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A NEW MANAGEMENT ALGORITHM FOR ESOPHAGEAL PERFORATION,

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BACKGROUND: Traditional surgical teaching mandates timely primary repair of esophageal perforations. Despite adequate repair, continued esophageal leakage occurs in about 30% of patients with a large proportion of patients requiring additional procedures. Recently, we have begun managing esophageal leaks using a removable Polyflex (Boston Scientific) esophageal stent.

METHODS: A retrospective review was undertaken of 14 patients who had endoscopically placed Polyflex stents for esophageal perforation from 2003 until 2005. 5 secondary and 9 primary esophageal repairs were documented and followed. All patients underwent placement of Polyflex esophageal stents rather than surgical repair.

RESULTS: Esophageal stent placement was successful in all patients. No patient required thoracotomy or laparotomy because of stent failure or migration. No patient required surgical repair of his or her esophageal leak following stent deployment. One patient required thoracoscopy for drainage of a previously undrained mediastinal collection. All patients were given and tolerated liquid diets following extubation (1 - 6 days). No contrast extravasation was seen on follow-up esophagrams.

CONCLUSIONS: Esophageal perforation is life threatening and requires rapid diagnosis and intervention. Using the Polyflex esophageal stent, a new algorithm has been described that obviates the need for surgery and minimizes extensive intervention with good short-term results.

DIAGNOSTIC LAPAROSCOPY FOR THE EVALUATION OF OCCULT DIAPHRAGMATIC INJURY FOLLOWING PENETRATING THORACOABDOMINAL TRAUMA,

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Objectives: Occult diaphragmatic injury following penetrating thoracoabdominal trauma can be difficult to diagnose. Radiographic findings are often non-specific or absent. Undetected injuries may remain clinically silent, only to present later with life-threatening complications associated with diaphragmatic herniation. Diagnostic laparoscopy allows for the evaluation of trauma patients lacking clinical indications for a formal celiotomy. The purpose of this study was to evaluate the incidence of occult diaphragmatic injury and investigate the role of laparoscopy in patients with penetrating thoracoabdominal trauma who lack indications for exploratory celiotomy except the potential for a diaphragmatic injury.

Methods: Hemodynamically stable patients with penetrating thoracoabdominal trauma treated at a Level 1 trauma center without indications for celiotomy were evaluated with diagnostic laparoscopy to determine the presence of a diaphragmatic injury.

Results: 108 patients were evaluated for penetrating thoracoabdominal injuries (80 stabs and 28 gunshots) over the study period. 22 (20%) diaphragmatic injuries were identified. These were associated with injuries to the spleen (5), stomach (3) and liver (2). There was a greater incidence of hemopneumothorax (HPTX) in patients with diaphragmatic injury (32%) compared to those without injury (20%). 29% of patients with a HPTX had a diaphragmatic injury. However, 18% of patients with a normal chest radiograph were also found to have a diaphragmatic injury.

Conclusions: The incidence of diaphragmatic injury associated with penetrating thoracoabdominal trauma is high. Clinical and radiographic findings can be unreliable at detecting occult diaphragmatic injury. Diagnostic laparoscopy provides a vital tool for detecting occult diaphragmatic injury among patients who have no other indications for formal celiotomy.

MARGINAL ULCERATION AFTER LAPAROSCOPIC GASTRIC BYPASS: AN ANALYSIS OF PREDISPOSING FACTORS IN 260 PATIENTS.

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Background: Marginal ulceration (MU) after Roux-en-Y gastric bypass (RYGB) is diagnosed in 1-16% of patients. The factors predisposing patients to MU are still unclear.

Methods: A total of 260 patients who underwent laparoscopic RYGB were retrospectively reviewed. Data regarding demographics, comorbidities, BMI, H. pylori infection, gastrojejunum (GJ) anastomotic leaks, post operative bleeding, operative time, type of suture material and marginal ulcer formation were collected. Fisher's exact test was used to statistically analyze discrete variables and the student's t-test was used for continuous variables. Statistical significance was set at alpha =0.05.

Results: The overall MU rate was 7%. The various factors hypothesized to affect MU following laparoscopic RYGB are detailed in Table 1. Demographic data (age, gender distribution, BMI) did not differ significantly between patients who developed MU and those who did not (p >0.05). Similarly technical factors (choice of permanent or absorbable suture for the GJ anastomosis, attending as primary surgeon, robotic GJ, operative time, and post-operative hematocrit drop) were not statistically different between the two groups (p >0.05). Finally, the prevalence of comorbidities (diabetes, hypertension, obstructive sleep apnea, musculoskeletal complaints, dislipidemia, GERD and PUD) did not differ significantly between the two groups (p >0.05). However, pre-operative H. pylori infection, that was adequately treated, was twice as common among the patients who developed MU compared to those who did not, 32% vs. 12% respectively (p = 0.02). All patients who developed MU had complete resolution of symptoms with PPIs and sucralfate. No reoperations were required for MU.

Conclusion: H. pylori may potentiate marginal ulcer formation. We hypothesize that H. pylori damages the mucosal barrier in a way that persists post operatively which may precipitate MU even when the organism was medically eradicated.

	No MU	MU	P		No MU	MU	P
Age	42	40	NS	PUD	3%	0%	NS
% Male	10%	11%	NS	H. pylori	12%	32%	0.02
BMI	44	45	NS	Permanent suture	53%	47%	NS
Diabetes	23%	16%	NS	Absorbable suture	47%	53%	NS
Hypertension	49%	37%	NS	Attending Primary	22%	11%	NS
Sleep Apnea	50%	37%	NS	Robotic	22%	5%	NS
Musculoskeletal	79%	74%	NS	OR time (min)	179	172	NS
Dyslipidemia	42%	37%	NS	Intraop Leak	8%	16%	NS
GERD	48%	53%	NS	Hct drop	7%	5%	NS

IS CONCOMITANT CHOLECYSTECTOMY NECESSARY IN OBESE PATIENTS UNDERGOING LAPAROSCOPIC GASTRIC BYPASS SURGERY?

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Routine cholecystectomy in patients undergoing laparoscopic gastric bypass is controversial. Morbid obesity is associated with a high prevalence of cholelithiasis and increased risk of cholelithiasis during rapid weight loss. Trans-oral access to the biliary tree is lost after gastric bypass. In the era of open bypass surgery cholecystectomy was performed routinely to avoid a second laparotomy. We performed a retrospective review of a prospectively maintained database of patients undergoing laparoscopic Roux-en-Y gastric bypass (LRYGB) from Feb 2000 to Aug 2006. 1696 LRYGBs were performed. All had a preoperative USS to detect gallbladder (GB) pathology. 42 (2.5%) had previous cholecystectomy and were excluded from further analysis. 205 (12%) had GB pathology; cholelithiasis in 199 (83%), sludge in 5 (4%), and a polyp in 1 (0.5%). Cholecystectomy was not indicated for sludge or polyp size <1cm. 123 patients (60%) had a concomitant cholecystectomy at LRYGB, while 82 patients (40%) did not. Of these 120 (97%) were completed laparoscopically with insertion of an additional 5mm operating port. Concomitant cholecystectomy added a mean operative time of 20 mins (range 15-25). One patient developed a bile leak



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from an accessory biliary radicle requiring diagnostic laparoscopic transgastric ERCP (LTG-ERCP). Of the 82 patients who did not have cholecystectomy 16 (19%) have required subsequent cholecystectomy presenting with biliary colic (n=8), acute cholecystitis (n=6), and choledocholithiasis (n=2). All procedures were completed laparoscopically. 1 patient required transcystic CBD exploration (TCCBDE) with stone retrieval. 89 patients (5.2%) without preoperative GB pathology developed symptomatic cholelithiasis after LRYGB. Of these, 69 (4%) had a cholecystectomy, of which 98.5% were completed laparoscopically. 3 patients presented with gallstone pancreatitis and 2 with obstructive jaundice. 3 required TCCBDE and 1 LTG-ERCP with stone retrieval. 20 patients (1%) did not have further surgery. Another patient who had a cholecystectomy in 1983 presented with choledocholithiasis requiring LTG-ERCP with stone retrieval. In our experience, concomitant cholecystectomy at LRYGB for GB pathology is safe, feasible, and avoids subjecting patients to a second surgical procedure.

DO RECURRENCES FOLLOWING PRAESOPHAGEAL HERNIA REPAIR MATTER? TEN YEAR FOLLOWUP AFTER LAPAROSCOPIC REPAIR., Brent C White MD, Louis O Jeanson MD, Craig B Morgenthal MD, Matthew D Shane MD, Vickie Swafford RN, Leena Khaitan MD, Edward Lin DO, C. Daniel Smith MD, Emory Endosurgery Unit, Emory University School of Medicine.

Introduction: Previous studies have demonstrated early hiatal hernia recurrence in as many as 30% of patients following laparoscopic paraesophageal hernia repair. The aim of this study was to determine if patients had recurrent symptoms or need for re-intervention at ten year followup.

Methods and Procedures: Consecutive laparoscopic paraesophageal cases performed between 1993 and 1996 were identified in a single-institution prospectively maintained database. Patients were questioned about the presence and severity of symptoms (heartburn, chest pain, regurgitation, dysphagia). Patients were also asked whether they had: 1) been diagnosed with hernia recurrence or 2) undergone repeat surgical intervention.

Results: Follow-up was obtained in 43 of 52 total patients (83%). Thirteen patients have died since initial surgery (mean age 79 at time of death). The mean length of follow-up was 11 years (range 10-13 years). The proportion of patients reporting moderate/severe symptoms was less at ten years than preop: heartburn 10% vs. 61% (p<0.001), chest pain 10% vs. 29% (p<0.05), regurgitation 7% vs. 53% (p=0.001), and dysphagia 3% vs. 29% (p=0.002). Three patients (7%) underwent repeat surgical intervention, all of which were due to symptomatic recurrences within the first year. Four more patients (9%) have since been diagnosed with asymptomatic hernia recurrences greater than seven years after surgery; none have required reoperation.

Conclusions: Despite previously reported early hiatal hernia recurrence rates of 30%, the majority of patients in this series were asymptomatic and few required further intervention ten years after surgery. These results suggest that late recurrence of a hiatal hernia is unlikely and usually of no clinical significance.

ROUTINE INTERNAL BILIARY DRAINAGE FOLLOWING LAPAROSCOPIC CHOLEDOCHOTOMY DOES NOT REDUCE THE RISK OF BILE LEAK, Craig J Taylor MD, Laurent Layani MD, Stephen White MD, Michael Ghusn MD, John Flynn Gold Coast Hospital, Tugun Queensland Australia

Introduction Bile leak following laparoscopic trans-choledochal bile duct exploration for choledocholithiasis is a feared complication with significant and sometimes lethal consequences. Temporary decompression of the biliary system by either external or internal drainage following choledochotomy is widely believed to reduce the risk and severity of post-operative bile leak. Placement of a trans-papillary stent within the bile duct prior to primary duct closure may achieve internal drainage, however the clinical value of this is unproven.

Methods A retrospective comparison of primary duct closure with and without a biliary stent following laparoscopic choledochotomy for choledocholithiasis was performed. Post-operative bile leak was defined as more than 30mls of bile drainage beyond the 3rd postoperative day, re-operation for biliary peritonitis, or radiological drainage of a biloma.

Results 160 consecutive laparoscopic bile duct explorations were performed for choledocholithiasis within a single institution between 2000 and 2005. Of these, 41 laparoscopic choledochotomies were closed primarily following complete clearance, either with (25 patients) or without (16 patients) an internal stent. The 2 groups were well matched for age, preoperative presentation, bile duct diameter, and number of cleared stones. Bile leak occurred in 2/25 cases (8%) in the stent group vs 2/16 cases (12%) in the no-stent group (p=0.64). One death occurred from bile leak in the stent group. Further endoscopic procedures (mostly for stent removal) were required in 100% vs 12% of patients in the stent vs no stent groups (p<0.05). Stent migration occurred in 2 patients (7%). The median length of hospital stay was the same in both groups (5 days).

Conclusion Routine use of biliary stents following choledochotomy does not reduce the risk of bile leak or length of hospital stay but introduces further sources of morbidity and extra procedures.

FEASIBILITY OF ENDOSCOPIC TRANSGASTRIC DISTAL PANCREATECTOMY (ETDP), Kai Matthes MD, Tony E Yusuf MD, Mari Mino-Kenudson MD, David W Rattner MD, William R Brugge MD, Gastrointestinal Unit, Department of Surgery, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

BACKGROUND: Benign pancreatic tumors including cystadenomas and neuroendocrine tumors are often managed with surgical partial pancreatectomy. The aim was to develop an endoscopic minimally-invasive resection technique for removal of localized pancreatic tissue.

METHODS: Using an endoscopic transgastric approach, resection of the pancreatic tail was performed in six pigs. All animals were sacrificed after completion of the procedure. The endpoints of this study were technical feasibility and occurrence of complications such as bleeding or perforation.

RESULTS: Six Yorkshire breed pigs underwent endoscopy with a double-channel gastroscope. The procedure took on average 77.3 (SD 18.9) minutes. A mean gastric incision of 15.7 (SD 2.0) mm was performed with a needle knife to gain access to the peritoneal cavity. An Endoloop was placed on the distal part of the pancreas. The pancreatic tail was transected (< 3 minutes) using a 27 mm monopolar electrocautery snare with cutting current (see figure). 1-3 hemoclips were placed on the pancreatic stump. 3-4 hemoclips were used to close the stomach incision. The average max. diameter of the pancreatic specimens was 23.3 mm. A second resection was performed in 2 animals (max. diameter 18.7 mm), and a third resection in 1 animal (max. diameter 8.0 mm). There was one complication, an episode of bleeding from a splenic laceration resulting in the loss of 250cc of blood.

CONCLUSIONS: For the first time, we demonstrated the technical feasibility of endoscopic transgastric distal pancreatectomy (ETDP). This technique could be considered as a minimally invasive alternative to surgical resection in patients with pancreatic tail tumors.

PELV-SIM; A NOVEL PELVIC TRAINER DESIGNED TO IMPROVE GYNECOLOGIC LAPAROSCOPIC SUTURING SKILLS, Deborah Arden MD, Young Bae Kim MD, Daniel B Jones PhD, Christopher S Awtrey MD, Beth Israel Deaconess Medical Center

Training physicians in advanced laparoscopic techniques such as suturing in the live operating room setting is challenging. Many pelvic trainers have been designed to assist physicians develop a basic laparoscopic skill set that can prepare them for the operating room. Many trainers currently focus on abstract tasks and do not attempt to simulate



actual surgical scenarios. The objective of this pelvic trainer is to simulate actual gynecologic surgical tasks requiring suturing skills. The Pelv-sim laparoscopic pelvic suturing trainer is a box model which can be used with a laparoscope and video tower, or by itself. The trainer includes four exercises to teach variations of laparoscopic suturing skills. 1) ligation of an infundibulopelvic ligament, 2) closure of a port-site fascial incision, 3) closure of an open vaginal cuff and 4) transposing an ovary to the pelvic sidewall. We are currently undertaking an IRB approved prospective randomized trial of our model among our resident staff. Initial data gathered demonstrate construct validity.



The Pelv-sim laparoscopic pelvic suturing trainer is a simple and inexpensive device to simulate gynecologic surgical tasks that require suturing skills. We believe that the Pelv-sim trainer will significantly aide gynecologic surgeons develop proficiency in advanced gynecologic suturing skills.

LAPAROSCOPIC COLECTOMY FOR "BENIGN" COLORECTAL NEOPLASIA: A WORD OF CAUTION, Marc Brozovich

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Purpose : Endoscopically unresectable "benign" colorectal polyps are considered by some surgeons as ideal cases for their early laparoscopic colectomy experience. Our hypotheses were: (1) a substantial fraction of patients undergoing laparoscopic colectomy for "benign" colorectal neoplasia will have adenocarcinoma on final pathology; and, (2) in our practice, we perform an adequate laparoscopic oncologic resection for "benign" polyps as evidenced by margin status and nodal retrieval.

Methods: Data from a consecutive series of patients undergoing laparoscopic colectomy (on an intention to treat basis) for endoscopically unresectable neoplasms with benign preoperative biopsy histology were retrieved from a prospective database and supplemented by chart review. **Results:** The study population consisted of 63 patients (mean age 67, mean BMI 29). 2/63 cases (3%) were converted to laparotomy because of extensive adhesions (n=1) and equipment failure (n=1). Colectomy type: right/transverse (n=49, 78%); left/anterior resection (n=10, 16%); subtotal (n=4, 6%).

Invasive adenocarcinoma was found on histologic analysis of the colectomy specimen in 14/63 (22%), standard error of the proportion 0.052. Staging of the 14 cancers: I (n=6, 43%); II (n=3, 21%); III (4, 29%); IV (1, 7%). Median nodal harvest was 12 (range 5-21) and all resection margins were free of neoplasm.

By univariate analysis, neither dysplasia on endoscopic biopsy nor lesion diameter was predictive of adenocarcino-

ma, although sample size may be too small to adequately assess these variables. 8/23 (35%) patients with dysplasia on endoscopic biopsy had adenocarcinoma on final pathology vs. 6/40(15%) with no dysplasia (p=0.114, Fisher's exact test). Mean diameter of benign tumors was 3.2cm (range 0.5-10.0cm) vs. 3.9cm (range 1.5-7.5cm) for adenocarcinomas (p=0.189, t-test).

Conclusions: A substantial fraction of endoscopically unresectable colorectal neoplasms with benign histology on initial biopsy will harbor invasive adenocarcinoma, some of advanced stage. This finding supports the practice of performing oncologic resection for all patients with endoscopically unresectable neoplasms of the colorectum. The inexperienced laparoscopic colectomist should approach these cases with caution.

HAND-ASSISTED LAPAROSCOPIC RIGHT HEMICOLECTOMY OFFERS ADVANTAGES OVER OPEN RIGHT HEMICOLECTOMY AND STANDARD LAPAROSCOPIC HEMICOLECTOMY IN PATIENTS WITH COLONIC NEOPLASIA, Jason A Petrofski MD, Zachary Hollis BA, Christopher R Mantyh MD, Sandyha Lagoo MD, Kirk A Ludwig MD, Duke University Medical Center

Introduction: Randomized trials demonstrate that laparoscopic assisted colectomy for neoplasia offers short-term advantages over open colectomy while providing equivalent oncologic outcomes. However, operative times are significantly longer and adoption of laparoscopic techniques for colectomy have been hampered by a long learning curve. Hand-assisted laparoscopic colectomy is an alternative approach that may address these issues. This study compares the outcomes of patients with right sided colonic neoplasia undergoing hand-assisted laparoscopic right hemicolectomy (HAL) to those undergoing standard laparoscopic right hemicolectomy (LRC) and standard open right hemicolectomy (ORC).

Methods: A retrospective analysis was performed of 120 consecutive patients undergoing HAL (n=40), LRC (n=40), and ORC (n=40) for right-sided colonic neoplasia utilizing electronic chart review and a prospectively-maintained anesthesia database. Groups were compared by analysis of variance (ANOVA) and chi-square tests, where appropriate. **Results:** The groups were well matched for age, BMI, previous laparotomies, and co-morbidities. Specimen review showed no between group differences in oncologic parameters (margin status and number of lymph nodes harvested). However, operative times were significantly lower in the HAL and ORC groups (108.4 ± 31.7 and 97.2 ± 37.8) compared to the LRC group (143.6 ± 41.8; p<0.05). In addition, there were no conversions to laparotomy in the HAL group (n=0) compared to four in the LRC group. There were fewer post-operative complications in the HAL and LRC groups (11% & 13%) compared to the ORC group (40%; p<0.05), and length of stay (LOS) in days was less in the HAL and LRC groups (4.7 ± 1.9; 5.1 ± 2.3) when compared to the ORC group (8.2; p<0.05).

Conclusion: Both LRC and HAL for neoplasia were associated with a lower complication rate and shorter length of stay than open right colectomy, while maintaining equivalent oncologic clearance as measured by margin length and lymph node harvest. The hand-assisted technique had advantages over the standard laparoscopic technique, however, with a lower conversion rate and shorter operative time and than standard laparoscopic resection, but with a similar LOS.

**S001**

LONG TERM OUTCOMES FOR LAPAROSCOPIC VERSUS OPEN RESECTION OF NON METASTATIC COLORECTAL CANCER, Muhammad S. Mirza, Rob J Longman, Feroz Farrokhhyar, Jonathon P Sheffield, Robin H Kennedy, Yeovil District Hospital, Yeovil, Somerset UK; McMaster University, Hamilton, Canada

Background: Scepticism prevails over the role of minimally invasive surgery in the treatment of colorectal cancer. Long term data on the safety and efficacy of this technique remain scarce. A non-randomised, prospective comparison of laparoscopic colorectal cancer surgery (LS) with open surgery (OS) has been undertaken to evaluate long term survival.

Methods: 233 patients with non-metastatic colorectal cancer underwent either laparoscopic (n= 116) or open (n=117), potentially curative resection. Almost all patients between July 1996 and December 2002 were randomised within two consecutive trials, however prior to this a significant proportion of patients received open surgery. The primary end points were overall survival, disease free survival and cumulative disease recurrence. Analysis was by intention to treat.

Results: Median follow up was 40 months for LS group and 58 months for OS. No statistically significant difference was found between LS and OS groups regarding overall survival (p=0.603 colon cancer, p=0.841 rectal cancer), disease-free survival (p=0.684 colon cancer, p=0.625 rectal cancer) and overall recurrence (p=0.383 colon cancer, p=0.166 rectal cancer). Cumulative recurrence rate in colon cancer favours OS (p=0.018). In rectal cancer this did not differ between the two treatment modalities (p=0.965). Tumour resection margins and lymph node harvest were similar in the two surgery groups. Perioperative mortality in LS was also no different from OS (p= 0.644 30-day mortality, p= 0.692 in hospital mortality).

Conclusion: Long term survival data supports laparoscopic surgery as a safe and effective alternative to conventional surgery for treating potentially curative colorectal cancer. However the higher cumulative recurrence associated with laparoscopic surgery in the colonic cancer group needs further research into its underlying cause.

S002

COMPLETELY TRANSVAGINAL CHOLECYSTECTOMY USING MAGNETICALLY ANCHORED INSTRUMENTS, Daniel J. Scott MD, Shou Jiang Tang MD, Raul Fernandez PhD, Richard Bergs MS, Mouza T Goova MD, Ilia Zeltser MD, Jeffrey A Cadeddu MD, University of Texas Southwestern Medical Center, Dallas, Texas. Automation and Robotics Research Institute, University of Texas, Arlington, Texas.

Introduction: Natural Orifice Transluminal Endoscopic Surgery (NOTES) is an evolving field and suitable instruments are lacking. The purpose of this study was to perform transvaginal cholecystectomies using instruments incorporated into a Magnetic Anchoring and Guidance System (MAGS).

Methods: Non-survival procedures were conducted in pigs (n=3, 32-57kg). Through a vaginotomy created under direct vision, a rigid access port (20mm inner diameter, 30-50cm long) with integrated instrument tethers (electric, mechanical, and pneumatic power supplies) was inserted into the peritoneal cavity and used to maintain a CO2 pneumoperitoneum. MAGS instruments were deployed through the port and held in place on the peritoneal surface using magnetic coupling via an external handheld magnet which was optionally exchanged for an 18ga percutaneous threaded needle anchor; instruments included a tissue retractor (a clip-fixed magnet or flexible graspers) and a cautery dissector. A gastroscope was used for visualization.

Results: The first 2 procedures ended prematurely due to instrumentation shortcomings and inadvertent magnetic coupling between instruments; 1 case required a laparoscopic rescue. New instrumentation was developed: 1) a longer access port (50cm) which provided easier deployment of instruments and suitable reach in a smaller animal

(32kg), 2) a more robust cauterizer with improved anchoring strength, a longer, more rigid, pneumatically deployed tip with a forward cam and a rearward positioned anchor with better reach and sufficient torque to allow blunt dissection, and 3) a more versatile tissue retractor with bidirectional dual flexible graspers maneuvered with a magnetic anchor and then rigidly fixated with a needle anchor which provided excellent cephalad fundus retraction and inferiolateral infundibulum retraction. With these modifications, 100% of the cholecystectomy was completed in the 3rd animal using only a NOTES/MAGS approach. The cystic duct and artery were clipped with EGD clips and the gallbladder was removed using a Roth net. While deployment was successful, retrieval of the tissue retractor was difficult and resulted in a rectal injury.

Conclusions: While still under development with more refinements needed, completely transvaginal cholecystectomy using MAGS instruments seems feasible. By offering triangulation and rigidity, MAGS may facilitate a NOTES approach while alleviating shortcomings of a flexible platform.

S003

SAFETY, FEASIBILITY AND WEIGHT LOSS AFTER TRANSORAL GASTROPLASTY (TOGA): FIRST HUMAN MULTICENTER STUDY, J Deviere MD, G Ojeda Valdes MD, L Cuevas Herrera MD, J Clouet MD, O Le Moine MD, P Eisendrath MD, C Moreno MD, S Dugardeyn MD, M Barea MD, S Scott MD, R de la Torre MD, S Edmundowicz MD,

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OBJECTIVE: To evaluate the safety and feasibility in human subjects of a new transoral restrictive procedure for treatment of obesity.

METHODS: The protocol was approved by the IRBs of both centers, and all patients underwent informed consent. Patients met established inclusion criteria for bariatric surgery. The TOGa System (Satiety Inc, Palo Alto, CA), a set of transoral endoscopically-guided staplers, was used to create a stapled restrictive pouch along the lesser curve of the stomach, similar to other restrictive pouches. Patients were hospitalized overnight for observation and underwent barium UGI the next morning. Post procedure, all patients were placed on a liquid diet for one month and asked to begin an exercise program. Follow-up was completed at 1 week and 1, 3 and 6 months.

RESULTS: Twenty one patients were enrolled (17 female, age 43 (22-57), BMI 43.3 (35-53)). Device introduction was completed safely in all patients. There were no complications or serious AEs. Procedure-related AEs were self-limited and all resolved within 5 days (nausea, vomiting, pain, dysphagia, pharyngitis), with the exception of one case of mild temporomandibular dysfunction that lasted 7 days, and one case of persistent post-prandial fullness. At most recent endoscopy (3 or 6 mos), all patients had persistent full or partial stapled sleeves. Patients lost an average 17.5 pounds at 1 month and 24.7 pounds at three months post-treatment (EWL of 14.9% and 20.5%, respectively). At six months, average weight loss was 31.1 pounds and EWL was 24.9% for patients followed-up to date (n=6).

CONCLUSIONS: There is great interest in new procedures for morbid obesity that offer lower morbidity than current options. Early experience with the TOGa procedure indicates that this transoral approach may be safe and feasible. Further experience with the device and technique should improve anatomic and functional outcomes in the future. Additional studies are underway.

S004

POSTOPERATIVE ESOPHAGEAL PHYSIOLOGY STUDIES MAY HELP TO PREDICT LONG TERM SYMPTOMS FOLLOWING LAPAROSCOPIC NISSEN FUNDOPPLICATION, A P Boddy BA, S Mehta BA, J Bennett BA, D Mahon MD, M Rhodes MD, Dept of Surgery, Norfolk and Norwich University Hospital,



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Background: Laparoscopic Nissen fundoplication is an established treatment for gastroesophageal reflux disease (GERD). Postoperative improvement in esophageal physiology can be indicative of successful surgery, but the degree to which it correlates with symptom control remains questionable. We have performed this study to assess the utility of postoperative esophageal physiology studies in predicting long term symptomatic outcome.

Methods: Between August 1997 and August 2003 145 patients with symptomatic GERD underwent laparoscopic Nissen fundoplication as part of a randomised trial (91 were initially randomised to surgery and 54 crossed over at a later date). Four months after surgery patients were invited to have postoperative esophageal physiology studies. In November 2005 a postal questionnaire was sent to all patients in order to assess reflux symptomatology (Demeester symptom score).

Results: Completed symptom questionnaires were returned by 108 patients (74%) at a median time of 5.7 years postoperatively. Of these patients, 78 (72%) had undergone postoperative esophageal physiology studies. Linear regression of postoperative manometry data showed a significant correlation between difference in neosphincter above or below 17 mmHg (the median pressure) and scores for heartburn (p=0.03), dysphagia (p=0.02), regurgitation (p=0.01) and total symptom score (p=0.002). Linear regression models did not reveal a statistically significant correlation between results of esophageal pH studies and scores of heartburn, but when patients were divided into quartiles dependent on their physiology study results, analysis of variance did reveal a significant effect (p=0.04).

Conclusion: Postoperative physiology studies, particularly manometry, may be predictive of long term symptoms following laparoscopic Nissen fundoplication.

S005

IMPEDANCE PREDICTS RESPONSE TO NISSEN FUNDOPLICATION IN PATIENTS WITH POOR RESPONSE OF HEARTBURN TO PPIs, Brant K Oelschlagel MD, Valeria Martin MD, Federico Cuenca-Abente MD, Carlos A Pellegrini MD, The University of Washington

Patients with GERD whose heartburn (HB) responds poorly to proton pump inhibitors (PPIs) are considered poor candidates for Nissen fundoplication (NF). HB can be due to persistent acid or non-acid (pH>4) reflux, both of which can be detected by pH/Impedance monitoring (PH-IMP). We performed a prospective trial to determine the utility of PH-IMP in predicting which patients are good candidates for NF.

Methods: All patients (n=240) evaluated for NF in a 24 month period (2004-05) were evaluated on and off therapy in which HB was graded with a 10 point symptom severity score (SSS). Only patients with poor initial response of HB to bid PPIs (SSS on meds > 5, and a difference in SSS [off meds - on meds] < 4) were invited to participate (n=20), and 8 patients enrolled. Each had standard pH monitoring off meds, PH-IMP on bid PPIs, and NF followed 6 months later with a SSS and PH-IMP. Reflux episodes detected by impedance were divided into acid (pH<4) and nonacid (pH>4). We defined normal reflux as a DeMeester score <14.7 (pH) and less than 50 episodes of reflux detected with impedance (IMP).

Results:

	HB SSS	DeMeester Score	# Reflux Episodes (nonacid) - IMP	# Abnormal studies - IMP
Pre-op off PPIs	8.8 + 1.2	38.3 + 23.5	N/A	N/A
Pre-op On PPIs	5.8 + 1.3*	19.2 + 16.6	74 (46)	7 (88%)
Post-op off PPIs	1.3 + 2.2*†	2.5 + 2.9*	5 (2)†	0†

* Significant difference compare to Pre-op off meds (p<0.05)
† Significant difference compare to Pre-op on meds (p<0.05)

Six patients experienced complete, and 1 near complete (SSS 10 to 3), resolution of HB after NF. Of these 7, 5 had abnormal PH and all had abnormal IMP. The other patient had minimal improvement of HB (SSS 9 to 6). This patient had normal IMP and PH on PPIs before NF.

Conclusions: Patients with GERD whose HB does not respond to PPIs AND have abnormal PH/IMP on PPIs respond well to NF. The addition of impedance to pH monitoring may predict which patients who don't respond to PPIs will respond to NF.

S006

WHO WILL FAIL LAPAROSCOPIC NISSEN FUNDOPLICATION? PREOPERATIVE PREDICTION OF LONG TERM OUTCOMES, Craig B Morgenthal MD, Matthew D Shane MD, Edward Lin DO, C. Daniel Smith MD, Emory Endosurgery Unit, Emory University School of Medicine, Atlanta, Georgia, USA

INTRODUCTION: A small but significant percentage of patients are considered failures after laparoscopic Nissen fundoplication (LNF). We sought to identify preoperative predictors of failure in a cohort of patients who underwent LNF more than 10 years ago.

METHODS: Of 312 consecutive patients undergoing primary LNF between 1992 and 1995, recent follow-up was obtained from 166 patients at a mean of 11.0 ± 1.2 years. Eight patients known to have undergone reoperation were lost to follow-up but are included in this analysis. Failure is broadly defined as any reoperation, lack of satisfaction, or any severe symptoms at follow-up. Potential preop predictors evaluated included sex, age, absolute weight, BMI, response to acid reducing medications (ARM), psychiatric history, prior abdominal surgery, typical versus atypical symptoms, hiatal hernia, Barrett's esophagus, benign stricture, dilatation, manometry, and esophageal pH. Potential preop predictors underwent univariate analysis using logistic regression for continuous variables and Chi-square for categorical variables.

RESULTS: Of 174 known outcomes, 131 were classified as successful (75.3%), while 43 were failures (24.7%): 26 reoperations, 13 unsatisfied, and 13 with severe symptoms. Response and lack of response to ARM were associated with 77.1% and 56.0% success rates respectively (P = 0.035, odds ratio 2.6). Eighty four percent of patients with typical symptoms were categorized as successful, compared to only 41% with atypical symptoms (P < 0.001, odds ratio 7.8). Variables that did not achieve statistical significance include preop BMI (p = 0.60), psychiatric history (p = 0.06), and size of hiatal hernia (p = 0.55).

CONCLUSION: In a cohort with eleven years follow-up after LNF, factors predictive of successful long term outcome include preoperative response to ARM and typical symptoms. Patients with atypical symptoms or lack of response to ARM should be informed of their higher risk of failure.

S007

MEASURES OF HEALTH RELATED QUALITY OF LIFE FOR ACHALASIA, Julie L Harnish MSc, David R Urbach MD, Gail E Darling MD, Nicholas E Diamant MD, Paul P Kortan MD, George A Tomlinson PhD, Wayne Deitel MD, Audrey Laporte PhD, University Health Network, St. Michael's Hospital, University of Toronto, Toronto, ON Canada

Introduction: Various instruments may be used to measure health-related quality of life in patients with achalasia.

Methods: We administered 4 patient-centered measures used for evaluation of achalasia severity (an Achalasia Severity Questionnaire we developed previously, an Achalasia Symptom Checklist, the Gastrointestinal Quality of Life Index [GIQLI] and the MOS 36-item Short Form Survey [SF-36]) to 17 subjects enrolled in a randomized controlled trial comparing pneumatic dilatation and laparoscopic Heller myotomy. The instruments were administered after randomization, and prior to treatment. We estimated correlations between the different measures.

Results: 17 patients (9 male, 8 female) were studied, 8 of whom were assigned to pneumatic dilatation and 9 of whom were assigned to laparoscopic myotomy. The average age of patients was 46 (range 25-69, SD 14). Baseline scores demonstrated a substantial burden of impairment. The mean (standard deviation [SD]) score on the Achalasia Severity Measure (which ranges from 0 [best] to 100



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[worst]) was 63.9 (13.7). The mean (SD) Symptom Checklist score (ranges from 0 [best] to 36 [worst]) was 24.1 (6.4). The mean (SD) GIQLI (ranges from 0 [worst] to 144 [best]) was 72.17 (17.9). The SF-36 mean (SD) score (ranges from 0 [worst] to 100 [best]) was 49.7 (21.9). The Achalasia Severity Measure correlated highly with the GIQLI ($r=-.61$, $p=.01$), and the Symptom Checklist ($r=.66$, $p=.004$), but not with the SF-36 ($r=-.236$, $p=.36$), which is a generic health related quality of life measure.

Conclusion: Among subjects recruited to a randomized controlled trial of achalasia treatment, there was impairment in both generic and disease-specific quality of life. Scores on disease specific measures correlated with each other, but not with measures of generic quality of life.

S008

LAPAROSCOPIC HELLER MYOTOMY FOR ACHALASIA:

RESULTS AFTER TEN-YEARS, Alexander Rosemurgy MD, Sarah M Cowgill MD, Sharona Ross MD, Desiree Villadolid MPH, Robert Boyle, Sam Al-Saadi MD, Michael Albrink MD, University of South Florida, College of Medicine

Introduction: Laparoscopic Heller myotomy was first undertaken in the early 1990's and appreciable numbers of patients with ten-year follow-up are now available. This study was undertaken to determine long-term outcomes after laparoscopic Heller myotomy to treat achalasia.

Methods: 337 patients have undergone laparoscopic Heller myotomy since 1992; 47 patients, 55% male, of mean age 49 years (range 18 to 85 years) underwent myotomy more than 10 years ago and have been followed through a prospectively maintained registry. Among many symptoms, patients scored dysphagia, chest pain, vomiting, regurgitation, choking, and heartburn, before and after myotomy using a Likert scale, ranging from 0 (never/not bothersome) to 10 (always/very bothersome). Symptom scores before vs. after myotomy were analyzed using a Wilcoxon matched-pairs test. Data is reported as median, mean \pm SD.

Results: Length of stay was 2 days, 3 ± 8.6 days (range 1 to 60 days). Notable complications were infrequent after myotomy (1 acute renal failure, 1 enterotomy). There were no perioperative deaths. 1 patient required a "redo" myotomy after 5 years because of recurrence of symptoms. 33 (70%) patients are still alive: causes of death after discharge were unrelated to myotomy and included pneumonia, congested heart failure, and myocardial infarction. The frequency and severity scores of dysphagia, chest pain, vomiting, regurgitation, choking, and heartburn all decreased significantly after laparoscopic Heller myotomy ($p<0.0001$ for all). For example, severity of dysphagia decreased from 10, 9 ± 1.2 before myotomy to 1, 2 ± 2.6 ($p<0.0001$) ten years after myotomy.

Conclusions: Laparoscopic Heller myotomy can be undertaken with few complications. Laparoscopic Heller myotomy significantly decreases the frequency and severity symptoms of achalasia without promoting heartburn. Symptoms of achalasia are durably ameliorated by laparoscopic Heller myotomy with long-term follow-up, thereby promoting application of laparoscopic Heller myotomy.

S009

ESOPHAGEAL ACID CLEARANCE PHYSIOLOGY IS ALTERED

AFTER NISSEN-COLLIS GASTROPLASTY, Alfonso Torquati MD, Yassar Youssef MD, Rami Lutfi MD, Joan Kaiser MSc, William Richards MD, Vanderbilt University

Nissen-Collis Gastroplasty (NCG) is an effective treatment for short esophagus but sometime is associated with abnormal postoperative esophageal acid exposure. Our study was designed to test the hypothesis that NCG prevents gastric reflux and the pathologic distal esophagus acid exposure is due to prolonged acid clearance in the neoesophagus.

Methods: The IRB approved study supported by a SAGES research grant was conducted at Vanderbilt University. The study enrolled 11 normal subjects, 10 patients s/p Nissen fundoplication and 9 patients s/p NCG. All the participants were age and gender matched. All subjects were studied via manometry, acid clearance test and 24-h pH study. The clearance test was performed according to Helm (NJEM,

1984). A 15 ml bolus of 0.1 N HCl (pH 1.2) was rapidly infused (x4) 15 cm proximal to the LES, followed by dry swallows every 30 seconds, until esophageal pH rose above 4.

Results: All the subjects had normal esophageal peristalsis and distal amplitudes. As shown in Figure 1, the acid clearance time was significantly higher in NCG ($P=0.001$ vs Nissen and Normals).

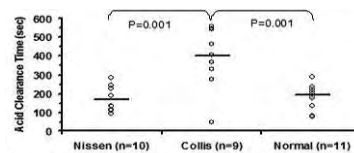


Figure 1. Esophageal chemical clearance time after infusion of 15 ml acid bolus.

Pathologic esophageal acid exposure occurred in 1 of 10 Nissen patients (10%) and in 2 of 9 patients (22%) after NCG ($P=NS$). Median distal esophageal acid exposure time was similar in the 2 groups (NCG= 2.5%, Nissen=1.2%, $P=NS$). In the NCG group, symptomatic reflux episodes were more common ($P=0.05$) and were significantly associated with longer acid clearance time ($P=0.001$)

Conclusion: NCG is a good barrier against acid gastric reflux but increases the prevalence of symptomatic reflux episodes secondary to delayed esophageal acid clearance.

S010

RANDOMIZED CLINICAL TRIAL OF LAPAROSCOPIC HIATOPLASTY WITH TOTAL FUNDOPLICATION AND GASTRIC FUNDUS MOBILIZATION WITH OR WITHOUT ROUTINE DIVISION OF SHORT GASTRIC VESSELS,

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Introduction: Gastric fundus mobilization may play an important role in the outcome after total fundoplication. Routine division of short gastric vessels (SGV) is still a controversial issue, even in laparoscopic era.

Aim: Evaluate short and long term results after fundoplication procedure, concerning the division of SGV.

Methods: A prospective randomization of 90 patients with indication for hiatoplasty and total fundoplication was performed. They were divided into two groups: no SGV division (Group A, n= 46) and with SGV division (Group B, n=44). Early outcome, clinical follow up and a 5-year routine endoscopic evaluation were analyzed.

Results: Both groups were similar regarding preoperative parameters and severity of gastroesophageal reflux disease (GERD). No difference in morbidity was observed during hospital stay. Nevertheless, the median operating time was 80,2 minutes in Group A and 94,1 minutes ($p=0,0045$) in Group B. Transitory dysphagia during the first year was significantly lower in Group B (56,5% versus 29,5%, $p=0,012$). However, long term clinical outcome was similar in both groups (clinical symptoms of GERD, persistent dysphagia and reoperations). The 5-year endoscopic follow-up evaluation revealed that anatomic failure of fundoplication was significantly higher in Group B (with division SGV) when compared to Group A (28,5% and 9,1%, $p=0,027$).

Conclusion: Mobilization of gastric fundus without routine division SGV is an alternative for routine division, in total fundoplication procedure, and related with less anatomic failure on long follow-up.

S011

COMPLEX LAPAROSCOPIC SURGERY IN PATIENTS WITH END-STAGE LUNG DISEASE,

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Background: Severe lung disease is considered by most to be a contraindication to laparoscopic surgery, partly due to concerns over impaired gas exchange, hypercarbia and CO2



pneumo-peritoneum. We evaluated the respiratory performance during the operative and immediate postoperative period in patients with end stage lung disease undergoing laparoscopic fundoplication.

Methods and Procedures: We performed 566 consecutive elective laparoscopic anti-reflux procedures between January of 1999, and August of 2006 for patients with documented GERD. Of these, 24 had end stage lung disease sufficient to meet UNOS listing criteria for lung transplantation at the time of their laparoscopy. A retrospective chart review was performed to examine all perioperative and postoperative respiratory events including operative time, arterial blood gas (ABG) determination and need for prolonged intubation.

Results: The average time from induction to extubation was 220 minutes (range 158-390 minutes) with an average operative time of 179 minutes (range 110-354 minutes). All 24 patients were extubated, at the completion of surgery and remained extubated for the duration of their hospitalization. None of the patients required admission to the ICU.

Fourteen of 24 (58%) patients had ABG during surgery with a mean PCO₂ of 49.4 mmHg (range 32-82 mmHg). The average PCO₂ for 18 of the patients (75%) who had ABG during the immediate postoperative period was 48.3 mmHg, and at 24hour it was 48.6 mmHg.

Conclusion: In the setting of a tertiary academic center with thoracic anesthesia and surgical expertise it is possible to safely perform laparoscopic surgery in patients with advanced lung disease. In this setting, hypercarbia proved not to be a significant outcome of laparoscopic surgery. Intra-operative patient management including: adequate pain control with thoracic epidural, careful attention and fine tuning of ventilation parameters and the combination of an experienced thoracic anesthesiologist and advanced laparoscopic surgeon can allow the safe management of patients with end stage lung disease.

S012

ENDOSCOPIC & SYMPTOMATIC ASSESSMENT OF ANASTOMOTIC STRICTURES FOLLOWING ESOPHAGECTOMY & CERVICAL ESOPHAGOGASTROSTOMY: INCIDENCE & PRESENTATION, Valerie A Williams MD, Thomas J Watson MD, Svetlana Zhovtis BA, Fernando Herbella MD, Oliver Gellersen MD, Daniel Raymond MD, Carolyn Jones MD, Jeffrey H Peters MD, University of Rochester, Rochester, NY.

Benign anastomotic strictures following esophagectomy and cervical esophagogastric anastomosis are common, and predisposing factors for their development are unclear. The purpose of this study was to evaluate the incidence and characteristics of cervical anastomotic strictures following esophagectomy.

METHODS: The study population consisted of 41 patients undergoing esophagectomy with gastric interposition and cervical anastomosis. Patients were followed prospectively and any complaint of post-operative dysphagia was investigated with upper endoscopy. Strictures were assigned to balloon or bougie dilation as part of a prospective randomized trial. Post-operative dysphagia was assigned a standardized severity score and stricture diameter pre-dilation was classified as minimal (>12mm), mild (9-12mm), moderate (5-8mm), or severe (<5mm). Outcome measures included the incidence and severity of symptomatic anastomotic strictures, time to first dilation, and influence of anastomotic technique on stricture occurrence.

RESULTS: Twenty-five of the 41 (60.9%) patients underwent endoscopy and dilation. Median time to presentation was 2.4 mos (min 27d, max 11mos). Most patients (65%) with stricture complained of dysphagia with every meal. The majority (92%) of strictures were mild to moderate (5-12mm) and there was no correlation between dysphagia frequency and stricture size. Tolerance of an unrestricted diet decreased with increasing stricture severity. A total of 75 dilations were performed without complication. There was a trend towards a higher stricture rate following hand-sewn anastomoses as compared to combined stapled and hand-sewn anastomoses (78.6% v 51.8%, p=0.091).

CONCLUSIONS: The development benign anastomotic strictures following esophagectomy with cervical esophagogastric anastomosis is common. Most patients will present with stricture within the first few months following surgery. Both endoscopic balloon and bougie dilation of these strictures is safe. A combined hand-sewn and stapled anastomosis may decrease the risk of stricture formation. Interventions to decrease stricture development such as post-operative proton-pump inhibitor therapy should be evaluated.

S013

MINIMALLY INVASIVE VIDEO-ASSISTED THYROIDECTOMY AND CONVENTIONAL THYROIDECTOMY: A PROSPECTIVE RANDOMIZED STUDY, Istvan Gal PhD, Zoltan Szabo PhD, A Balint MD, Gy Bolgar MD, Department of Surgery Bugat Pal Univ Hosp, Gyöngyös Hungary, MOET Institute San Francisco, CA USA

Since the first description of technique of minimally invasive totally gasless video-assisted thyroidectomy in 1998, only a few prospective randomized study evaluated advantages of this minimally invasive procedure.

Thirty patients undergoing surgery for either thyroid nodule or diffuse thyroid disease with hyperthyroidism were allotted to one of these procedures, minimally invasive video-assisted thyroidectomy (MIVAT) or conventional thyroidectomy (CT). Exclusion criteria were nodules greater than 35mm, thyroid lobe volume greater than 20ml, presence of thyroiditis and presence of previous neck irradiation or surgery. Operative time, postoperative complications and cosmetic results were evaluated.

MIVAT group included 15 patients and the CT group 15 patients. No significant differences were noted between the two groups in terms of age, sex and indication for operation. Operative time was 68.53±18 minutes for MIVAT and 43.3±14 minutes for CT (p value less than 0.05). No postoperative complications were detected in each group. Cosmetic results evaluated by verbal response scale and numeric scale were for MIVAT 3.7±0.2, 7.9±1.2 and for CT 2.3±0.7, 4.9±1.3 respectively. The difference was significant in favour for MIVAT (p value less than 0.05 and 0.05 respectively).

Conclusion: Although the conventional thyroidectomy has less operative time, the minimally invasive video-assisted thyroidectomy offers advantages to selected patients in terms of very good or excellent cosmetic results while the postoperative complications are comparable.

S014

VIDEOENDOSCOPIC NECK SURGERY- AN EXPERIENCE OF 43 CASES, Pradeep Chowbey MS, Chairman - Minimal Access & Bariatric Surgery Centre, Sir Ganga Ram Hospital, New Delhi (India)

Minimal access surgery has expanded in technical expertise, instrumentation and surgical stature since its inception over a decade ago. Its application beyond preformed cavities has also taken firm roots as experience with retroperitoneal and groin hernia surgery have met with tremendous success. The neck is another region where well defined tissue planes, with minimal vascular interference provide an ideal site for performing surgery by this technique. Benign thyroid nodules and parathyroid adenomas are the commonest indications for endoscopic neck exploration. Other indications include carotid body tumor, cervical discectomies and tuberculosis of cervical spine. The pretracheal space deep to the strap muscles forms the working space. The tracheal rings mark the midline and the carotid sheath defines the lateral limit of dissection. Since Jan'99 we have attempted a minimal access approach in 43 patients (25 patients with thyroid nodules and 18 patients with parathyroid pathologies). In 40 patients the approach involved CO₂ insufflation and in 3 patients (all parathyroid adenomas) a Micolli's approach was adopted. One patient required conversion to a conventional neck exploration due to non-identification of the parathyroid adenoma. In another patient a completion thyroidectomy was performed conventionally when histopathology showed a concomitant multicentric papil-



lary carcinoma. Basic surgical principles remained the same as for conventional surgery. Identification of anatomical structures was better due to magnification. Dissection was performed with both monopolar cautery and harmonic scalpel. External palpation helped in dissection and to control bleeding. Disadvantages included early fogging and inability to use suction due to loss of working space. This was overcome to a certain extent by placing the access ports below the clavicle which resulted in increasing the working space. Recovery was rapid and cosmesis highly appreciated by the patient.

S015

TRANSAXILLARY ENDOSCOPIC PARATHYROIDECTOMY: A PRACTICAL ALTERNATIVE TO THE OPEN APPROACH, Qammar Rashid MD, Titus Duncan MD, Jjeoma Egeh Egeh MD, Fredne Speights MD, Department of Surgery: Morehouse School of Medicine

Introduction: Transaxillary endoscopic parathyroidectomy is a safe and feasible procedure for patients with benign parathyroid disease. Minimally invasive surgery has well documented advantages of cosmesis, better visualization, and postoperative pain management. We present the use of an endoscopic technique to access the parathyroid gland from a remote transaxillary site. Endoscopic neck procedures may be approached in a direct or indirect fashion. A direct approach is an anterior approach that allows visualization of anatomy that is similar to the open technique. The indirect approach is from a remote site such as the axilla, and visualization is skewed and not that typically seen in the open approach. The indirect approach requires significant invasion of natural tissue architecture to advance to the target area. It does, however, avoid visible scarring within the neck region that may possibly improve the overall cosmetic outcome. The resulting incisions are small and well hidden in the axilla, and not visible when the patient has the arm in a natural anatomic position.

Materials and Methods: We performed a transaxillary approach to the parathyroid gland for 11 patients presenting with primary hyperparathyroidism and diagnosed with unilateral parathyroid adenoma(s) over a 2 year period (July 2004 - July 2006). There were 2 men and 9 women. The average age of the patients in this series was 53 (range 34 - 75).

Results: The final pathology of each patient's gland was benign parathyroid adenoma with an average weight of 1550 mg (range 100 mg - 2400mg). Ten patients had a single hyperplastic parathyroid lesion while one patient had two ipsilateral hyperplastic glands. Each patient had documented elevated calcium and PTH levels preoperatively with symptoms characteristic for clinical hyperparathyroid disease. All PTH levels normalized. There were no postoperative complications.

Conclusion: Garnier et al reported the first endoscopic parathyroidectomy, and Takami et al have since reported the transaxillary endoscopic approach to the thyroid and parathyroid glands. The advantages of this approach include superior visualization of critical anatomy of the neck, and superior cosmetic outcome with no visible scar in the neck region. We conclude that the transaxillary approach to the parathyroid gland is a safe, and feasible alternative to the open technique of parathyroidectomy for single or unilateral glandular disease.

S016

AXILLARY SENTINEAL LYMPH NODE BIOPSY BY ENDOSCOPIC PROCEDURE, Motoo Yamagata MD, Kazuo Sato MD, Yukie Morishita, Minoru Matsuda MD, Tadatoshi Takayama, Department of surgery, Nihon university

Endoscopic breast conserving therapy improved esthetic factors of breast conserving surgery by reducing the size and changing the position of surgical wounds as skin sparing surgery. It is not minimally invasive. SLNB minimize invasion of breast conserving surgery. Endoscopic sentinel lymph node biopsy was showed same detection rate by dye-injection method except radioisotope.

These method was safety and feasible. endoscopic breast conserving surgery.

Method: F Endoscopic axillary sentinel lymphnode(SLN) biopsy consist of 4 step,

1st step: Dye (we usually use indigo carmine) was injected at the point close to tumor. 2nd. step is the method for making cavity in axilla. VISIPORT is inserted into axillary space for introduce dissecting balloon to the proper layer.

3rd. step: dissecting balloon was inserted into axillary space and inflated for making working space. Stained SLNB was detected by endoscopic observation..

Stained lymph nodes were dissected by open method or endoscopic method under pneumo-axilla (8mmHgCO₂).

Results:ESLNB was performed in 116cases Detection rate is 96.9% (131/32) . True positive rate 93.7% "A@Average OP time@136min.@Average Bleeding@63.5,†. Hospital stay after OP@4days@Cosmetic finding@after operation@was@better than normal procedure. @Because operation scar of SLNB was very small.And Axillary function was preserved except rehabilitation .@Minimally invasive breast surgery was not improved esthetic factors of breast surgery but also preserving function except rehabilitation .the patients with early breast cancer will take more benefits by using this technique.

S017

ENDOSCOPIC EXCISION OF FIBROADENOMA BREAST, B B Agarwal, S Agarwal, M K Gupta, V R Saggarr, K C Mahajan, Sir Ganga Ram Hospital & Lady Hardinge Medical College, N.Delhi, India

Objectives: To perform Endoscopic excision of fibroadenoma, breast, safely and aesthetically.

Methods & Procedures: Circumareolar incision is universally recognized as a good & cosmetic approach for fibroadenoma excision. Surgery leaves not only physical but psychological scars as well, which seems more relevant to breast surgery. Possibility of some structural & physiological disruption of the nipple-areola complex is a potential concern. We excised the fibroadenomas of all sizes from 2-5cms.

Endoscopically by placing the trocars along or just behind the anterior axillary fold. Usually two working ports & a camera port (10mm) are required. However in case of a large or less mobile fibroadenoma a single working port was also sufficient. The fibroadenoma once completely dissected was extracted through the 10mm. port, while a 5mm. telescope was put in the working port. Perfect haemostasis was ensured & confirmed under vision. A compression bandage for 72hrs. was applied to the area of excised lump

Results: There was no failure or need to convert in 12 consecutive unselected patients of fibroadenomas presenting in all quadrants of the breast. There was no bleeding or collection. Port sites were not visible in frontal view, there were no scars over the breast and port site scars remained hidden in the anterior axillary fold.

The ladies expressed pleasure and appreciation for their breast exterior not subjected to knife.

Conclusion: Endoscopic excision of benign breast lumps such as fibroadenoma is possible, safe, aesthetic and is appreciated by ladies.

S018

LAPAROSCOPIC BILATERAL ADRENALECTOMY: RESULTS OF 30 CONSECUTIVE CASES, Mark C Takata MD, Quan-Yang Duh MD, Department of Surgery, University of California San Francisco

Background: Laparoscopic adrenalectomy has become the standard treatment for surgical diseases of the adrenal gland. Most patients requiring bilateral adrenalectomy have adrenocorticotropin hormone (ACTH) dependent Cushing's syndrome. Some of these patients are severely debilitated from the chronic effects of cortisol overproduction.

Objective: To analyze the safety, efficacy, and outcomes of our experience with laparoscopic bilateral adrenalectomy (LBA).

Design: Retrospective review.

Setting: University tertiary referral center.



Patients: Thirty consecutive patients underwent simultaneous LBA utilizing a transperitoneal approach.
Methods: We analyzed patient records to obtain demographics, disease etiology, clinical course, surgical approach, operative information, postoperative complications (30 days), and length of hospitalization.

Results: There were 22 female and eight male patients with a mean age of 44 years. Disease etiology consisted of refractory Cushing's disease (N=16), ectopic ACTH (N=9), and bilateral pheochromocytoma (N=5). ACTH dependent Cushing's syndrome was present in 25 of 30 patients (83%) and a median of 23 months (range 2 to 348 months) elapsed between onset of symptoms and adrenalectomy. LBA was completed in all 30 patients with no intraoperative complications. The median operative time was 270 minutes (range 180 - 480 minutes). The median estimated blood loss was 50 mL. Seven complications (pneumonia, Addisonian crisis, disseminated intravascular coagulation, wound infection, hyponatremia, and two urinary tract infections) occurred in four (13%) patients. The mean length of postoperative hospitalization for all patients was 3.5 days (range 1 to 12 days). Seven patients had a preoperative hospitalization with a mean of 7.1 days (range 1 to 20 days) and a mean postoperative hospitalization with a mean of 5.0 days (range 2 to 12 days). If no preoperative hospitalization was required the mean length of hospitalization was 3.0 days (range 1 to 7 days). Preoperative hospitalization did not predict postoperative complication. All patients received postoperative steroid replacement and appropriate follow-up with an endocrinologist.

Conclusion: LBA is safe and effective in this high risk patient population. Although patients should be monitored closely in the postoperative period, most patients are discharged with steroid replacement in a short time without complication.

S019

LAPAROSCOPIC ADRENALECTOMIES IN ICELAND 1997-2005, A NATION WIDE OUTCOME, Bergthor Bjornsson MD, Margret Oddsdottir MD, Dept. Of Surgery, Landspítali-University Hospital, Reykjavik, Iceland

BACKGROUND Laparoscopic adrenalectomy (LA) was first done in Iceland in June 1997. Since then all procedures for benign lesions of the adrenals have been done laparoscopically in a single center. Compared with conventional adrenalectomy, LA appears to achieve superior results in terms of recovery, hospital stay, cosmesis and morbidity.

MATERIAL AND METHODS The hospital records of all patients that have had LA in Iceland since it was first done early in 1997 throughout 2005 were reviewed. Preoperative diagnosis was documented as was PAD, operative factors and complications as well as length of hospital stay.

RESULTS In the study period 53 adrenal glands were removed from 48 patients in 49 operations. Women were 37 and male were 11. Mean patient age was 53.6 years (24.4-78.8). In 29 patients the left adrenal was removed, in 14 the right was removed and in 5 both adrenals were removed. Indications and diagnoses were 12 nonsecreting adenomas (all confirmed by PAD), 10 aldosteronomas (all confirmed), 10 pheochromocytomas (9 confirmed, 1 adrenal hyperplasia) and 6 because of gland size (3 adrenal gland hyperplasia, 1 cyst, 1 haemangioma, 1 normal adrenal gland) other indications and diagnoses were less common.

Mean operative time was 168 min (87-370) for unilateral operations and 412 min (345-480) for bilateral operations. Mean bleeding was 117 ml (0-650) for unilateral operations and 200 ml (0-350) for bilateral operations. Complications were; mild pancreatitis (1), UTi (1), Atelectasis (1), CHF (2), transient corneal abrasion (1). No conversion to open procedure was needed. Mean size of surgical preparat was 6,8 cm (4,5-10,5 cm). Mean postop stay was 2,6 days (1-6 days).

CONCLUSION The introduction of LA in Iceland for all benign lesions of the adrenals has been successful and without conversions or major complications. These nationwide results are comparable to results from large referral centers.

S020

THE DEVELOPMENT AND TESTING OF A NEW SIMPLE FLEXIBLE ENDOSCOPIC SUTURING METHOD FOR INTRALUMINAL AND TRANSGASTRIC SURGERY (NOTES), WITH EARLY CLINICAL EXPERIENCE., Per-Ola Park MD, Maria Bergström MD, Keiichi Ikeda MD, Sandy Mosse PhD, Annette Fritcher-Ravens MD, Paul Swain MD, Sahlgrenska University Hospital, Gothenborg and Imperial College, London

Background: In order to perform advanced endoscopic treatments, like dealing with perforations, full-thickness resections one has to be able to close defects. There have been many devices constructed to perform endoscopic suturing, but all are rather complicated, expensive and difficult to use.

Method 17 and 19G flexible needles constrained within a plastic catheter loaded with a metal tag, to which a 3-0 polypropylene thread was attached, were passed down the working-channel of a conventional endoscope. Two tags are placed into the wall of the stomach wall, one on each side of the defect. The threads are then locked together using a ring and pin (collet and sleeve method). The thread is cut using a guillotine. Precise stitch positioning is easily performed in the middle of the visual field. Multiple stitches can be placed quickly without the need to remove the endoscope during the procedure. An overtube is unnecessary and the device can be used with 9 mm flexible endoscopes with a 2.8mm channel. The component of this device all are CE marked. Ethical committee approval was received for the use of this method to oversee perforated ulcers in Gothenburg.

Results: By using this simple technique we were able to close perforations, perform gastro-jejunostomies and pyloroplasty in experimental porcine models in survival animals. We have also been able to close perforated duodenal ulcer, leaking anastomosis and stop upper GI-bleeding successfully in patients when other methods of treatment had failed.

Conclusions: The above described technique is simple, easy to use and makes endoscopic suturing possible almost anywhere in the GI-tract which can be reached by a flexible endoscope. The suturing technique makes it possible to close perforations and approximate tissue without laparoscopic or open surgery. The first clinical results reported in three patients.

S021

A NEW GENERATION OF FLEXIBLE ENDOSCOPE AND INSTRUMENTATION FOR ADVANCED ENDOSCOPY AND NOTES, Lee L Swanstrom MD, Richard A Kozarek MD, Nat D Soper MD, Legacy Health System, Portland, OR; Virginia Mason Medical Center, Seattle, WA; Northwestern University, Chicago, ILL

Background: The concept of intraperitoneal flexible endoscopy has created a great deal of interest and investigation. Both gastroenterologists with a surgical leaning and surgeons with an advanced endoscopy interest are researching the feasibility of this new approach. Current flexible scopes and instruments are extremely limited for use in NOTES. We describe a current advanced endoscope specifically designed for endoluminal and NOTES procedures and demonstrate feasibility in cadaver models.

Technique: In conjunction with industry, A 18 mm 4 channel rigidizing access device was designed. In addition, specific instruments which are larger (4.5mm) and more robust and which include tissue approximating tools are described. Measurements of the strength (torsional and lifting) of standard endoscopes and the new scope were compared. The new scope and instruments are used in 8 cadavers to document their feasibility and safety in a variety of specific tasks: upper abdomen and lower abdomen visualization, bowel manipulation, solid organ retraction and enterotomy apposition and closure.

Results: Benchtop comparison between a standard scope and the new scope showed equal maneuverability but the newer scope had greater force delivery at the tip (.042lbs vs 1.96lbs, p<.001) and greater instrument application force (.09 vs .23lbs, p<.002). Peroral introduction of the scope was possible in all cadavers but difficult in patients < 60kg.



Intragastric manipulation was rated excellent and exiting the stomach was not difficult although it required a 2 cm gastro-tomy for the larger instrument. The scope system was easily maneuverable in the lower abdomen, accessing both lower quadrants without difficulty. The upper abdomen was viewable but there was variable success with steering the scope between left and right quadrants. The entire GI tract was able to be visualized from stomach to rectum. The scope generated sufficient force to lift and manipulate the bowel. Liver and spleen were uniformly able to be lifted and held with the curve of the scope. Using the tissue approximation device, secure full thickness closures were uniformly accomplished.

Conclusion: A new flexible access endoscope with 4 large access channels showed utility in a cadaver setting – satisfying some of the requirements to perform NOTES procedures and defining the next generation of operating endoscopes.

S022

LAPAROSCOPIC SURGICAL TREATMENT OF EARLY STAGES GASTROINTESTINAL TUMORS CHASED BY MAGNETIC CLIP DETECTING AND CHASING SYSTEM (MCDCS), Takeshi Ohdaira BA, Hideo Nagai BA, Jichi Medical University

Laparoscopic gastrectomy and colectomy by a lesion-lifting procedure using a mucosa-nondamaging micromagnetic clip detecting and chasing system

Background: It is difficult to detect an early-stage cancer from the serosal side during laparoscopic gastrectomy and colectomy. However, it is necessary to resect the bowel while constantly detecting the site of lesion. We succeeded in the development of a laparoscopic, lesion-lifting procedure using a newly developed micromagnetic marking clip with special magnetic directivity. This new type of magnetic microclip allows tumor resection while easily detecting the site of the lesion and constantly chasing the site according to a marking clip-detecting and -chasing system (MCDCS).

Methods: Preoperative endoscopy was conducted to place a micromagnetic clip to the lesion periphery, and a stick-like device, which easily allows the change in tip magnetic flux density, was used to conduct tumor resection by lesion lifting during surgery. A micromagnetic body which we developed can easily pass through the forceps hole of an endoscope. Furthermore, the micromagnetic clip was designed and magnetized in such a manner to be endowed with special directivity to emit magnetic traction force in a direction which constantly does not damage the intestinal mucosal surface.

Results: The marking site was detected in 25 patients in a clinical study which used the prototype micromagnetic body. The mean length between the detection site and the clip along the longitudinal axis of greater curvature was 14.8 mm (SD: 9.2). The mean detection time was 7.7 sec (SD: 2.3). With an intention to complete the study in less than 1 minute, we eventually completed partial gastrectomy in 2 minutes. The micromagnetic body for MCDCS, which we developed this time, demonstrated its striking easiness for marking and its nondamaging activity on the mucosa.

Conclusion: A lesion-lifting procedure, which uses a mucosa-nondamaging, potent, micromagnetic clip and MCDCS, was suggested to possibly provide safety, effectiveness, and simplicity in laparoscopic gastrectomy and colectomy.

S023

A NOVEL METHOD FOR STAGING AND RESECTION OF INTRA ABDOMINAL CANCERS WITH LAPAROSCOPIC PET PROBES, Vivian E Strong MD, John Humm PhD, Paul Russo MD, Doug Wong MD, Farhad Daghighian PhD, Murray Brennan MD, Yuman Fong MD, Steven Larson MD, Memorial Sloan-Kettering Cancer Center and IntraMedical Imaging Positron Emission Tomography (PET) detects release of high-energy gamma emissions to detect and evaluate cancer. However, correlating preoperative PET images with intraoperative findings remains a challenge. Although most clinical applications of PET in cancer have been with F-18

labeled fluorodeoxyglucose (to evaluate metabolic activity of tumors), PET has even greater potential for imaging other metabolic or immunologic markers. Since positron emitting isotopes emit both gamma and beta rays, we tested whether beta emission detected by hand held beta ray detectors would correlate with conventional gamma emission detected by pre-operative PET scans, to improve intra-operative localization of tumor.

Within the context of IRB-approved protocols utilizing ¹²⁴I labeled humanized monoclonal antibodies for colorectal cancer (Hu-A33) and renal tumors (cG250), hand-held detectors for beta and gamma emissions (PET-Probes TM) were used intra-operatively, on regions of intensity shown on pre-operative PET images and other regions suspicious for cancer and also used ex vivo on tissue samples positive for tumor by H+E staining and autoradiography. Beta and gamma emissions were correlated. Metastatic colorectal cancer (n=4) and renal cell carcinoma (n=2) patients were evaluated with the hand-held probes during surgery performed post-injection of I-124 labeled antibodies. Gamma and beta emission from tumor and normal tissue were made in vivo and ex vivo and evaluated for pathology and by autoradiography.

The hand-held PET probes detected gamma and beta emissions from all tumors. Count rates of the gamma probe on the cancerous tissue ranged from 80 to 532 counts per second (cps) in vivo, and 72 to 278 cps ex vivo. For the beta probe these were 31 to 82 cpm in vivo and 34 to 95 cps ex vivo. Gamma and beta emissions exhibited a strong positive correlation. Beta emission showed a stronger correlation than gamma emission with overall tissue radioactivity.

This study demonstrates that gamma emission detected by conventional PET imaging correlates directly with beta emission in humans. Furthermore, this study suggests that compared to detection of gamma emission, beta emission detection may offer superior real-time localization of tumor, particularly as a laparoscopic version of this probe is tested in humans. Intraoperative portable PET probe may prove a useful bridge to combining tumor biology and PET technology to guide surgical therapy.

S024

DESIGN OF A NOVEL MULTIFUNCTION LAPAROSCOPIC TOOL TO SHORTEN OR TIME, David J Miller MS, Carl A Nelson PhD, Dmitry Olevnikov MD, University of Nebraska Medical Center, University of Nebraska-Lincoln

Introduction: With a limited number of access ports, minimally invasive surgery (MIS) often requires the complete removal of one tool and reinsertion of another. The investigators have designed a multifunction laparoscopic tool that can interchange six different instrument tips through the tool's shaft, facilitating multiple different functions in a single tool. Soft computing techniques can be used to optimally arrange the tool's functional tips, allowing surgeons to deliver treatment of improved quality in less time, decreasing overall cost.

Methods: Endoscope video from MIS procedures performed at UNMC (e.g. cholecystectomy and gastrectomy) was obtained. This video was used to analyze the types of instruments used, the time of each use and the function of each instrument. These data were aggregated with fuzzy logic techniques to quantify the overall usefulness of each tool. This allowed subsequent optimization of the arrangement of functional tips within the modular tool to decrease overall time spent changing instruments.

Results: Based on the tool's design, the range of tool change times is approximately 11 to 13 seconds. The following table summarizes projected time savings over standard tools. Total surgery time (TST), actual time spent changing instruments (C), projected time spent changing modular instruments (PC), and time savings (TS) were obtained from the data (all values in minutes):



Procedure	A	B	C	D	E	F	G	H	I	J	K
TST	48.7	20.7	88.2	127	95.7	115.5	101	48.2	125.3	42.7	26.1
C	7.2	9.1	16.3	30	18.7	30	11.4	12.4	39.9	5.7	3.5
PC	4.6	0.2	0.9	9.4	1.4	5.9	2.5	3.8	7.7	1.1	1
TS	2.6	9	15.3	20.5	17.3	24.1	8.9	8.6	32.2	4.7	2.5

Conclusion: Estimated time savings ranged from 2.5 to over 32 minutes, and on average, total surgery time can be reduced by 17% by using the multifunction tool. In addition, the use of a single tool for multiple functions overcomes the different tactile sensations caused by varying handle configurations, resulting in a standardized feel.

S025

DEVELOPMENT OF A NOVEL TOOL TO MORE PRECISELY ANALYZE POSTURAL STABILITY OF LAPAROSCOPIC SURGEONS, Gyusung Lee PhD, Adrian E Park MD, University of Maryland

Physical difficulties experienced by surgeons during MIS procedures are being given much attention by ergonomic researchers. We take postural stability, which has been insufficiently addressed, as a prime focus. The few studies now existing in this area have used Center of Pressure (CoP) alone to determine posture. Using CoP, we previously correlated postural stability to instrument type, task difficulty, and subject skill level. This study extends our investigative scope, particularly in terms of skill level, by broadening analysis to include Center of Mass (CoM) and what we uniquely term Postural Stability Demand (PSD). Six subjects with different levels of surgical experience were recruited to complete 3 FLS tasks: circle-cutting, endo-loop placement, and pegboard transfer. Subjects performed each while standing on 2 force plates while a motion capture system recorded body movements. CoP—at the bottom of the feet—is the point where ground reaction force is located. CoM is the point at which the mass of the body is concentrated. Principal Component Analysis was used to create an ellipse covering 95% of CoP and CoM excursions for calculation of sway area. PSD we characterize as the mean distance between CoP and CoM locations in anterior-posterior (A-P) or medial-lateral (M-L) directions. Postural parameters were correlated to performance time. During circle-cutting, less skilled subjects required longer times to complete the task and showed larger sway areas both in CoM and CoP ($r=.858$, $p<.05$; $r=.779$, $p=.06$). During endo-loop task, sway areas of CoM and CoP were smaller for less skilled subjects ($r=-.899$, $p<.05$; $r=-.890$, $p<.05$). These results indicate postural control differences between more and less experienced lap surgeons. No significant sway area correlation was found during pegboard transfer. Importantly, PSD in the A-P direction during all three tasks was strongly correlated with performance time ($r=.744$, $p<.05$; $r=.913$, $p<.05$; $r=.772$, $p<.05$). This indicates less skilled participants experienced increased postural demand equated with higher postural instability. This study demonstrated that variance in postural adjustments could be correlated to skill level and individual task. Strong correlation between PSD and performance time shows potential as an indirect predictive measure of surgical skill levels. Combining CoM, CoP, and PSD postural data results in a more robust analytical tool for identifying postural adjustments with skill level.

S026

TEMPERATURE SAFETY PROFILE OF LAPAROSCOPIC DEVICES: HARMONIC ACE (ACE), LIGASURE V (LV) AND PLASMA TRISSECTOR (PT), Fernando J Kim MD, Eduardo V Gewehr MD, Minoru Morihisa MD, Fernando Caldas MD, Marcelo Baptistussi MD, Edson Hayacibara MD, Adriano Campagna MD, Adrie VanBokhoven PhD, Hari Koul PhD, Denver Health Medical Ctr, Univ. of Colorado HSC

Background: Reports of surgeon's hand burn injuries caused by laparoscopic instruments during hand assisted surgery evoked questions about the temperature safety profile and the cooling properties of these instruments.

Purpose: We examined the temperature range generated by

each instrument using the pre-determined manufacturer's settings applied against different tissue/organs.

Methods: Video recording of temperatures generated by different instruments (ACE, LV and PT) were applied using manufacturers pre-set settings (coagulation/cutting) using the infrared camera IR-Flex Cam Pro on 3 different types of swine tissue: a) liver (L), b) peritoneum (P), and c) mesenteric vessels (MV). Activation and cooling temperature and time were measured for each instrument.

Results: Range of temperatures from each instrument and tissue application is defined in Table:

Tissue	Device	Mean Temp (Celsius)	Change in temperature after OFF
P	ACE	195.9+14.5 (149.4 - 234.5)	- 67.3 + 89.6 in 1-3 seconds
P	LV	88.9+2.7 (81.4 - 97.3)	- 7.9 to + 0.6 in 1-2 seconds
P	PT	87+2.2 (80.5 - 93.3)	- 8.7 to - 0.4 in 1-2 seconds
L	ACE	121.3+9.7 (99.5 - 156.1)	- 15.5 to + 24.4 in 1-4 seconds
L	LV	76+2.9 (64.8 - 80.0)	- 8.2 to + 2.5 in 1-3 seconds
L	PT	83.7+2.4 (74.4 - 87.6)	- 6.4 to + 6.7 in 1-2 seconds
MV	ACE	172.9+16.8 (127.6 - 229.8)	- 39.4 to + 31.4 in 2-6 seconds
MV	LV	96.3+4.1 (83.9 - 110.0)	- 29.0 to + 15.7 in 1-2 seconds
MV	PT	86.3+2.6 (78.1 - 92.7)	- 13.0 to + 16.0 in 1-7 seconds

Conclusion: All instruments increased peak temperatures after they were turned off requiring few seconds to cool down. The ACE generated very high temperatures that could harm adjacent tissue and potentially the surgeons hand when in contact with the instrument immediately after deactivation. Judicious use of these instruments may prevent burn injuries during laparoscopic procedures, particularly when using the ACE.

S027

COMPARISON OF BLOOD VESSEL SEALING AMONG NEW ELECTROSURGICAL AND ULTRASONIC DEVICES, William L Newcomb MD, William W Hope MD, Thomas M Schmelzer MD, Jessica J Heath BS, H J Norton PhD, Amy Lincourt PhD, B T Heniford MD, David A Iannitti MD, Carolinas Medical Center

Background: Bipolar electro-surgical devices and ultrasonic devices are routinely used in open and advanced laparoscopic surgery for hemostasis. New electro-surgical and ultrasonic instruments are available that offer improvements in blood vessel sealing compared to devices used previously. The purpose of this study was to compare burst pressure, sealing time, and failure rate among these new vessel sealing devices.

Methods: Five millimeter laparoscopic instruments tested included Gyrus PKS™ Cutting Forceps (GPK), Gyrus Plasma Trisector™ (GPT), Harmonic Scalpel® (HS), EnSeal™ Tissue Sealing and Hemostasis System (ES), LigaSure™ V with LigaSure™ Vessel Sealing Generator (LS), LigaSure™ V with Force Triad™ Generator (FT), and Ligamax™ 5 Endoscopic Multiple Clip Applier (LM). Each device was used to seal 13 small (2-3mm diameter), 13 medium (4-5mm diameter), and 13 large (6-7mm diameter) arteries from euthanized pigs. Burst pressure (mmHg), sealing time (s), and percent failure rates were determined for each device. The SAS® software was used for all statistical analyses. P<0.05 was considered statistically significant.

Results: For 2-3mm vessels, mean burst pressures were not statistically different for any device. For 4-5mm vessels, LS had the highest mean burst pressure recorded and was statistically higher than all instruments other than LM, ES, and FT. No electro-surgical or ultrasonic device had statistically different burst pressures for 6-7mm vessels. Mean seal times were statistically shorter for every vessel size when the FT was compared to LS. The shortest sealing times for 2-3mm vessels were recorded for the GPT. The shortest sealing times for medium and large vessel sizes were observed with FT. The highest percent failure rate for each vessel size was seen with the GPT. For 4-5mm diameter vessels, failure rate was 48.39% for GPT, 40.91% for GPK, and 22.2% for HS. For 6-7mm diameter vessels, failure rate was 91.67% for GPT, 40.91% for GPK, and 7.94% for HS. LM and FT had no recorded failures.

Conclusions: Among the new 5mm laparoscopic electro-surgical and ultrasonic instruments available for testing, ES, LS, and FT produced the highest mean burst pressures. FT



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had the shortest mean seal times for medium and large size vessels. Minimal or no seal failures were seen with HS, ES, LS, LM, and FT.

S028

HISTOPATHOLOGIC COMPARISON OF FOUR ENERGY-BASED VASCULAR SEALING AND CUTTING INSTRUMENTS: A PORCINE MODEL.

Benjamin Person, David A. Vivas, Dan Ruiz, Michael Talcott, James E. Coad, Steven D. Wexner, Cleveland Clinic Florida, Weston, Florida

Aim: To compare the efficacy and safety of four energy-based vascular sealing and cutting instruments.

Methods: Blood vessels of various types and diameters were harvested from 4 pigs using 4 instruments: Harmonic ACE, LigaSure V and Atlas and EnSeal vessel fusion system. The diameters of the vessels, speed of the cutting and sealing and the bursting pressure of the sealed end were compared. An additional set of specimens was sealed and left in situ for up to 4 hours after which the vessels were harvested and sent for histopathological evaluation of the degree of thermal injury.

Results: The parameters of vessel diameter, speed of seal and bursting pressures are summarized in table 1. The bursting pressures were significantly the highest with EnSeal compared to all other instruments ($p < 0.0001$). The sealing process was significantly the shortest with Harmonic ACE and significantly the longest with LigaSure Atlas ($p < 0.0001$). The mean seal width was significantly the largest with the LigaSure Atlas compared to the other instruments ($p < 0.0001$), and it was the smallest with EnSeal and Harmonic ACE. Radial adventitial collagen denaturation was significantly smaller with EnSeal and LigaSure V than with the other 2 instruments ($p < 0.0001$); EnSeal caused less collagen denaturation than LigaSure V, with no statistical difference ($p = 0.07$). Proximal thermal injury to the smooth muscle in the media was least common with LigaSure Atlas than with the other instruments although the numbers were too small for statistical analysis. **Conclusions:** The bursting pressures with EnSeal are significantly higher than all the other instruments. Harmonic ACE is the fastest sealing instrument and LigaSure Atlas the slowest. EnSeal creates significantly less thermal damage to the adventitia of the vessels and LigaSure Atlas significantly less thermal damage to the media of the vessels compared to the other instruments. The clinical significance of these findings is unknown.

Instrument	Vessel diameter (mm)	Speed (s)	Burst pressure (mmHg)
EnSeal	4.1±1.5	4.1±0.9	677.8±184.4
LigaSure Atlas	4.8±0.6	7.9±2.2	489.2±269.9
LigaSure V	3.8±1.6	5.2±2.1	379.5±135.1
Harmonic ACE	3.3±1.0	3.3±1.0	434.7±320.7

S029

PRELIMINARY RESULTS OF LAPAROSCOPIC ADJUVANT INTRAPERITONEAL CHEMOHYPERHERMIA (IPCH) IN PATIENTS OPERATED FOR LOCALLY ADVANCED COLORECTAL OR GASTRIC CANCER,

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Intraperitoneal chemohyperthermia (IPCH) may be part of the management of patients with peritoneal carcinomatosis of colorectal or gastric origin. However, its role is not fully documented in patients with locally advanced colorectal and gastric cancer, usually at high risk of developing future peritoneal carcinomatosis. We evaluated the feasibility and the short-term morbi-mortality of IPCH in such patients.

Methods: On January 2006, we started a prospective evaluation of a protocol of adjuvant IPCH in patients who had R0 resection for locally advanced gastric or colorectal cancer. Eligible patients had laparoscopic IPCH. The procedure was performed either immediately after primary resection or secondarily. Twelve litres of heated serum were delivered through a pump system under electronic control of intraab-

dominal temperature maintained between 41°C and 43°C. Mitomycin and cisplatin were used.

Results: Twenty one patients (15 women and 6 men, mean age 55 years (41-74)) had laparoscopic IPCH. Sixteen patients had colorectal cancer and 5 patients had gastric cancer. IPCH was performed after a mean interval of 5 weeks (0-8) after primary surgery. No conversion to laparotomy or operative incident occurred. There was no 30-day or intra-hospital mortality. Overall morbidity rate was 19 % (6 complications in 4 patients) including two bone marrow aplasia, two intraabdominal abscesses, one pneumonia, and one pulmonary embolism. One patient was reoperated for pelvic abscess.

Conclusion: Adjuvant laparoscopic IPCH in patients operated for locally advanced colorectal or gastric cancer is feasible and sure. Short-term mortality and mortality are relatively low. Possible impact on overall survival or disease-free survival needs further evaluation.

S030

TRUE INCIDENCE OF PORT SITE METASTASIS (PSM) FOLLOWING MINIMALLY INVASIVE ONCOLOGIC SURGERY,

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Introduction: PSM are still a concern for oncologic surgeons with varying rates reported in the literature. The aim of this study was to determine the true incidence of PSM following laparoscopy or thoracoscopy for malignancies of various organ systems in a large series of patients from a tertiary care cancer center.

Materials and methods: All patients that underwent laparoscopy or thoracoscopy for gastrointestinal, gynecological and thoracic malignancies were identified from prospectively maintained institutional databases. (1991-2003). A thorough review of the databases was performed to identify patients with PSM.

Results: A total of 2148 procedures were performed in 2069 patients with gastrointestinal, gynecological and thoracic malignancies accounting for 527, 1288 and 254 patients respectively. The incidence of PSM for the entire cohort of patients was 1.26% (26 patients). PSM were noted in 9/527 (1.7%), 13/1288 (1%) and 4/254 (1.57%) patients with gastrointestinal, gynecological and thoracic malignancies, respectively. The median interval to detection of PSM was 6 months (range- 2 weeks to 28 months). Of the 26 patients with PSM, only 3 patients (0. 14%) were noted to have true PSM (isolated single site of disease at port site). The remaining 23 patients had PSM in association with carcinomatosis (16 patients- 0.77%) or in the presence of intra-peritoneal catheter (7patients- 0.34%).

Conclusion: Isolated port site metastasis following minimally invasive oncologic surgery is rare. The majority of the port site metastasis occur in the context of systemic spread of malignancy and therefore could represent a surrogate marker of ensuing advanced disease.

S031

THE USE OF SELF-EXPANDING SILICONE STENTS IN ESOPHAGEAL CANCER CARE: OPTIMAL PRE-OPERATIVE, PERI-OPERATIVE AND POST-OPERATIVE CARE,

Robert Martin MD, Ryan Duvall BS, Charles R Scoggins MD, University of Louisville, Department of Surgery, Division of Surgical Oncology

Introduction: Preoperative nutritional supplementation, management of esophageal leaks, and post-operative anastomotic strictures still remain a common problem in the management of esophageal cancer. Jejunal feeding tubes, TPN with nasogastric suction, and repeated esophageal dilations remain the most common treatments respectively, but are not optimal for efficient patient management and quality of life. Thus the aim of this study was to evaluate the use of removable silicone stents in 1) The pre-operative nutritional optimization during neoadjuvant therapy, 2) The manage-



ment of peri-operative anastomotic leak, and 3) the management of post-operative anastomotic strictures.

Methods: Review of our prospectively maintained esophageal database identified 20 patients who had removable self-expanding silicone stents placed in the management of one of these three management problems from July 2004 to August 2006.

Results: Pre-operative Therapy:: Five patients underwent initial stent placement in preparation for neoadjuvant therapy. Dysphagia relief was seen in 100% of patients, with optimal caloric needs taken within 24 hours of placement. All patients tolerated neoadjuvant therapy without delay from dehydration or malnutrition. One stent migration was found at the time of operation, which was removed without sequelae.

Peri-operative therapy:: Five patients developed delayed (>10 days) esophageal leaks that were managed with removable esophageal stent and percutaneous drainage (in 3 patients). All patients had successful exclusion of the leak on the day of the procedure with resumption of oral intake on the evening of procedure. All five healed leaks without sequelae.

Post-operative Therapy:: Ten patients developed post-operative anastomotic strictures that required dilation and placement of removable esophageal stent. The median number of dilations was 1 (range 1-2), with all stents placed for 3 months duration. All patients had immediate dysphagia relief after stent placement.

Conclusion: Continued improvements in pre-operative, peri-operative, and post-operative management is needed to improve patient therapy and minimize the quality of life effect from this disease and its therapy. Removable esophageal stents are novel treatment option to optimize relief of symptoms and return the patients back to a more normal oral intake. Continued evaluation is needed to consider stent use as first line therapy.

S032

MINIMALLY INVASIVE ESOPHAGECTOMY FOR CANCER : TOTALLY LAPAROSCOPIC TRANSHIATAL APPROACH OR THORACOSCOPY IN PRONE POSITION FOLLOWED BY

LAPAROSCOPY ?, Giovanni Dapri MD, Jacques Himpens MD, Elie Capelluto MD, Jean Louis Majcher MD, Guy Bernard Cadriere PhD, Department of Gastrointestinal Surgery, European School of Laparoscopic Surgery, Saint-Pierre University Hospital, Brussels, Belgium

Background: Esophageal anatomy and characteristics of patients affected by esophageal cancer invite surgeons to a minimal invasivity. This retrospective study compares two techniques of esophagectomy for cancer : transhiatal laparoscopy (A) versus right thoracoscopy in prone position followed by laparoscopy and cervicotomy (B).

Methods: Between April 1999 and August 2005, 24 patients (A) and 15 patients (B) underwent to minimally invasive esophagectomy for cancer in our Department. Average age was 61,2 years (A) and 60,4 years (B). Preoperatively endoscopic localization of the tumor was upper third in 2 cases (1 vs 1), middle third in 11 cases (7 vs 4) and lower third in 26 cases (16 vs 10). Preoperatively endoscopic stage was : 0 in 2 cases (0/24 vs 2/15), I in 8 cases (5/24 vs 3/15), IIa in 12 cases (7/24 vs 5/15), IIb in 6 cases (4/24 vs 2/15), III in 9 cases (6/24 vs 3/15) and IV in 2 cases (2/24 vs 0/15). Six patients of A underwent additional neo-adjuvant therapy.

Results: Median operative time was 300 minutes (240-420) for A and 420 minutes (240-540) for B (p=0,01). Median peri-operative bleeding was 325 ml (100-800) for A and 700 ml (100-2400) for B (NS). Perioperative complications were 1 splenectomy for both groups and 1 conversion into thoracoscopy for B. Postoperative medical complications were 5 (A) and 6 (B). Postoperative surgical complications were 1 hemoperitoneum, 1 pneumothorax, 4 anastomotic leaks (A) and 4 anastomotic leaks, 1 colic leak, 2 tracheal necrosis, 2 hiatal hernias (B). Median intensive care stay was 5 days (2-70) for A and 5 days (1-180) for B (NS). Median hospital stay was 12 days (7-98) for A and 14 days (7-480) for B (p=0,05). Early mortality was 0%. All specimens were free of disease; median number of mediastinal/periesophageal lymph nodes

was 3 (1-10) for A and 4 (2-13) for B (NS); median number of celiac/perigastric lymph nodes was 11 (2-31) for A and 10 (3-22) for B (NS). After a mean follow-up of 42,4 months (2-84) for A and 19,1 months (1,5-34) for B, total survival rate is respectively 8/24 (33,3%) and 8/15 (53,3%).

Conclusions: This retrospective study shows significant differences between these two techniques in term of operative time and hospital stay, in favour of the transhiatal approach.

S033

LAPAROSCOPIC GASTRECTOMY FOR GASTRIC CANCER - AN EXPERIENCE OF OVER 600 CASES-, Shinya Tanimura MD, Masayuki Higashino MD, Yosuke Fukunaga MD, Yoshinori Tanaka MD, Yushi Fujiwara MD, Osaka City General Hospital

As less-invasive operations have been noted in recent years, laparoscopic gastrectomy for gastric cancer has become popular because of advances in surgical techniques. We have performed laparoscopic gastrectomy with regional lymph node dissection on 612 cases of gastric malignancies between March 1998 and August 2006. Here we present the technique and results of laparoscopic gastrectomy for gastric cancer.

Of all 612 cases, distal gastrectomy was performed on 485 cases, proximal gastrectomy on 42 cases, and total gastrectomy on 85 cases, respectively. For all cases, D1 or D2 lymph node dissection was carried out according to the general rule of Japanese Gastric Cancer Association.

The average duration of operation and the amount of blood loss were 248 minutes (distal: 242, proximal: 246, total: 286) and 193 mL (distal: 165, proximal: 225, total: 337). The post-operative days of flatus, oral feeding and hospital stay were 2.6 (distal; 2.5, proximal: 3.0, total; 2.9), 3.5 (distal: 3.3, proximal; 4.3, total: 4.6) and 12.4 days (distal: 11.8, proximal; 13.9, total: 15.3), respectively. The average of tumor diameter was 32.4 mm (distal: 31.2, proximal: 27.5, total: 41.2) and the number of harvested lymph nodes per patient was 29.2 (distal: 29.1, proximal: 22.3, total: 33.8), respectively. Recurrence was recognized only in six (two T1 and four over T2 cases) of all patients so far.

In conclusion, laparoscopic gastrectomy for gastric cancer is considered less-invasive and as curative as compared to the conventional open gastrectomy.

S034

LAPAROSCOPIC GASTRIC RESECTION FOR GASTROINTESTINAL STROMAL TUMORS, Jennifer A Spittler

MD, Richard A Pierce MD, Valerie J Halpin MD, Christopher Eagon MD, William G Hawkins MD, David C Linehan MD, Michael Brunt MD, Margaret M Frisella RN, Brent D Matthews MD, Department of Surgery, Washington University, St Louis, Missouri

INTRO: The purpose of this study is to review the clinical outcomes for patients selected to undergo a laparoscopic resection for a gastrointestinal stromal tumor (GIST) of the stomach.

METHODS: All laparoscopic gastric resections (n=100) performed from Feb 1995 to July 2006 were reviewed under an IRB-approved protocol. Pre- and postoperative variables including complications, pathology and tumor recurrence were analyzed. Data are given as mean ± SD.

RESULTS: Laparoscopic gastric resection was attempted for 56 GIST in 55 patients (29:26; M:F) with a mean age of 58.7 years ± 19.5. The tumors were located at the GE junction/cardia (n=7), fundus (n=17), body (n=16), antrum (n=14) or pylorus (n=2). The most common presentation was an UGI bleed (n=26) or incidental finding on EGD (n=12). Laparoscopic procedures performed were partial gastrectomy (n=45), antrectomy (n=4), esophagogastrectomy (n=3) and endoscopic-assisted transgastric resection (n=3). One patient was converted to an open procedure to control bleeding from the spleen. Mean tumor size was 3.8 cm ± 1.8. Negative surgical margins were achieved in all but one case. Mean operative time was 156 min ± 68 and mean EBL was 105 ml ± 212. Regular diet was resumed at a mean of 2.8 days ± 1.5 and mean LOS was 3.9 days ± 2.2. Perioperative complication rate was 18.2% including a DVT,



a postoperative bleed requiring re-exploration on POD #1, an anastomotic stricture requiring dilatation at 3 months and incisional hernia at 12 months follow-up. There was one postoperative death from respiratory failure. Forty-three GIST were low risk (≤ 5 cm, < 5 mit/50 HPF), 8 GIST were intermediate risk (< 5 cm, 6-10 mit/50 HPF or 5-10 cm, < 5 mit/50 HPF) and 5 GIST were consider to be of high malignant potential (> 5 cm, > 5 mit/50 HPF or > 10 cm, any mitotic rate or any size, > 10 mit/50 HPF). After a mean follow-up of 15 months \pm 21.8 (range, 0-103), 3/8 patients with high malignant potential GIST developed metastatic disease to the liver, liver and lung, and peritoneum, respectively. All other patients are disease free.

CONCLUSIONS: Laparoscopic resection for GIST is a feasible option for tumors located in the stomach. Adequate oncologic resection was successfully achieved in 98.2% of patients chosen for a laparoscopic resection. Resection margin positivity and recurrence rates are low after a minimally invasive approach in appropriately selected patients with GIST demonstrating favorable characteristics.

S035

FACTORS AFFECTING LYMPH NODE RETRIEVAL IN COLORECTAL CANCER SURGERY, *Michelle A Ostadi, Julie Harnish MSc, David R Urbach MD, Department of Surgery, University Health Network, Toronto, ON, Canada*

INTRODUCTION: Staging of colorectal cancer is dependent on the number of lymph nodes (LN) in a surgical specimen that are positive for metastatic cancer. The American Joint Committee on Cancer (AJCC) recommends a minimum of 12 LNs be examined to ensure adequate staging. It is unclear which factors specifically contribute to variation in the number of LNs retrieved from surgical specimens. This study aims to understand the factors affecting the number of LNs identified in colorectal cancer surgical specimens.

METHODS: A total of 264 retrospectively collected cases of colorectal cancer surgically treated at the University Health Network in Toronto from 2004 to 2006 were analyzed. We used univariate ANOVA and multivariate linear regression analysis to determine the variation in LN number associated with age, gender, surgeon, pathologist, pathology assistant, primary vs. recurrent, tumor site, neoadjuvant radiotherapy, admission category, and laparoscopic vs. open surgery.

RESULTS: The average number of LNs retrieved per case was 18.1. Of the 264 cases, 70 (26.5%) contained fewer than 12 nodes. The variables we examined accounted for 31.8% of variation in LN number. Variation in LN number was greatest between different pathology assistants ($P < 0.001$). Mean number of nodes retrieved by different pathology assistants ranged from 12.6 to 29.7. On average, surgery for recurrent cancer removed 6.0 (95% CI 1.2 to 10.9, $P = 0.02$) fewer LNs than for primary cancer. Each additional year of patient age was associated with retrieval of 0.1 (95% CI 0.04 to 0.2, $P = 0.005$) fewer nodes. Laparoscopic surgery retrieved 3.4 (95% CI 0.1 to 6.9, $P = 0.06$) fewer LNs than open surgery, and rectal cancer specimens had 2.7 (95% CI 0.04 to 5.4, $P = 0.05$) fewer LNs than colon cancer specimens. Other factors analyzed were not associated with statistically significant variation in LN number.

CONCLUSIONS: Most of the variation in the number of colorectal cancer LNs retrieved at our hospital that could be explained by statistical modeling was accounted for by differences between pathology assistants. Recurrent cancer, older patients, and rectal cancer were also associated with fewer LNs.

S036

ENDOLUMINAL SURGERY OFFERS A SAFER TREATMENT OPTION FOR RECTAL NEOPLASMS IN HIGH RISK PATIENTS, *Daniel H Hunt MD, Lauren A Kosinski MD, John H Marks MD, Gerald J Marks MD, The Lankenau Hospital and Institute for Medical Research, Wynnewood, PA*

Introduction: In the management of rectal neoplasms avoidance of a major abdominal procedure and/or stoma is particularly desirable in high risk patients. To determine the ability of endoluminal surgery to expand safer treatment options for patients at high risk as identified by the

American Society of Anesthesiologists physical status classification (ASA) above II, and/or morbid obesity, and/or pelvic irradiation we investigated outcomes in such patients undergoing transanal endoscopic microsurgery (TEM) excision for benign and malignant rectal neoplasms.

Methods: Patients with a body mass index (BMI) above 30 (kg/m^2), and/or ASA above II, and/or pelvic irradiation were selected from a prospective database consisting of 142 consecutive TEM procedures performed by a single surgeon. The postoperative morbidity, mortality, recurrence rates, and need for a permanent or temporary ostomy were assessed.

Results: Ninety three patients, 33 women and 60 men, with an average age of 69 years (29-91) qualified for inclusion. Thirty eight (40%) had a BMI above 30 (30-52), 40 (43%) had pelvic irradiation (4,320-5,580 cGy) and 73 (78%) had an ASA above II. Mean follow up was 25 months. Primary diagnoses were: 43 adenocarcinomas (40 with neoadjuvant therapy), 39 benign polyps, 6 carcinoma in situ, and 3 carcinoids. Thirty five patients referred specifically for sphincter preservation surgery and 22 sought referral after being advised they required abdominal perineal resection (APR). Sixty five (72%) tumors involved lower third of the rectum, 21 (23%), and 4 (5%) involved the middle and upper thirds respectively. No perioperative deaths; 2 patients: major postoperative wound separation requiring temporary colostomy; 10 developed minor wound separation; 3 postoperative transient fever; 2 arrhythmias; and 1 mild postoperative bleeding. Among 43 cancers pathological T staging: 10: T1, 22: T2, and 7: T3. Two patients required a subsequent APR; 1 for recurrent carcinoma and 1 for a T3N1 rectal carcinoma. There were 3/43 (7%) local pelvic recurrences.

Conclusion: Short term results of our experience indicates endoluminal TEM surgery offers a safe alternative to abdominal partial or total proctectomy in the high risk patient for whom local excision of a rectal tumor is oncologically appropriate. As an additional benefit TEM allows avoidance of a temporary or permanent stoma in the vast majority of patients.

S037

TRANSANAL ENDOSCOPIC MICROSURGERY IN THE TREATMENT OF SELECTED PATIENTS WITH DISTAL RECTAL CANCER: EXPERIENCE OF 15 YEARS, *Mario Guerrieri MD, Maddalena _ Baldarelli MD, Angelo _ De Sanctis MD, Lorenzo _ Organetti MD, Martina _ Nisi MD, Giovanni _ Lezoche MD, Emanuele _ Lezoche BA, _ Dpt of General Surgery, University of Ancona _ Il Clinica Chirurgica, University "La Sapienza", Rome*

PURPOSE: Local therapy of early rectal cancer is a valid alternative to the classical radical operation which has a higher morbidity and mortality rate. The use of high dose preoperative radiation appears to enhance the options for sphincter saving surgery also in T2-T3 rectal patients (pts) with effective local control. We report our experience with the use of Transanal Endoscopic Microsurgery (TEM) in the management of selected cases of distal rectal cancer without evidence of nodal or distant metastasis (N0-M0).

METHODS: 196 pts with rectal cancer (51 T1, 84 T2 and 61 T3) were enrolled in the study. All pts staged preoperatively as T2 and T3 underwent preoperative high dose radiotherapy and since 1997 pts with less than 70 years old and good general conditions underwent also preoperative chemotherapy.

RESULTS: Minor complications were observed in 17pts (8.6%) whereas major complications only in 2 patients (1%). The definitive histology was as follows: 33 pT0 (17%), 73 pT1 (37%), 66 pT2 (34%) and 24 pT3 (12%). Eight pts (5 pT2 and 3 pT3) developed local recurrence (4,1%) The rectal cancer specific survival rate at the end of follow-up was 100% for T1 and 96% and 76% for T2 and T3 pts respectively.

CONCLUSIONS: Pts with T1 cancer and favourable histologic features may undergo local excision alone, while those with T2 and T3 lesions require preoperative radio-chemotherapy. The results reported after TEM seems to be not substantial different in terms of local recurrence and survival rate to the results reported after conventional surgery.



S038

A RESEARCH AGENDA IN GASTROINTESTINAL AND ENDOSCOPIC SURGERY, David R Urbach MD, Karen D Horvath MD, Nancy N Baxter MD, Blair A Jobe MD, Atul K Madan MD, Aurora D Pryor MD, Leena Khaitan MD, Alfonso Torquati MD, Steven T Brower MD, Thadeus L Trus MD, Steven D Schwaitzberg MD, Society of American Gastrointestinal and Endoscopic Surgeons (SAGES)

Background: Development of a research agenda may help inform researchers and research granting agencies about the key research gaps in an area of research and clinical care. We sought to develop a list of research questions for which further research was likely to have a major impact on clinical care in the area of gastrointestinal and endoscopic surgery.

Methods: We used a formal group process to conduct an iterative, anonymous web-based survey of an expert panel consisting of the general membership of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES). In round 1, we solicited research questions, which were categorized, collapsed, and re-written in a common format. In round 2, the expert panel rated all the questions using a priority scale ranging from 1 (lowest) to 5 (highest). In round 3, the panel re-rated the 40 questions with the highest mean priority score in round 2.

Results: 241 respondents to round 1 submitted 382 questions, which were reduced by a review panel to 106 unique questions encompassing 33 topics in gastrointestinal and endoscopic surgery. In the 2 successive rounds, 397 and 385 respondents ranked the questions by priority and then re-ranked the 40 questions with the highest mean priority score. High priority questions related to anti-reflux surgery, the oncologic and immune effects of minimally invasive surgery, and morbid obesity. The question with the highest mean priority ranking was: "What is the best treatment (antireflux surgery, endoluminal therapy or medication) for GERD?" The second highest-ranked question was: "Does minimally invasive surgery improve oncologic outcomes as compared with open surgery?" Other questions covered a broad range of research areas including clinical research, basic science research, education and evaluation, outcomes measurement, and health technology assessment.

Conclusions: We used an iterative, anonymous group survey process to develop a research agenda in gastrointestinal and endoscopic surgery, consisting of the 40 most important research questions in the field. This research agenda can be used by researchers and research granting agencies to focus research activity in the areas most likely to impact clinical care and to appraise the relevance of scientific contributions.

S039

OPEN SURGERY IS ASSOCIATED WITH SUSTAINED ELEVATION OF CIRCULATING PDGF-BB, A KNOWN TUMOR GROWTH PROMOTER, WHEN COMPARED TO MINIMALLY INVASIVE SURGERY, A Belizon, A Hoffman, S Kumara, PK Horst, D Feingold, T Arnell, M Foster, A Offodile, D Moradi, RL Whelan, New York Presbyterian Hospital-Columbia Campus

Introduction: Open surgery has been associated with increased tumor growth when compared to minimally invasive surgery (MIS) in animal models; the cause remains unclear. Platelet derived growth factor-BB (PDGF-BB) is a potent angiogenic cytokine that has been shown to facilitate tumor growth in vitro. We have earlier shown that preoperative (preop) levels of PDGF-BB are significantly elevated in colorectal cancer patients when compared to those with benign disease. PDGF-bb is also an important factor in post-operative wound healing. In this study we evaluated plasma PDGF-BB levels postoperatively (postop) in both open and closed colorectal cancer patients.

Methods: Preop and postop day 2 and 3 plasma PDGF-BB levels were measured by ELISA in a total of 92 patients undergoing colorectal cancer resection. 48 patients underwent open surgery and 44 patients underwent MIS. Wilcoxon matched pairs test was used to compare PDGF-bb levels within groups, the levels at a particular time point

between groups were analyzed using the Mann whitney U test.

Results: The open and MIS groups were comparable in regards to cancer location and resection performed. Mean incision size was 17.6cm in the open group and 6.1cm in the MIS group. The open group median preop PDGF level (1737pg/ml) declined on POD 2 (1666pg/ml, p=NS vs Preop). In the MIS group the preoperative plasma PDGF-bb level (1817pg/ml) significantly decreased on POD2 (1355, p=0.0002). The POD#3 levels for both groups continued to decrease and were similar (Open-866.3 pg/ml, lap-908 pg/ml; vs preop for both, p=0.0001). The rate of decline in the MIS group was 31% in the first 48 hours and 46% after 72 hours. The rate of decline in the open group was 4 % in the first 48 hours and 44.2% after 72 hours.

Conclusion: Although many cancers produce PDGF-bb, surgical wounds may be another source. Although by POD3 similar levels were noted, open surgery is associated with higher levels of PDGF-bb early after surgery. This may be due to PDGF-bb production associated with the larger abdominal wound. Although unproven, this sustained elevation might impact the growth of residual tumor microfoci and circulating tumor cells. Further studies are needed to determine if these findings are clinically relevant and to determine late postop levels.

S040

VALIDATION OF A RODENT MODEL OF BARRETT'S ESOPHAGUS USING QUANTITATIVE GENE EXPRESSION PROFILES, Daniel S Oh MD, Steven R DeMeester MD, Christy M Dunst MD, Bethany J Lehman BS, Hidekazu Kuramochi MD, Erlinda L Kirkman DVM, Paul Kirkman BS, Jeffrey A Hagen MD, John Lipham MD, Tom R DeMeester MD, University of Southern California

BACKGROUND: There are few experimental models of GERD and Barrett's esophagus (BE). One that is commonly used involves surgically inducing reflux in rats by creating an esophagojejunostomy near the ligament of Treitz. This results in the development of intestinal-type columnar mucosa in the distal esophagus similar to BE in humans. However, this columnar mucosa is often short and it is unknown if this is truly intestinal metaplasia as a consequence of reflux or if it merely represents migration of adjacent jejunal mucosa across the anastomosis. The aim of this study was to use quantitative gene expression to determine a gene profile of the columnar mucosa located proximal to the anastomosis in this model and compare it to normal rat jejunal mucosa in order to determine the origin of this columnar esophageal mucosa.

METHODS: Seven 8-week old male Sprague-Dawley rats had ligation of the gastroesophageal junction and reconstruction with esophagojejunostomy just distal to the ligament of Treitz. After 30 weeks the rats were euthanized and the distal esophagus, proximal jejunum, and colon were harvested from each. Tissue was microdissected to obtain only the mucosal cells of interest. Total RNA was isolated, reverse transcribed to cDNA, and RT-PCR was used to measure the mRNA expression of trefoil factor (TFF)-1, -2, and -3, informative genes for distinguishing BE from small intestine in humans. Principal components analysis was used to compare the expression profiles.

RESULTS: All 7 rats had columnar mucosa in the distal esophagus proximal to the anastomosis, and in all cases goblet cells were present on H&E staining. The length of columnar mucosa was 1 to 5 mm. Principal components analysis of the gene expression data classified 4 esophageal samples (57%) as distinctly different from normal rat jejunum or colon, while the remaining 3 (43%) were classified as jejunum.

CONCLUSION: We confirm that the rat esophagojejunostomy model can produce intestinal metaplasia in the distal esophagus with a significantly different genetic profile than that of normal rat intestine, suggesting that this is similar to BE in humans. The inability of gene profiling to distinguish the esophageal columnar mucosa from normal rat intestine in 3 animals may reflect creeping of jejunal mucosa above



the anastomosis in these animals rather than true metaplasia. Future studies using this model should use this gene panel to confirm that the columnar mucosa is truly metaplastic.

S041

MICRODIALYSIS AS A NEW METHOD FOR EVALUATING OF INFLUENCE OF PNEUMOPERITONEUM ON THE KIDNEY: EXPERIMENTAL STUDY,

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Background: Nowadays, laparoscopic donor nephrectomy is a less invasive technique for the donor than a conventional open donor operation and has become the first choice for living donor kidney transplantation. Many experimental and clinical studies about the influence of increased intra-abdominal pressure on graft have showed that micro- and macro-circulation of abdominal organs and tissues are reduced, and this condition is thought to cause severe damage on splanchnic organs. However there is not enough monitoring method to evaluate hemodynamic and metabolic changes in kidney during and after pneumoperitoneum. Microdialysis is a technique to monitor the metabolic state of organ itself, based on a chemistry analysis over time with sampling of interstitial compounds using membrane based dialysis sacs. In physiological conditions during glycolysis, glucose is metabolized into pyruvate, and in the presence of oxygen, pyruvate enters the citric acid cycle. During ischemia lactate is produced from pyruvate in order to maintain anaerobic glycolysis with low energy production. Therefore, monitoring of lactate and pyruvate levels reveals whether aerobic metabolism is occurring in the organ. Glycerol is an end product of lipolysis in adipose tissue and is also an indicator of membrane disintegration during such events as ischemia. All these parameters of ischemia can be monitored in the tissue with microdialysis and analysed. The aim of this study is to evaluate cell damage during and after pneumoperitoneum by microdialysis.

Material and Method: Two microdialysis catheters were inserted into both cortex and medulla of left kidney after open laparotomy to eight pigs. Continuous microdialysis analysing was performed under standard pressure (16-18 mmHg) for 4 hours and after rapid disufflation.

Result: During pneumoperitoneum, Glucose, Lactate and Pyruvate level did not show ischemia pattern and Lactate-Pyruvate Ratio in cortex and medulla gradually decreased. After decompression, Glucose, Lactate, Pyruvate level and Lactate-Pyruvate ratio did not change, but Glycerol level especially in medulla rapidly increased.

Conclusions: The changes in glucose metabolism and glycerol level strongly suggested that renal cell damage occurs. This injury is most likely related to hyperperfusion after decompression, or mechanical cell expansion at the point of rapid decompression. Microdialysis is useful tool to monitor the cell damage faster than analyzing peripheral blood.

S042

TCF7L2 EXPRESSION IN DIABETIC PATIENTS UNDERGOING BARIATRIC SURGERY,

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Objective: Bariatric surgery can improve type 2 diabetes in obese patients. However, the physiologic mechanisms of this process remain unclear. Genetic studies have linked polymorphisms of the transcription factor 7-like 2 (TCF7L2) gene with type 2 diabetes. We examined the expression of the TCF7L2 gene product in patients undergoing bariatric surgery.

Methods: Extraneous liver tissue was collected from 22 patients (8 diabetic) and snap frozen in liquid nitrogen. Total RNA was extracted from each tissue sample and reverse transcribed into cDNA. TCF7L2 expression was measured using quantitative PCR (qPCR) with oligonucleotide primers specific for the TCF7L2 gene product. The 18S ribosomal gene was used to normalize expression levels. A linear

regression analysis of TCF7L2 was performed using preoperative variables including BMI, age, and HbA1c. Statistical analysis was considered significant at $p < 0.05$.

Results: TCF7L2 expression had a significant positive linear relationship with BMI in patients with diabetes or HbA1c $> 6.0\%$ ($p < 0.02$). TCF7L2 expression was not significantly correlated with BMI in non-diabetic patients. Finally, no significant correlation was found between TCF7L2 expression and age.

Conclusions: Increased expression of TCF7L2 correlates with increased BMI in diabetics undergoing bariatric surgery. These results suggest that the mechanisms of impaired glucose homeostasis in morbid obesity may involve the TCF7L2/Glu-1 signaling pathway. TCF7L2 or its downstream products may be effective as markers or as novel therapeutic targets for diabetes in obesity. Our future studies will examine the relationship between TCF7L2 and BMI in peripheral blood obtained from bariatric patients pre- and post-operatively.

S043

IMMUNOHISTOCHEMICAL AND HISTOLOGICAL ANALYSIS OF HOST REACTION TO HEAVY-WEIGHT, REDUCED-WEIGHT, AND POLYTETRAFLUOROETHYLENE-BASED MESHES AFTER SHORT- AND LONG-TERM IMPLANTATIONS,

Yuri W Novitsky MD, Joseph Cristiano BS, Andrew G Harrell MD, H. James Norton PhD, Kent W Kercher MD, B. Todd Heniford MD, Carolinas Medical Center

Background: The degree of foreign body reaction is related to the mesh biocompatibility. Exaggerated inflammatory response may lead to excessive scarring with detrimental clinical consequences. Our aim was to characterize the degree of inflammatory change induced by common prosthetic meshes, both short- and long-term.

Materials and Methods: Twenty 4x4cm samples each of ePTFE, standard polypropylene (PP), ePTFE with PP (ePTFE/PP), and reduced-weight PP (rPP) were implanted intraperitoneally in 40 rabbits. After 4 and 12 months, mesh/tissue complex samples were sectioned for histologic and immunohistochemical analysis of infiltrating cell types (Masson's trichrome), cellular apoptosis (ELISA) and cellular turnover (Ki-67 mouse monoclonal antibody). Statistics were performed using Kruskal-Wallis and Wilcoxon-Rank Sum tests.

Results: In the short-term, the cell apoptosis surrounding PP and ePTFE/PP was significantly higher than either ePTFE or rPP ($P < 0.01$). The amount of Ki-67-positive cells was higher in the PP than ePTFE and rPP groups ($p = 0.004$ and $p = 0.002$). The cell turnover in the ePTFE/PP group was similar to the PP group, but higher than either ePTFE or rPP groups ($p = 0.007$ or $p = 0.003$). In the long-term, the degree of apoptosis was significantly lower in the ePTFE than ePTFE/PP and PP groups. There were no differences between the ePTFE vs rPP or PP vs ePTFE/PP groups in either apoptosis or Ki-67 positivity. When the short and long-term groups were compared, significant reduction in apoptosis was noted in all meshes except for PP. Histologically, the numbers of inflammatory and giant cells were statistically greater surrounding PP and ePTFE/PP meshes.

Conclusion: PP-based meshes were associated with more profound inflammatory response, higher cell apoptosis and turnover, indicative of ongoing inflammation and scar remodeling even 1 year after implantation. Overall, exaggerated and persistent host foreign-body response to heavy-weight polypropylene-based meshes indicates poor biocompatibility with potential detrimental clinical sequela. rPP mesh may have better tissue response due to the reduction in foreign body.

**S044**

TRANSGASTRIC INSTRUMENTATION AND BACTERIAL CONTAMINATION OF THE PERITONEAL CAVITY, Jeffrey W Hazey MD, Bradley J Needleman MD, W S Melvin MD, Dean J Mikami MD, Vimul R Narula MD, The Ohio State University Medical Center

Introduction: Natural Orifice Transluminal Endoscopic Surgery (NOTES) is a rapidly evolving technique providing access to the peritoneum utilizing an endoscope via a natural orifice. One of the most significant requirements of this technique is the need to minimize the risk of clinically significant peritoneal contamination. We report the bacterial load and contamination of the peritoneal cavity in patients requiring a gastrotomy open to the peritoneum during roux-en-y gastric bypass.

Methods and Procedures: We prospectively studied 19 patients undergoing laparoscopic gastric bypass. As part of the operative procedure, a gastrotomy was created to perform the gastrojejunostomy. We recorded the patient's PPI utilization preoperatively and sampled gastric contents without lavage. We also sampled peritoneal fluid prior to and after gastrotomy noting the length of time the gastrotomy was open to the peritoneum. Each of the three samples was sent for bacterial colony counts, accounting for dilution with irrigation, and culture with identification of species. Morbidity and mortality were also recorded.

Results: Nineteen patients underwent laparoscopic roux-en-y gastric bypass with a mean operative time of 95 minutes. The gastrotomy was open to the peritoneal cavity for an average of 18 minutes. Five of nineteen patients were on ppi's preoperatively resulting in no significant difference in post gastrotomy peritoneal bacterial counts. The average number of colony forming units (CFU) of the gastric aspirate was 7,672 CFU/ml. Peritoneal aspirates obtained for examination prior to creation of a gastrotomy showed no CFU's in 18 of 19 patients. One patient had 167 CFU/ml prior to creation of the gastrotomy. Peritoneal sampling after gastrotomy showed contamination of the abdomen with an average of 24,720 CFU/ml. There was no correlation between the bacterial load in the stomach and peritoneal load after gastrotomy. No patients developed an infectious complication or leak. There was one complication of rhabdomyolysis in a patient with no peritoneal bacterial contamination.

Conclusions: Transgastric instrumentation does contaminate the abdominal cavity but pathogens are clinically insignificant due to species or bacterial load.

S045

INFECTIOUS COMPLICATIONS OF NATURAL ORIFICE TRANSLUMENAL ENDOSCOPIC SURGERY (NOTES) WITH PERCUTANEOUS ENDOSCOPIC GASTROTOMY (PEG) TUBE CLOSURE: A QUANTITATIVE BACTERIOLOGIC STUDY IN THE PORCINE MODEL, Michael F McGee MD, Jeffrey M Marks MD, Raymond P Onders MD, Amitabh Chak MD, Michael J Rosen MD, Christine P Williams MD, Judy Jin MD, Steve J Schomisch BS, Jeffrey L Ponsky MD, Case Medical Center, Case Western Reserve University, Department of Surgery, Department of Gastroenterology, Cleveland, Ohio, USA

BACKGROUND: Reliable closure of transvisceral defects is a barrier currently limiting NOTES in human practice. PEG tubes have been proposed as means of managing a NOTES gastrotomy while providing chronic enteral access. NOTES PEG closure has not been studied in survival animals, nor have the microbiological implications of NOTES been characterized.

METHODS: 19 pigs received gastric lavage with saline, chloramphenicol or no lavage and underwent transgastric NOTES peritoneoscopy. Quantitative cultures were obtained endoscopically at discrete points during each surgery. A sterile foreign body (teflon coated wire) was placed percutaneously under NOTES guidance into the peritoneal cavity and left in place. The gastrotomy was closed with a standard 20-Fr. PEG tube. Animals were followed for 14 days and then underwent sterile laparotomy. Completion cultures for both wire and peritoneal cavity were obtained.

RESULTS: 19 animals successfully underwent NOTES and 18 (94.7%) survived the entire 14 day period without observable sequelae. 1 animal died on post-operative day #2 after the PEG tube dislodged. At 14 days, 5 animals (27.8%) demonstrated intra-abdominal abscesses, 7 (38.9%) had positive peritoneal wash cultures, and 10 (55.6%) wires were contaminated on culture. 12 animals (75%) had either abscess, positive peritoneal, or positive wire culture at the end of the study. Infectious complications were not altered by type of gastric lavage or peritoneal bacterial inoculum introduced at time of surgery. Pre-procedural lavage was not effective in completely evacuating gastric succus, as 8 of 13 animals (38.5%) had intra-operative NOTES peritoneal fluid cultures grow in excess of 10^3 CFU/ml of bacteria.

CONCLUSIONS: In the pig, PEG closure of a NOTES gastrotomy causes subclinical intra-abdominal abscess formation, and can result in death when the tube is dislodged in the perioperative period. Pre-procedural gastric lavage does not alter the intra-abdominal bacterial burden introduced at time of surgery or subsequent infectious outcomes in the pig model. Infectious complications may represent failure of PEG gastrotomy management, intra-operative seeding and deposition of succus during NOTES, or conditions unique to the pig such as inability to evacuate bezoars, dependent positioning of the PEG, and quadrupedism. These concerning findings necessitate additional studies to determine if porcine models are appropriate and applicable to human subjects in the NOTES setting.

S046

DUAL LUMEN NOTES: A NEW METHOD FOR PERFORMING A SAFE ANASTOMOSIS, Yoav Mintz MD, John Cullen MD, Eric Falor, Mark A Talamini MD, Department of General Surgery, University of California San Diego, CA

Objective: Bowel anastomosis is one of the most challenging and difficult tasks to perform during NOTES procedure due to the technical limitations of the endoscopic instruments available. Currently, endoscopic clips, T-bar sutures or cumbersome suturing devices are used. A dual lumen NOTES approach will facilitate bowel resection in a pig model by allowing the use of laparoscopic staplers through the rectum. **Methods:** An acute study on a 40-kg pig model was performed in the dual lumen NOTES approach. An endoscope was passed into the stomach and was pushed through the stomach wall into the peritoneal cavity following an incision on the anterior wall of the stomach. A 5 mm incision on the anterior part of the rectum was performed under direct vision using the gastric endoscope. A laparoscopic stapling device was then passed through the rectum and into the peritoneal cavity. Following this, a loop of small intestine was transected using both the stapler and the gastric endoscopic instruments. Small enterotomies were made in each bowel stump and the two segments of bowel were loaded onto the stapler using the endoscopic graspers. A communication between the two parts of bowel was created and a final staple load closed the remaining enterotomy and completed the anastomosis. The resected small bowel was then removed through the rectum.

Results: Small bowel resection and anastomosis was successfully created using the dual lumen NOTES approach. The stapler was used one more time to close the gastrotomy. At autopsy, intact suture lines were noted at the bowel anastomosis and in the stomach with no evidence of leak from either site.

Conclusions: Performing a sutured anastomosis in NOTES is complex and time consuming. Designing flexible staplers that would fit through the endoscope channels is a major engineering challenge and therefore there is a need for another method. The use of stapling devices designed for laparoscopic procedures greatly facilitates gastrointestinal tract operations in NOTES. Using both the upper and lower GI tract as entry sites for natural orifice surgery eliminates some of the current technical limitations of these procedures. Additionally, staple closure of the stomach incision is a convenient and safe method that can be applied in the same manner. Closing the rectal incision seems to be a lesser challenge.

**S047**

SUCCESSFUL CLOSURE OF GASTROTOMY USING BIOABSORBABLE PLUGS IN A CANINE MODEL, T J Cios BS, K M Reavis MD, D R Renton MD, J W Hazey MD, D J Mikami MD, M T Allemang BS, S S Davis MD, C M Paul BA, W S Melvin MD, The Ohio State University Hospital, Center for Minimally Invasive Surgery

Introduction: The repair of gastric perforation commonly involves simple suture closure using an open or laparoscopic approach. An endoluminal approach using prosthetic materials may be beneficial. The role of bioprosthesis in this instance has not been thoroughly investigated, thus we evaluated the feasibility of gastric perforation repair using a bioabsorbable plug and quantified gross and histological changes at the injury site.

Methods: Twelve dogs were anesthetized and underwent open gastrotomy. A one centimeter-diameter perforation was created in the anterior wall of the stomach and plugged with a bioabsorbable device. Luminal pH was recorded. Dogs were sacrificed at 1, 6, 8 and 12 weeks. The stomach was explanted followed by gross and histological examination. The injury site was examined; the relative ability of the device to seal the perforation was recorded, as were post-operative changes. Tissue samples were analyzed for gross and microscopic tissue growth and compared to normal gastric tissue in the same animal as an internal control. A scoring system of -2 to +2 was used to measure injury site healing.

-2 = Leakage present; no tissue ingrowth
 -1 = No leakage; minimal tissue ingrowth
 0 = Physiologic healing
 +1 = Mild hypertrophic tissue ingrowth
 +2 = Severe hypertrophic tissue ingrowth

Results: In all dogs, the bioabsorbable plug successfully sealed the perforation without leak under ex vivo insufflation. At one week, the device maintained its integrity but there was no tissue ingrowth. Histological healing score was -1. At six and eight weeks, gross examination revealed a healed injury site in all animals. The luminal portion of the plug was completely absorbed. The gross and histological healing score was 0.

Conclusion: The application of a bioabsorbable plug results in durable closure of gastric perforation with physiologic healing of the injury site. This method of gastrotomy closure may aid in the evolution of advanced endoscopic approaches to perforation of the GI tract.

S048

RELIABLE GASTRIC CLOSURE AFTER NOTES USING A NOVEL PER-ORAL FLEXIBLE STAPLING DEVICE, Ozanan R Meireles MD, Sergej Kantsevov MD, Lia R Assumpcao MD, Eric J Hanly MD, Anthony N Kalloo MD, Michael R Marohn DO, Dept of Surgery - Johns Hopkins University School of Medicine, Baltimore, MD

Introduction: Among natural orifice transluminal endoscopic surgery (NOTES) approaches, the transgastric route is both the most studied and appears the most promising. However, transgastric NOTES still has important challenges to overcome, including the crucial step of assuring reliable and adequate gastrotomy closure. We report our initial experience with gastrotomy closure using Power Medical's SurgASSIST, a novel, per-oral, flexible, endoluminal automated stapling device investigated in a porcine model of NOTES.

Methods: Four adult swine underwent per-oral gastrotomy with transgastric advancement of the gastroscope into the peritoneal cavity. At conclusion of the NOTES procedure, the gastroscope was withdrawn to within the stomach. The SurgASSIST stapler was advanced per-orally into the stomach. Under direct visualization, gastrotomy edges were positioned between the stapler blades using two gastroscope forceps inserted through the working channels. The stapler blades were approximated and the stapler load fired; the stapling device's cutting blade was deployed, transecting

between the two staple lines leaving a linear gastric staple line representing gastrotomy closure, and a small linear piece of gastric tissue which was removed. Integrity of the staple line was assessed with visual inspection. Upper GI xray series was then performed to assess for gastric leakage. All procedures were performed in accordance with an institutionally approved animal care and use protocol.

Results: The SurgASSIST stapling device was easily introduced through the oral cavity into the esophagus and gastric chamber. The number of staple loads varied from one to two to obtain complete gastric closure. The resected portion of gastric tissue following staple deployment and transection revealed continuous, intact staple lines in all animals. Upper GI series demonstrated no gastric leaks.

Conclusion: NOTES is feasible and an expanding array of potential applications are being investigated. However, dependable gastric closure is essential for future clinical application of NOTES. The Power Medical SurgASSIST device may provide a simple, secure, reliable, technique for gastric closure following NOTES. The results of this small pilot experiment warrant the performance of a large-scale animal survival study to evaluate the long-term efficacy of SurgASSIST for gastric closure NOTES transluminal surgery.

S049

COMPLETE ENDOSCOPIC CLOSURE OF GASTROTOMY FOLLOWING NATURAL ORIFICE TRANSLUMINAL ENDOSCOPIC SURGERY (NOTES) USING THE NDO PLICATOR, Jeffrey Marks MD, Michael McGee MD, Raymond Onders MD, Amitabh Chak MD, Christina Williams MD, Judy Jin MD, Steve Schomisch, Jeffrey Ponsky MD, Case Western Reserve University

Background: The NDO Plicator is a device developed for endoscopic treatment of gastroesophageal reflux disease (GERD) by approximating tissues together with a double pledgeted u-stitch. It was theorized that this device may facilitate transgastric NOTES, as closure of the transgastric defect remains a key component for advancement of this new technology.

Methods: A standardized 12 mm gastrotomy was created endoscopically in 4 pigs with a combination of needle knife cautery and balloon dilation. As the endoscope was removed, a Savory soft-tipped wire was introduced into the stomach and the NDO Plicator was subsequently advanced over the wire. Each defect was identified and the device was positioned. If necessary, the Plicator's tissue grasper was used to hold the superior aspect of the gastrotomy and bring the opposed borders of the defect within the jaws of the device. The device was fired three times, leaving three pledgeted suture bundles to close the gastric defect. Following closure, each animal was explored and the integrity of closure was assessed. Animals underwent in vivo contrast fluoroscopy and ex vivo burst pressure testing studies to assess leakage at the closure site.

Results: The first animal was used to test feasibility, refine techniques, and develop a standard procedure. Of the next three animals studied, all showed complete sealing of the gastrotomy site without evidence of contrast extravasation on multi-planar fluoroscopic imaging. Each stomach was excised, submerged under water, and subjected to a pressurized air leak test. No air leaks were noted until pressures exceeded 55 mmHg.

Conclusion: This study supports the use of the NDO Plicator for closure of standardized gastric defects in a porcine model. In addition to closing NOTES gastrotomies, the NDO Plicator may be a particularly useful tool in obtaining complete closure of gastric perforations, anastomotic leaks, and performing stomal reduction following gastric bypass procedures. The mechanical properties of a closure are not the only factor in determining if a leak will develop. Tissue apposition, ischemia, and tension are important factors that are not easily or reliably measured. The physiologic relevance of gastric bursting pressure is not known; therefore corollary studies with longer term evaluation in animals are necessary prior to proceeding to clinical trials.



S050

OBJECTIVE OUTCOME ANALYSIS OF CURRENTLY AVAILABLE GASTRO-ESOPHAGEAL REFLUX DISEASE (GERD) TREATMENTS., Richard Nguyen DO, Yasser Youseff MD, Joan Kiser RN, William O Richards MD, Alfonso Torquati MD, Vanderbilt University

Despite the endoscopic treatment for GERD has been available in the last 5 years, there are no studies that compare objective outcome of these procedures with the gold standard therapies: laparoscopic Nissen fundoplication (LF) and proton-pump inhibitors (PPI). The aim of the study is to evaluate if these new endoscopic techniques have comparable efficacy in distal esophageal acid exposure control.

Methods: Under IRB approved protocols, 57 patients with pH-data proven GERD were included in cross-sectional study after GERD treatment. A 24-hour pH study was performed in 13 patients with on-going BID PPI therapy, in 10 patients after LF fundoplication, 10 patients after endoscopic plication (NDO Plicator) and in 24 patients after endoscopic radiofrequency treatment (Stretta procedure). Tracings were analyzed for distal esophagus acid exposure.

Results: As shown in the table, patients after LF and with ongoing PPI treatment had a significant lower distal esophageal acid exposure (P<0.05 vs. Plicator and RF) and lower Johnson-DeMeester score (P<0.05 vs. Plicator and RF). Furthermore, LF and PPI treatment were more effective in achieving a normal pH exposure in GERD patients (P<0.05 vs. Plicator and RF) .

Pt. with pathol	% time pH<4.0	Johnson-DeMeest
LF (n=10)	0/10 (0)	1.2±0.9 5.9±5.0
PPI (n=13)	2/13 (15)	2.5±4.1 12.2±21.1
Plicator (n=10)	6/10 (60)	5.1±3.4 28.9±19.1
RF (n=24)	15/24 (62.5)	5.4±3.5 29.5±19.9

Results of Ph study after treatment

Conclusion: Currently, laparoscopic Nissen fundoplication and PPI therapy still represent the best therapeutic approaches in patients with GERD in terms of objective outcome.

S051

FLANK APPROACH VERSUS ANTERIOR SUBMESOCOLIC ACCESS IN LAPAROSCOPIC LEFT ADRENALECTOMY: A RANDOMIZED TRIAL. Mario Guerrieri MD, Francesca Crosta MD, Maddalena Baldarelli MD, Giovanni Lezoche MD, Angelo De sanctis MD, Roberto Campagnacci MD, Emanuele Lezoche MD, General Surgery and Surgical Methodology Unit, University of Ancona, Italy; 2nd Surgical Institute, "La Sapienza" University, Rome, Italy

Aim: The most frequently access performed by laparoscopy to adrenal gland is the flank approach. Aim of the present study is to compare the results of two different approach to adrenal gland in a randomized trial: anterior submesocolic access vs flank in laparoscopic left adrenalectomies.

Patients and methods: Twenty four cases were treated by flank intraperitoneal approach (group A) and 23 by submesocolic transperitoneal approach (group B). BMI, operative time (total and from the start of the skin until adrenal vein closure), hospital stay, tumour size, definitive histology between the two approach were analysed.

Results: There were not conversions to open surgery neither major complications. Mean BMI was similar between two groups. Mean operative time was 75 min (range 50-140) vs 61,75 (range 40-130) between group A and B, respectively (p<0,05). Mean operative time from the start of the skin until adrenal vein closure was 42 min (range 34-57) vs 21 (range 16-27) between group A and B, respectively (p<0,05). Mean hospital stay was 3,2 days vs 2,1 between group A and B, respectively (p<0,004). Mean tumor size was similar between group A and B: 3,6 (range 1,5-6,5) vs 3,8 (range 2-6), respectively. Definitive histology between group A and B were: Cushing adenoma (6 vs 3), Conn adenoma (5 vs 6), pheochromocytoma (3 vs 9), Incidentaloma (7 vs 4). Moreover 1 myelolipoma, 1 metastases and 1 adreno-

genital adenoma were observed in group A and 1 carcinoma was observed in group B.

Conclusions: Submesocolic approach provides a significantly shorter operating time and hospital-stay. The identification and early closure of the adrenal vein with minimal gland manipulation resulted the main benefit of this approach.

S052

MORBIDITY AND COMPLICATIONS FOLLOWING TRANSANAL ENDOSCOPIC MICROSURGERY: A SINGLE SURGEON'S TWENTY FIVE YEARS EXPERIENCE. Lee E Smith MD, Chadi T Abouassaly MD, Washington Hospital Center

Transanal endoscopic microsurgery (TEM) has been advocated as an alternative to radical surgery for tumors of the rectum in patients with benign or T1N0M0 carcinomas or as palliation in high risk patients. The purpose of this article is to review our complications with TEM. From 1991-2006, we treated 183 patients with TEM. Indications were adenoma in 94, rectal cancer in 37, malignant polyp site in 30, carcinoid in 13, and palliation in 9. Follow up ranged from one month to 125 months with an average of forty two months. The average level of lesions in rectum was 8.27 cm. The adenoma group had the largest average diameter with carcinoid and malignant polyp site being the smallest (3.65, 1.35, 1.39 cm respectively). One patient died of an ischemic colon within one month of surgery. Twenty five patients (13.6%) had complications. The most frequent morbidity was urinary retention in 6 patients. Two patients had a significant rectal bleed that occurred after they were discharged and necessitated hospital readmissions. One patient complained of short term musculoskeletal pain which was attributed to intra-operative positioning. Five patients had complications related to anesthesia. Two patients had perforation into the peritoneum requiring laparotomy; both were in the adenoma group. One patient developed a recto-vaginal fistula. Three patients were febrile post-operatively and were treated with antibiotics empirically. One patient developed C-Difficile colitis. The group that underwent TEM for carcinoid, had no complications and had the smallest diameter of lesion excised. The rest of the groups had no significant difference in rate of complications.

Average length of hospital stay was 0.5 days, with a range from zero to seven days. TEM is a safe and well tolerated procedure with few major complications, even in a high risk population. It is a good option for T1N0M0 carcinomas, benign lesions and high risk patients.

S053

PROVIDER VOLUME IMPACTS IN-HOSPITAL MORTALITY FOLLOWING GASTRIC BYPASS SURGERY. Jennifer L Denne MD, Yangchun Du MS, Ioannis Raftopoulos MD, Frank D'Amico PhD, Anita Courcoulas MD, University of Pittsburgh School of Medicine, Duquesne University Department of Statistics

Initiatives such as pay for performance and center of excellence designation offer great promise for improving surgical quality. In addition, there is increasing recognition that surgical outcomes following complex procedures vary by provider, both surgeon and hospital. Gastric bypass surgery is one such procedure that is the subject of increasing scrutiny as it relates to outcomes and has become a popular target for quality-based selective contracting. This study explores the relative importance of surgeon and hospital volume on in-hospital mortality following gastric bypass surgery in a large population-based and geographically diverse sample. Using information from five states' discharge databases for 2001-2003, we examined mortality among 49,111 patients who underwent gastric bypass procedures. There were 122 in-hospital deaths among 49,111 cases (0.25%) over the three-year period. Hospital volume was grouped into "low", "medium", and "high" volume institutions, each containing approximately one third of the total number of patients treated. Surgeon volume was categorized based on clinically relevant numbers of cases per-



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formed (< 150 cases, 151-584 cases, and > 585 cases per surgeon) over the three-year period. Model adjusted mortality rates for "low" to "high" volume hospitals were 0.23%, 0.21%, and 0.31%, respectively (p = 0.60). In contrast, surgeon volume was strongly, and inversely, related to operative mortality (p<0.01) with rates of 0.48% (< 150 cases), 0.27% (151-584 cases), and 0.01% (> 585 cases). The most common in-hospital, post-operative complications were respiratory in nature, followed by cardiac, bowel obstruction, and bleeding. Of those patients who had infection, peritonitis, fascial wound disruption, or acute renal failure, eight to 12% of them went on to die during that hospitalization. In-hospital mortality following gastric bypass is significantly lower when performed by high-volume surgeons. The volume level of the hospital did not have the same effect on outcome. The finding that the volume-outcome effect is mediated by surgeon alone, along with the early complication profile, indicates that this may be due to a higher technical, operative and early complication rate among inexperienced surgeons. These results can be used to help define opportunities to improve care and imply that increasing the individual surgeon's volume under mentorship can save lives, further contributing to improvement in surgical quality.

S054

SIMULATED LAPAROSCOPIC OPERATING ROOM CRISIS: APPROACH TO ENHANCE THE SURGICAL TEAM PERFORMANCE, Kinga A Powers MD, Scott T Rehrig MD, Noel Irias, Hedwig A Albano RN, David M Feinstein MD, Anna C Johansson PhD, Stephanie B Jones MD, Andrew Malinow PhD, Donald W Moorman MD, John B Pawlowski MD, Daniel B Jones MD, Beth Israel Deaconess Medical Center, Harvard Medical School

OBJECTIVE: Diminishing human error and improving patient outcomes is the goal of task training and simulation experience. The Fundamentals of Laparoscopic Surgery (FLS) is a validated tool to assess technical laparoscopic skills. We hypothesize that performance in a crisis depends on technical skills and team performance. We developed a high fidelity crisis simulation model and evaluated its face and construct validity. Reliability of measures of individual provider's technical and team performance were also tested. **METHODS:** Conducted in our mock endosuite, the scenario assessed FLS certified surgeon experts (n=5) and not FLS certified novices (n=5). Performance was assessed using validated procedure-specific rating scales. Objective outcome measures were: time to diagnose bleeding (TD), to inform the team (TT), to convert to open (TC). Welch's t-Test, ANOVA and Cronbach's coefficient alpha were used for data analysis.

RESULTS: Median Score for Face Validity was 4.2, 4.4, 4.6 (maximum=5) for FLS, non-FLS and nursing groups respectively, with an inter-rater reliability of 93%. Although no difference was observed in Veress safety (VS) and laparoscopic equipment set up (SU) (p>0.05), there was a significant difference between the two groups in their overall technical and non-technical abilities (p<0.05), especially in identifying bleeding (IDB), controlling bleeding (CB), team communication (TCom) and team skills. There was a trend, towards a difference between the two groups for TD, TT and TC. While experts controlled bleeding in a shorter time they persisted longer laparoscopically.

group	TECHNICAL (%)					NON-TECHNICAL (%)		
	VS	SU	IDB	CB	Overall	T Com	T Skills	Overall
FLS	96.2 ±2.5	93.7 ±7.5	88 +11.1*	91 ±17.5*	91 ±17.5*	94 ±4.56*	86 ±6.2*	89 ±5.94*
NON FLS	79 ±18.3	80.0 ±7.9	58 ±18.3	43 ±25.6	46 ±21.6	56 ±12.81	53 ±9.3	51 ±14.86

All data mean ± SD, P < 0.05 *

CONCLUSIONS: Our evidence suggests that face and construct validity has been established for a laparoscopic simulation in a mock endosuite. Technical and non-technical performance discrimination was observed between novices and experts. This innovative multidisciplinary simulation is aimed at improving error/problem recognition and initiation of appropriate and safe responses by surgical teams.

S055

TIMING OF LAPAROSCOPIC CHOLECYSTECTOMY FOLLOWING EMERGENCY ADMISSION WITH ACUTE BILIARY DISEASE, Gerald G David, Ali A Al-Sarira, Simon L Singer, David J Corless, Mark Deakin, John P Slavin, Department of General Surgery, Leighton Hospital, Crewe. United Kingdom. Department of General Surgery, University Hospital of North Staffordshire, Stoke-on-Trent. United Kingdom.

Introduction. Early laparoscopic cholecystectomy (LC) is considered to be safe and efficacious in the management of acute biliary colic or cholecystitis. If LC is performed after 72 hours of symptom onset the conversion rate was thought to be higher. We set out to analyse the timing of LC and its relation to conversion rate following emergency admission with acute biliary disease.

Methods. Hospital Episode Statistics (HES) data for the year 2003 - 04 was obtained from the Department of Health and exported to an access database for analysis. All patients admitted as an emergency with gall stone disease as identified by the International Classification of Diseases (ICD) code - 10th revision K80 were included in our analysis. Operative codes for laparoscopic and lap converted to an open cholecystectomy were used to identify patients undergoing surgery.

Results. Thirty two thousand one hundred and five patients were admitted 36,442 times as an emergency with acute gall bladder disease in England between April 2003 and March 2004. The male to female ratio was 1:2 and the median age at presentation was 59 years (Inter quartile range (IQR) 42 - 72 years). Four thousand and eighty three (13.34%) patients underwent an emergency cholecystectomy during their first emergency admission. The median number of days between admission and operation was 3 (IQR 1-6). Three thousand (70.05%) of these were attempted laparoscopically. Two hundred and ninety eight LCs were converted to an open cholecystectomy (Conversion rate of 9.93%). When the conversion rate was further analysed over the first week following admission, there was no statistically significant difference observed on any particular day (p value 0.35). The median post op stay following a LC was 2 days (IQR 1 - 4 days) and was significantly lower compared an open cholecystectomy or a laparoscopic converted to an open cholecystectomy when the median post op stay was 6 days (IQR 3-10 days), p value <0.001.

Conclusions. The conversion rate for an emergency LC remains around 10% during the first week following an emergency admission with acute biliary disease and is not increased after 72 hours. Successful laparoscopic cholecystectomy is associated with a reduced post operative stay.

S056

THE IMMEDIATE REOPERATION OF T1B INCIDENTAL GALL-BLADDER CARCINOMA- A CONTROVERSY DEBATE ABOUT THE POSSIBLE IMPROVEMENT OF THE PROGNOSIS AND ABOUT GETTING A DEFINITE STAGING., Vittorio Paolucci PhD, Thorsten Goetze PhD, Clinic for general-, abdominal- and minimally invasive surgery

Introduction: The immediate reoperation after a cholecystectomy for an incidental gallbladder carcinoma is discussed controversy.

For a T1 tumour a cholecystectomy is enough. For T2 and more advanced stages an immediate reoperation is permitted according to the guidelines of German Society of Surgery.

The rate of positive lymph nodes is up to 46% in the T2 stage.

In which T- stage such a reoperation should be undertaken is discussed controversy in the international literature. Some authors recommend a reoperation in case of T1b-stage and improve the 5 year survival from 60 to 100%, because the rate of positive lymph nodes is up to 16% and the lymphatic, venous and perineural infiltration is up to 50% according to the literature.

Others recommend a reoperation only when the margins are positive or when there is subserosal invasion > 2mm. The question is, if T1b tumours do profit from a reoperation



or if this operation is only an additional lethality, the same question for T3 and T4 tumours.

Material and method: To obtain data we are using Register of incidental gallbladder carcinoma of the German Society of Surgery.

Results: 441 cases of incidental gallbladder carcinomas are registered.

In 68 patients with T1- tumour there was no reoperation.

In 23 patients with T1- tumour there was a reoperation.

There is a prognostic advantage for T1- tumours with a reoperation.

In 115 patients with T2- tumour there was no reoperation.

In 85 patients with T2- tumour there was a reoperation.

The Kaplan- Meier graph for T2- tumours shows a significant prognostic advantage for T2- tumours with reoperation. Graph 3 and 4 shows no better survival for T3 and T4- tumours after a reoperation.

Discussion: There is a survival benefit for the reoperated T1b tumours and a significant better survival for T2- tumours after an immediate reoperation (log- rank < 0,05). For T3/4- tumours there seems to be no prognostic benefit. Gallbladder cancer is a very aggressive tumour and the following outcome is not clear, so according to the authors an immediate reoperation for patients with gallbladder cancer above all in the early stages should be proclaimed, regarding the morbidity and mortality.

Without a radical resection it is almost impossible to make definite statement concerning the nodal status and to get exact staging of the patient to estimate the prognosis.

S057

INTRAOPERATIVE ERCP FOR THE TREATMENT OF RETAINED BILIARY STONES, Avraham Belizon MD, Valentine Nfonsam MD, Bernard Stark MD, Amit Joshi MD, Gary Gecelter MD, Long Island Jewish Medical Center

We have previously demonstrated the feasibility of combined laparoscopic cholecystectomy (LC) and intraoperative ERCP for the management of retained common bile duct (CBD) stones. This larger scale study evaluates the combined procedure in more detail and compares it to the results of alternative management options reported in the literature.

Methods: All pts at a single institution that underwent a combined LC/ERCP between Jan 93 and July 06 were identified using a computerized operating room database. All pts had either an intraoperative transcystic cholangiogram positive for retained CBD stones or clear preoperative evidence of choledocholithiasis. Charts were reviewed for age, length of stay, morbidity, mortality, ERCP results, and postoperative course.

Results: A total of 287 pts were identified during the time period under investigation. The mean age was 59 years. 275 pts (96%) underwent successful combined LC/ERCP. All 275 pts underwent successful stone extraction and endoscopic sphincterotomy. In 8 patients ERCP was unable to be performed and subsequently necessitated either an open or laparoscopic CBD exploration. 4 pts underwent negative ERCP. Overall morbidity was 12% among all pts and 10% among pts with successful ERCP. 8 pts (2.7%) developed cystic duct leaks (2 were recognized during ERCP and underwent stent placement, the remaining 6 necessitated repeat ERCP and stent placement postop), 4 pts (1.4%) developed symptomatic instrumental pancreatitis, 16 pts (5.6%) developed asymptomatic postoperative hyperamylasemia, 2 (0.7%) pts developed a postoperative collections, and 3 pts (1%) had a prolonged hospital stay secondary to a postoperative ileus that resolved with conservative management. Median op time for the combined procedure was 149 min. Median length of hospitalization was 2.8 days and the median postoperative hospitalization was 2.1 days. There were no mortalities.

Conclusion: We continue to show that combined LC/ERCP is effective management for the treatment of retained CBD stones. In addition, the combined procedure eliminates the need for unnecessary ERCP in the absence of a positive cholangiogram, and obviates the need to return to the OR when postop ERCP is technically impossible. Although fur-

ther study is necessary our results seem to demonstrate distinct advantages with the combined procedure both in regards to LOS, mortality, and morbidity when compared to results reported for pre or postop ERCP and CBD exploration.

S058

INCIDENCE OF RESIDUAL CHOLEDOCHOLITHIASIS AT THE TIME OF LAPAROSCOPIC CHOLECYSTECTOMY IN PATIENTS HAVING UNDERGONE PREOPERATIVE ERCP, Richard A Pierce, Sreenivasa Jonnalagadda MD, Jennifer A Spittler MD, Deron J Tessier MD, Jane M Liaw MD, Shelly C Lall MD, Lora M Melman MD, Margaret M Frisella RN, Laura M Todd BS, Michael Brunt MD, Valerie J Halpin MD, Christopher Eagon MD, Brent D Matthews MD, Department of Surgery and Medicine, Washington University, Saint Louis, Missouri

Introduction: The purpose of this study is to determine the incidence of residual common bile duct (CBD) stones after preop ERCP for choledocholithiasis and to evaluate the utility of performing routine intraoperative cholangiography (IOC) during laparoscopic cholecystectomy (LC) in this patient population.

Methods: All patients who underwent preop ERCP and interval LC with IOC from 5/96-12/05 were reviewed under an IRB-approved protocol. Data collected included all radiologic imaging, laboratory values, clinical and pathologic diagnoses and results of preop ERCP and LC with IOC. Statistical analysis and significance ($p < 0.05$) was determined using contingency tables with Fisher's Exact Test.

Results: A total of 227 patients (M:F 72:155) with a mean age of 51.9 years \pm 20.2 underwent preop ERCP for suspicion of CBD stones. Of these patients, 118 (52.0%) were found to have CBD stones while 109 (48%) had a negative ERCP. In the 118 patients with CBD stones, 22 (20.8%) had CBD stones diagnosed on IOC during LC. However, 2 patients had residual stones on completion cholangiogram after preop ERCP and were considered to have retained stones. Therefore, 20 (16.9%) patients overall were diagnosed with interval passage of stones or false negative preop ERCP. There was no correlation ($p > 0.05$) between an increased incidence of CBD stones on IOC and a longer time interval between ERCP and LC, performance of sphincterotomy, incidence of cystic duct stones or pathologic diagnosis of cholelithiasis. In the 109 patients without CBD stones on preop ERCP, 9 patients had CBD stones on IOC during LC, an 8.3% incidence of interval passage of stones or false negative preop ERCP. Similar to the other cohort, there was no correlation ($p > 0.05$) between an increased incidence of CBD stones on IOC, a longer time interval between ERCP and LC, performance of sphincterotomy, incidence of cystic duct stones, pathologic diagnosis of cholelithiasis or the performance of a completion cholangiogram during preop ERCP.

Conclusions: The incidence of residual CBD stones or interval passage of stones on IOC during LC after a preop ERCP has documented CBD stones is 16.9%. There is an 8.3% incidence of CBD stones when a preop ERCP is performed for presumptive CBD stones and fails to find any. Although the morbidity of residual CBD stones after preoperative ERCP is not known, the routine use of IOC should be considered in patients with CBD stones on preop ERCP undergoing an interval LC.

S059

LAPAROSCOPIC ULTRASOUND AS THE PRIMARY METHOD OF ROUTINE BILE DUCT IMAGING DURING LAPAROSCOPIC CHOLECYSTECTOMY, Kyle A Perry MD, Jonathan A Myers MD, Daniel J Deziel MD, Rush University Medical Center

Background: Intraoperative fluorocholangiography (IOC) has been the standard method of bile duct imaging during cholecystectomy. Laparoscopic ultrasound (LUS) has been evaluated as a possible alternative, but has been used less frequently. We examined the evolving use of these modalities to assess the relative utility of LUS as the primary method for routine bile duct imaging in laparoscopic cholecystectomy (LC).



Methods: We performed a retrospective analysis of a prospective database containing 396 consecutive LC performed by a single attending surgeon in an academic medical center between 1995 and 2005.

Results: Intraoperative bile duct imaging was performed in 94% of 396 consecutive LC performed for cholelithiasis. IOC was performed in 239, LUS in 236, and both modalities were utilized in 104 cases. Fifty-five patients (13%) had choledocholithiasis. LUS identified common bile duct stones (CBDS) in 3% of patients without any preoperative indicators of CBDS, and in 10% of patients with one or more indicators. LUS had a PPV of 100%, NPV of 99.6%, sensitivity of 92.3%, and specificity of 100% for the detection of CBDS. In addition to detecting CBDS, LUS identified clinically significant bile duct anatomy in 6% of patients. In 1995, LUS was used in 20% of cases whereas by 2005, it was utilized in 97% of cases.

Conclusions: With moderate experience, LUS can become the primary routine imaging modality for evaluation of the bile duct in LC. It is as reliable as IOC for the detection of choledocholithiasis. In addition LUS can facilitate the identification of bile duct anatomy during difficult dissections. Based on this experience, LUS is currently used in 97% of cases, and is the sole imaging modality in 75%.

S060

LAPAROSCOPIC COMMON BILE DUCT EXPLORATION CAN BE SAFELY PERFORMED BY TRAINEES, Matthew G Tutton MD, Tan Arulampalam MD, Roger W Motson MD, Colchester General Hospital

Introduction: A recent Cochrane review has shown that laparoscopic cholecystectomy with common bile duct (CBD) exploration is at least as safe as pre- or post-operative ERCP for clearing CBD calculi. Laparoscopic CBD exploration avoids many of the complications of ERCP and has the advantage of being performed as one definitive procedure. We aimed to evaluate the outcome of laparoscopic CBD exploration carried out by senior trainees compared to an experienced consultant.

Methods: During a 15 year period 235 (161 female) consecutive cases of laparoscopic CBD exploration were prospectively analysed. All patients underwent a standard 4 port technique and operative cholangiogram. Patients demographics, operative techniques and success of CBD clearance, and complications were analysed.

Results: The mean age of patients undergoing laparoscopic CBD exploration was 61 years (range 19-94 years) with 35% being performed as an emergency. 187 (79%) of CBD explorations were performed by one consultant and 48 (21%) by trainees. Calculi were successfully cleared in 141 (90%) and 43 (94%) respectively. The surgical approach was by a trans-cystic route in 102 (55%) and 21 (44%) respectively with a choledochotomy used for all other cases. The mean operating time was 136 minutes in the consultant group versus 158 minutes in the trainee group ($p=0.02$; Mann Whitney U-test). There was one death in the consultant group with 14 (7%) patients having complications and 5 (10%) complications in the trainee group. There was no significant difference in CBD clearance rate, surgical approach and complication rate between consultant and trainees (Fisher's exact test).

Conclusion: Laparoscopic CBD exploration is a safe procedure both in consultant and trainee hands with an excellent clearance rate and an acceptable complication rate. In order to provide a one-stop procedure and optimum management for gallstones and clearance of CBD calculi adequate provision of training is required.

S061

PRESERVING THE SPLEEN DURING LAPAROSCOPIC DISTAL PANCREATCTOMY- MAIN VESSEL PRESERVATION VERSUS SHORT GASTRIC VESSELS ALONE, Craig J Taylor MD, Nicholas O'Rourke MD, Leslie Nathanson MD, George Hopkins MD, Royal Brisbane Hospital, Brisbane Queensland Australia

Background Preservation of the spleen is desirable because of important immunological and haematological functions

and can frequently be performed in laparoscopic distal pancreatectomy (LDP). This may be achieved by main splenic vessel preservation (SVP) or through continued perfusion from Short Gastric (SG) vessels alone following excision of the splenic vessels with the distal pancreas as described by Warsaw.

Method The two methods were evaluated through a multi-centre retrospective study together with a review of the published literature.

Results 46 consecutive LDP were performed between 1996-2006, with splenic preservation in 14 cases. This was achieved by SVP in 9 cases, and by SG in 5. Mean operative time was shorter (155 vs 205 mins) for SG. Two patients (40%) in the SG group developed infarcted inferior splenic poles (managed conservatively) whilst no splenic complications occurred in the SVP group. The rate of pancreatic fistula (15%) and other non-splenic complications was the same. Overall SVP was more tedious, and virtually impossible if chronic pancreatitis existed.

A total of 153 spleen-preserving LDP were identified from the literature. SVP was performed in 129 (86%) and was associated with significant intra-operative bleeding in 14%. Post-operative splenic complications (infarction or abscess) occurred in 29% of the SG group with over half of these requiring unplanned splenectomy. No post-operative splenic complications occurred in the SVP group. Mean operative duration was 29 mins longer for SVP.

Conclusion Despite taking longer and carrying a potential risk of greater blood loss, SVP is generally preferred over SG because of the moderate risk of post-operative splenic complications.

S062

RESULTS OF LAPAROSCOPIC LIVER RESECTION: RETROSPECTIVE STUDY OF 60 PATIENTS., Hitoshi Inagaki MD, Tsuyoshi Kurokawa MD, Tadashi Yokoyama MD, Manabu Kikuchi MD, Yasuhisa Yokoyama MD, Toshiaki Nonami, Department of Surgery, Yokoyama Hospital for Gastroenterological Diseases, Nagoya, Japan.

Introduction: Although an increasing number of reports and publications have dealt with the laparoscopic approach to liver resection, this procedure remains uncommon, and its feasibility, safety and effectiveness are still not established. There are only some reports which prove some advantages on postoperative recovery.

Aims & Methods: We clarified our experiences in laparoscopic liver resection mainly from the aspects of safety and effectiveness. We report here operative method, blood loss, operative time and complications in 60 patients who underwent laparoscopic liver resection in our hospital from Dec. 1997 to Jul. 2006.

Results: Seventeen patients had cirrhosis. Tumors 2.9 cm in diameter ranging from 1.5 to 5.0 cm were located in every liver segment except segment I. Liver resection was anatomical in 11 patients; lobectomy in 3 patients, and lateral segmentectomy in 8 patients. Non-anatomical resection was performed in 49 patients. Operative time averaged 210 (98) minutes. Blood loss was 446 (656) g. Hand-assisted laparoscopic surgery was required in 26 patients (43.3%). Operative complications occurred mainly in our early cases. They included 3 patients (5%) with operative bleeding, 2 of them with conversion to laparotomy. Postoperative complications occurred in 8 patients (13.3%): 2 biliary leakage, 4 abscess at cutoff stump of liver, 1 port-site bleeding and 2 surgical site infections. The mean hospital stay was 17 days. There were no complications in our late cases.

Conclusions: The laparoscopic approach for liver tumors is feasible, if the indication is strictly selected. Its safety is dependent on surgical experience and technology availability.

**S063**

LAPAROSCOPIC LIVER RESECTION FOR HEPATOCARCINOMA, Ibrahim Dagher MD, Alessio Carloni MD, Panagiotis Lainas MD, Ariana Boschetto, Dominique Franco, Antoine Beclere Hospital, PARIS

INTRODUCTION: Unique small hepatocarcinomas (HCC) are still an indication to partial liver resection when transplantation is not indicated. Anatomical resections are recommended for carcinological reasons. The laparoscopic mini invasive approach should minimize hepatic and parietal injury and consequently decrease the risk of liver failure and ascites. However the carcinologic results of this approach are still uncertain.

AIMS & METHODS: The aim of this work was to evaluate the short and midterm results of laparoscopic liver resections for HCC. Between 1999 and 2005, 30 laparoscopic liver resections were performed for HCC. The tumour mean size was 3.7 ± 2 cm (range: 1.5 to 7 cm). The patients mean age was 65 ± 9 years. 22 patients had cirrhosis (21 Child A and one Child C). Patients were followed up post operatively every four months with a CT scan and α FP measurement. Mortality, morbidity, recurrence and survival rates were analyzed.

RESULTS: There were Thirteen unisegmentectomies, 9 bisegmentectomies, 1 trisegmentectomy, 2 right hepatectomies and 5 atypical resections. Operative time was 212 ± 89 minutes. Conversion to laparotomy was required in 3 patients (10%) for continuous although moderate bleeding during transection. The mean blood loss was 522 ml and 5 patients (17%) required blood transfusion. The mean surgical margin was 11 mm (> 5 mm in 23 patients). The mean hospital stay was 7.4 days. One cirrhotic patient (Child C) operated for a partially ruptured tumour of the left lobe died of liver failure. No ascites and no transient liver failure occurred in the other 21 cirrhotic patients. During a mean follow-up of 2 years, 11 patients (37%) had recurrence within the liver. Two-year overall and disease-free survival rates were 77% and 63%, respectively. None of the patients had peritoneal carcinomatosis or trocar site deposit during follow-up.

CONCLUSION: Laparoscopic liver resection for HCC is feasible and well tolerated. The mid term survival and recurrence rates are similar to those observed after laparotomy.

S064

WIRELESS LAPAROSCOPIC ENDOSURGERY, Per-Ola Park MD, Paul Swain MD, Sandy Mosse PhD, Keiichi Ikeda MD, Maria Bergström MD, Michael Kochman MD, Imperial College, London, University College Hospital, London, Sahlgrenska University Hospital/Ostra, Gothenburg, Sweden, University of Pennsylvania

Background: Autonomous miniature wireless laparoscopes might be valuable during intra-abdominal endosurgery. They might add extra images from different angles during selected otherwise conventional laparoscopic procedures. Their use during transgastric endosurgery or single port endosurgery might allow all the available space for access to be used for therapy. Remote methods of camera manipulation and attachment to removable intra-abdominal supporting structures need to be developed. Aim: 1: To acquire wireless intra-abdominal video. 2: To test new radio-controlled RC methods to manipulate intra-abdominal cameras. 3 To study methods using motors and shape memory alloys to perform tasks during NOTES and intra-abdominal surgery.

Methods: Wireless capsule endoscopes WCE (27 x 11 mm) acquiring images at 2, 7 and 14 frames per second (Given Imaging - SB and ESO) were used for laparoscopic imaging. Radio controlled servos, motors and shape memory alloy muscle wires were used to manipulate autonomous capsule endoscopes in the peritoneal cavity. WCE were introduced into the peritoneal cavity through trocars or transgastric incisions. Capsule video-images were acquired with a real-time video viewer.

Results: This study acquired the first wireless laparoscopic images of intra abdominal organs including gallbladder,

pancreas. It gave close up views of the cystic duct during transgastric gallbladder dissection. Subdiaphragmatic structures difficult to view using rigid laparoscopic instruments were imaged. Internal camera stabilization used moveable candelabra and tripods. RC manipulations used up-down movement with small motors and rotation using servos. New methods of wire guided and wheel based traction within the abdominal cavity were studied. Sutured attachments to the peritoneal cavity of wireless capsule laparoscopes were successful. Wireless imaging of biliary manipulations were achieved without conventional laparoscopes. WCE with two imagers passed through transgastric incisions allowed views of both sides of the gastric incision during suturing procedures.

Conclusions: Autonomous wireless laparoscopy was probably performed for the first time. Spatial separation of imaging and therapeutic functions of laparoscopic or transgastric surgery may carry advantages for patients. New RC manipulations of intraperitoneal capsules were performed. Servos, motors, shape memory metal springs were used to alter the autonomous miniature wireless laparoscope by remote control.

S065

RESULTS OF A NEW METHOD FOR STOPPING ACUTE BLEEDING FROM ESOPHAGEAL VARICES: IMPLANTATION OF A SELF-EXPANDING STENT, Jörg Zehetner MD, Andreas Shamiyeh MD, Wolfgang Wayand MD, Rainer Hubmann MD, Ludwig Boltzmann Institute for Operative Laparoscopy, II, Surgical Department, AKH Linz, Austria

Background: Non-treated esophageal varices have a mortality of 30-50% in acute bleeding. Different endoscopic and pharmacologic methods for stopping the acute bleeding exist but there are 20% of the patients that need to be treated by placement of a balloon sonde.

The aim of this study was to assess the treatment method of implanting a self-expanding stent for stopping acute bleeding from esophageal varices.

Methods: In a multidisciplinary approach we implanted between January 2003 and August 2006 in 39 patients with acute bleeding from esophageal varices a self-expanding stent (SX-ELLA stent Danis) In all patients common methods to stop bleeding failed. With a new delivery system the stent was implanted and position was controlled by endoscopy and computer tomography.

Results: In all 39 patients the implantation of the esophageal stent was successful and acute bleeding could be stopped. There were no complications from stent implantation. No recidive bleeding during the stent implantation (median time 4 days, range 2-7) from esophageal or gastric varices was noticed.

In all patients the stent could be extracted by endoscopy with a foreign body forceps without any complications or recidive bleeding.

Conclusion: With the implantation of a self-expanding stent for stopping acute bleeding from esophageal varices a new therapeutic method exist. Our initial results with no method-related mortality and no complications show that this new method is safe and effective.

S066

GASTRIC BYPASS POUCH AND STOMA REDUCTION USING A TRANSORAL ENDOSCOPIC ANCHOR PLACEMENT SYSTEM: A FEASIBILITY STUDY, Daniel M Herron MD, Desmond M Birkett MD, Marc Bessler MD, Lee L Swanstrom MD, Mount Sinai Medical Center, New York, NY; Lahey Clinic, Burlington, MA; Columbia University Medical Center, New York, NY; Legacy Health System, Portland, OR

Background: Weight regain after Roux-en-Y gastric bypass may be caused by pouch enlargement or dilatation of the gastrojejunostomy (stoma). In order to avoid the substantial morbidity of revisional bariatric surgery, investigators have recently demonstrated the feasibility of reducing stoma diameter using transoral endoscopic suturing techniques. Our aim was to demonstrate the feasibility of performing both pouch and stomal reduction using transoral endoscopy.



cally placed tissue anchors in an ex-vivo and acute animate model.

Methods: Part I: We created an ex-vivo model of a dilated gastric pouch and stoma using 4 explanted porcine stomachs. The stomach was divided to create an upper pouch of approx. 100 ml volume, which was reconnected to the lower portion of the stomach (gastric remnant) via an anastomosis of 18 to 20 mm diameter. Endoscopically placed anchors were then used to create plications of the stoma and reduce its diameter. In 2 stomachs, anchor plications were also used to decrease pouch volume. Pouch volumes and stoma diameters were measured pre- and post-procedure. Part II: A similar experimental model was created in vivo using 2 pigs. Anchors were placed in the stoma and pouch. The animals were immediately sacrificed and similar measurements were obtained.

Results: In the ex vivo model, stoma diameter was successfully reduced in all 4 stomachs by a mean of 8mm (41%). This represented a mean decrease in cross sectional area of 65%. Pouch volume was reduced by a mean of 28 ml (30%) in 2 stomachs. Stomal plications were successfully placed in 1 of the live animals, with a stoma diameter reduction of 8 mm (35%). Feasibility of pouch reduction using plicating anchors was confirmed.

Conclusions: This is the first study to demonstrate the feasibility of using endoscopically placed tissue anchors to reduce both stoma diameter and pouch volume. This technique may ultimately be clinically useful in treating weight regain after gastric bypass surgery.

S067

CHRONIC IN-VIVO EXPERIENCE WITH AN ENDOSCOPICALLY DELIVERED AND RETRIEVED DUODENAL-JEJUNAL SLEEVE IN A PORCINE MODEL, Michael E Tarnoff MD, Keith S Gersin MD, Anthony Lembo MD, Tufts-New England Medical Center, Boston, MA; Beth Israel Deaconess Medical Center, Boston, MA; Carolinas Medical Center, Charlotte, NC

Background: Despite the widespread safety and efficacy of obesity surgery, life threatening complications can occur. We report the initial feasibility study of a totally endoscopically delivered and retrieved duodenal-jejunal bypass sleeve in a porcine model.

Methods: The implant consists of a 60 cm fluoropolymer sleeve that is endoscopically deployed via a coaxial catheter system into the jejunum and fixed in the proximal duodenum with a Nitinol anchor. The system creates a proximal biliopancreatic diversion. Six female Yorkshire pigs were endoscopically implanted and survived. Four animals (group 1) were slated to survive 90 days, 2 animals (group 2) for 120 days and 3 animals (group 3) underwent sham endoscopy and were survived 120 days. Animals were fed standard dry pig chow 0.5 kg three times daily. Data points included daily general health, weekly weight, serum blood tests (complete blood count, amylase, lipase, liver function tests), and monthly evaluation of anchor/sleeve position/patency by x-ray, fluoroscopy and endoscopy. Following the in-vivo period, the devices were endoscopically removed and the animals were sacrificed. Duodenal/jejunal tissue samples were assessed histologically.

Results: All 6 test animals were implanted and explanted without adverse events and had normal serum values. Three of 4 group 1 animals survived 90 days. Of these, 1 animal had no device-related issues. One animal was found to have a pivoted anchor that was repositioned at day 63. The animal went on to 90 days without incident. The third animal was explanted at 90 days but the anchor was found partially rotated. The animal had been asymptomatic. The fourth animal was incidentally implanted with a crossover of the anchor struts. This was endoscopically repaired on day 14 but explanted on day 20 when the animal had persistent vomiting. Both group 2 animals survived 120 days. One animal had a partially rotated anchor but was asymptomatic. The average weight gain between test and sham groups was 0.23 kg/day and 0.42 kg/day, respectively (p=0.01). There were no ulcers or strictures and the tissue reactions at the anchor sites were acceptable.

Conclusions: A totally endoscopic and reversible bypass of

the duodenum and proximal jejunum has been achieved for 120 days. Initial experience suggests patency of the sleeve and acceptable tissue response. Reduced weight gain in the test animals suggests device efficacy. Further investigation is warranted.

S068

PRE-CLINICAL TRIAL OF A MODIFIED GASTROSCOPE THAT PERFORMS A TRUE ANTERIOR FUNDOPLICATION FOR THE ENDOLUMINAL TREATMENT OF GERD, W Kauer PhD, A

Roy-Shapira PhD, H J Stein PhD, D Watson PhD, M Sonnenschein, J Unger MD, M Voget MD, University Hospital Salzburg, Soroka University Medical Center Beer Sheva, Flinders University Adelaide, MediGus Ltd Omer, Charite Virchow Clinic Berlin, Econ Inc. Luebeck

Background: Laparoscopic fundoplication provides good reflux control but side effects due to the surgical procedure are known. Different endoluminal techniques have been introduced but all with disappointing results.

Objective: Evaluation of the feasibility and safety of a new device, that enables a totally endoluminal anterior fundoplication for the treatment of GERD.

Material: The device is a modified video gastroscope, which incorporates a surgical stapler (using standard 4.8 B shaped surgical staples) and an ultrasonic sight. The cartridge is mounted on the shaft and the anvil is at the tip. This enables accurate stapling of the fundus to the esophagus, using the ultrasonic sight to guide distance and alignment of the anvil and the cartridge.

Method: Sixteen female swine of mixed breed were used in the study, 12 underwent the endoscopic procedure, and 4 were used as controls to monitor weight gain. The 12 study animals were sacrificed at 2, 4, and 8 weeks (4 pigs each time) and visually inspected for complications, healing and fundoplication. The study was sponsored by MediGus Ltd. and monitored for compliance with GLP regulations by an external company (Econ Inc.), which is GLP certified by the German Federal Government. It was conducted at the animal testing facility of the Charite Virchow Clinic in Berlin.

Results: The procedure went smoothly in all pigs, median procedure time was 12 minutes (range 9 - 35 minutes). At sacrifice the stapled area had healed well, all animals had a satisfactory 180° anterolateral fundoplication, and there were no procedure related complications.

Conclusions: Creating a satisfactory anterior fundoplication with the new device is feasible, easy, and safe. Proof of efficacy must await clinical trials, which are underway.

S069

ESOPHYX? ENDOLUMINAL FUNDOPLICATION (ELF) FOR THE TREATMENT OF GERD, Nicole Bouvy PhD, Bart Witteman MD, Ronald van Dam MD, Wim Hameeteman PhD, Ger Koek PhD, University Hospital Maastricht, department of surgery

Background: Previous work has suggested that the anatomy of the gastroesophageal junction can help define propensity to reflux. In this study the first patients, treated with this Esophyx (ELF) device, are evaluated

Method: Pre-operatively patients were selected having a small hernia diaphragmatica (<4cm) and having an abnormal 24 hours pH metry. In a retroflexed endoscopic view pre-operative Hill classifications were measured. Directly post-operatively the created valve was measured and photographs were taken of the result. Two weeks after this procedure patients were allowed to stop their PPI's.

Results: ELF was performed safely in all 14 patients. Intraoperatively solid full-thickness fundoplication were achieved in all patients, which resulted in robust valves. At baseline valve grading according to Hill, et al. (grades I-IV), a mean grade 2.5 valve was found in retroflexed endoscopic. Immediately after the ELF procedure, all newly-created valves were graded as a grade I. After 2 weeks, QOL scores of all patients were improved and 14 out of 15 patients were able to stop PPI.

Conclusions: The EsophyX procedure appears to be safe and efficacious in creating robust gastroesophageal valves. Most patients were able to stop PPI's after two weeks.



S070

GASTROPARESIS ASSOCIATED WITH GERD AND CORRESPONDING REFLUX SYMPTOMS MAY BE CORRECTED BY RADIOFREQUENCY ABLATION (RF) OF THE CARDIA AND ESOPHAGOGASTRIC JUNCTION. Mark D Noar MD, The Heartburn and Reflux Center - Endoscopic Microsurgery Associates

Gastroesophageal reflux (GERD) is a common problem among the adult population. Approximately 20% of patients will have unmanageable symptoms despite treatment with BID PPI's. Clinical evidence suggests delayed gastric emptying may be a causative factor for severe reflux, occurring in 25% of patients with GERD, and has been known to improve following Nissen fundoplication. RF treatment for GERD may also potentially correct GERD-associated gastroparesis. AIM: To determine if RF treatment for GERD will result in improvement of gastroparesis and symptoms in patients with abnormal Gastric Emptying Scans (GES) and refractory GERD.

METHODS: In July 2000-July 2004, 227 patients undergoing RF (Stretta) correction for GERD were screened for gastroparesis. Those with gastroparesis, on standardized GES, and GERD uncontrolled by BID PPI's had RF ablation of the cardia and EGJ by Stretta procedure. Prior to and 6 months post-treatment, all had EGD, manometry, and solid-phase GES, electrogastrography, and standardized heartburn, dyspepsia and satisfaction surveys. Patients with pyloric obstruction or taking motility agents were excluded. The nuclear radiologist was blinded to study design.

RESULTS: 31 patients had abnormal baseline GES. At 6 months, emptying scores improved significantly with the percentage of solid food emptied at 90 minutes improving from 41 % to 66% post-Stretta (p<0.0001). GES at 120 minutes improved from 55% to 84%. 23 patients (74%) had normalization of gastric emptying, 4 improved but remained abnormal, and 4 showed no improvement.

	30 Pre	30 Post	60 Pre	60 Post	90 Pre	90 Post	120 Pre	120 Post
Value	16.2	25.6	39.1	48.8	41.1	65.7	55.3	84.1
Std Dev	18.2	18.2	28.5	28.5	29.5	29.5	22.4	22.4
F value		<0.01		<0.03		<0.0001		<0.0001

All patients have one-year follow-up with significant improvements in GERD HRQL (Velasovich) scores and patient satisfaction.

GERD HRQL	Baseline Off Meds	Baseline On Meds	6 Months	One year
GES Normalized	25.91	18.74	8.04	5.35 p=0.00001
GES Abnormal	36.75	25.13	14.00	11.75 p=0.026

CONCLUSIONS: 1) RF treatment is demonstrated to correct gastroparesis, 2) GERD symptoms improved significantly, 3) RF correction, similar to Nissen, can result in reversal of gastroparesis, 4) Mechanism of action may be reduced TLESRs, decreased esophageal venting, increase in EGJ barrier, or gastric pacemaker alteration.

S071

EXPANDABLE METAL STENT PLACEMENT FOR BENIGN COLORECTAL OBSTRUCTION: OUTCOMES IN 23 CASES, Aaron J Small BS, Tonia M Young-Fadok MD, Todd H Baron MD, Mayo Clinic College of Medicine

INTRODUCTION: Self-expanding metal stents (SEMS) are an established treatment for palliation of malignant colorectal strictures and as a bridge to surgery for acute malignant colonic obstruction. Patients with benign colonic strictures may benefit from stent placement, but little data exists for this indication.

METHODS: All cases of colonic stent placement identified from a GI database from 4/99-8/06 were reviewed. During the study period, 23 patients with benign obstructive disease underwent endoscopic SEMS placement. Etiology of the stricture: Crohn's disease (n = 1), postsurgical anastomotic (n = 3), radiation-induced (n = 3), and diverticular/inflammatory (n = 16). All strictures were located in the left colon. Five patients had an associated colonic fistula. Uncovered Enteral Wallstents or Precision Ultraflex stents (Boston Scientific) were endoscopically placed in all but one patient.

RESULTS: Stent placement was technically successful in all

23 patients; obstruction was relieved in 22 (95%). Major complications occurred in 38% of patients: migration (n = 2), reobstruction (n = 4), and perforation (n = 2). Of these 8 patients with major complications, 7 were delayed (>=7days after placement). Of the 19 patients who underwent planned surgical resection, 16 were successfully decompressed and converted from an emergent operation to an elective one with a median time to surgical resection of 12 days (range, 2 days - 18 months). Of these, surgery was delayed >30 days after stent placement in 6.

CONCLUSIONS: SEMS can effectively decompress high-grade, benign colonic obstruction allowing elective surgery. SEMS can offer medium-term symptom relief for benign colorectal strictures but is associated with a high rate of delayed complications. Thus, if elective surgery is planned, data from this small study suggests it should be performed within 7 days of stent placement.

S072

MINIMALLY INVASIVE HEMORRHOIDECTOMY: THE HAL PROCEDURE, Matthew R Albert MD, Paul Mancuso MD, Sergio Larach MD, Department of Colorectal Surgery, Florida Hospital, Orlando, FL

ABSTRACT: Hemorrhoidal Arterial Ligation (HAL) has been performed as an alternative to surgical hemorrhoidectomy since 1995. Despite very positive outcomes in the surgical literature worldwide, a 90-95% success rate, and minimal postoperative pain, the procedure has not been widely adopted in the United States. The authors describe the first case series in the American literature using the most updated HAL device for grade II-III hemorrhoids.

METHODS: The HTS? Doppler-Guided Hemorrhoid Treatment System uses a proctoscope combined with a single use Doppler probe to rapidly identify and suture ligate the terminal branches of the hemorrhoidal arteries several centimeters above the dentate line. In addition the newly devised longitudinal operating windows allow suture hemorrhoidopexy to be performed correcting prolapsing internal hemorrhoids. 50 consecutive patients (mean age 52 years; range 28-69 years) with grade II and III hemorrhoids were treated with hemorrhoidal arterial ligation and hemorrhoidopexy.

RESULTS: Postoperative pain and return to work was determined by postoperative questionnaires and visual analog scale. Patients were examined at 2 and 6 weeks and 6 months postoperatively. Hemorrhoidal bleeding resolved in 93% of patients and prolapse in 98% of patients.

Complications were recorded in one patient who developed bleeding 1 week postoperatively requiring an ER visit but no further therapy. Pain was greater than expected in most patients with a mean score of 5.6, however return to work or daily activities was 4.3 days.

CONCLUSION: Hemorrhoidal arterial ligation is a safe, effective, and less painful alternative to surgical and stapled hemorrhoidectomy for symptomatic grade II and III hemorrhoids. Prolapsing hemorrhoids are effectively treated as well with a combination of hemorrhoidopexy and suture ligation of the offending vessel likely enabling its use in grade IV hemorrhoids. An extremely low risk of complications also makes this procedure an attractive alternative to other procedures.

S073

SHOULD SURGICAL NOVICES TRADE THEIR RETRACTORS FOR JOYSTICKS? VIDEOGAME EXPERIENCE DECREASES THE TIME NEEDED TO ACQUIRE SURGICAL SKILLS, Matthew D Shane MD, Barbara J Pettitt MD, Craig B Morgenthal MD, Leena Khaitan MD, Edward Lin DO, C. Daniel Smith MD, Emory Simulation, Training and Robotics (E*STAR), Emory University

Introduction Video game experience (VGE) has been identified as a possible predictive factor for surgical skill. We hypothesized that surgical novices with previous VGE would acquire new surgical skills faster than those without.

Method 4th year medical students (M4) and 1st year surgical residents (PG-1) completed a survey asking about stan-



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standard demographic data and previous VGE. "Gamers" had high VGE, defined as more than 3 hours per week of videogame playing. "Non-gamers" had little or no VGE. Both groups trained to proficiency on two tasks (AcquirePlace and Traversal) of the MIST-VR simulator, proficiency defined as meeting previously validated criteria on two consecutive trials. The number of trials required to achieve proficiency for each task was recorded.

Results The 26 participants included 11 M4s/15 PG-1s, 17 males (8 gamers/ 9 non-gamers) and 9 females (3 gamers/ 6 non-gamers), mean age 27.8 years. There were no differences in time to reach proficiency between the M4 and PG-1 residents, and there were no significant differences in the relative number of gamers per gender. All participants eventually met proficiency criteria. The 11 gamers reached proficiency more quickly than the 15 non-gamers (median 0 trials vs. 6 trials, $p = 0.01$). Women overall took longer to reach proficiency than did men (median 10 trials vs. 0 trials, $p = 0.002$). When stratified according to VGE, female non-gamers took longer to reach proficiency than male non-gamers (median 11 trials vs. 1 trial, $p = 0.006$) but among gamers, there was no difference between females and males (median 0 trials vs. 0.5 trials, $p=NS$).

Conclusion Previous VGE shortens time to achieve proficiency on two tasks on a validated surgical simulator. The possibility that VGE may ameliorate gender differences in length of time required to acquire surgical skills should be explored further.

S074

FLS SIMULATOR PERFORMANCE PREDICTS INTRAOPERATIVE LAPAROSCOPIC SKILL, A L McCluney MD, M C

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INTRODUCTION: Simulators are increasingly used for teaching and testing laparoscopic skills. However, the relationship between performance in a simulator and operative skill has yet to be firmly established. This study defines the sensitivity and specificity of SAGES FLS simulator performance for the prediction of intraoperative laparoscopic skill.

METHODS: 40 subjects consisting of 19 novice (PGY 1-2), 13 intermediate (PGY 3-4), and 8 expert (PGY 5, fellows, and attending) laparoscopic surgeons underwent SAGES FLS manual skills testing. During laparoscopic cholecystectomy, each subject dissected the gallbladder from the liver bed and was objectively assessed with the previously validated Global Operative Assessment of Laparoscopic Skill (GOALS). ANOVA with posthoc analysis was used to compare mean FLS scores and mean GOALS scores across experience levels. The relationship between individual FLS scores and GOALS scores was analyzed with Pearson's correlation coefficient. Receiver Operator Curves were used to determine the optimal FLS score for predicting high intraoperative performance. Data are presented as mean±SD. Significance was defined as $p<0.05$.

RESULTS: As expected, mean FLS scores increased with experience level ($p<0.01$). Mean GOALS scores also increased with experience ($p<0.01$), and distinguished between novice ($12±2$), intermediate ($17±4$), and expert ($22±1$) laparoscopic surgeons. FLS and intraoperative GOALS scores correlated well (0.73 , $p<0.01$). A passing FLS score (>357) yielded a sensitivity of 100% and a specificity of 90% in predicting and expert level GOALS score (>20).

CONCLUSIONS: In this study, scores obtained in the FLS simulator predict intraoperative laparoscopic skill as measured by objective GOALS metrics. All surgeons performing at an expert level in the OR passed FLS while 90% of surgeons with GOALS < 20 failed FLS. The FLS simulator score could thus be used as a benchmark for junior level trainees to verify their readiness to competently dissect the gallbladder from the liver bed during laparoscopic cholecystectomy.

S075

PRECISION TRUMPS SPEED IN LAPAROSCOPIC SKILL

RETENTION, Prashant Sinha MD, Nancy J Hogle MS, Dennis L Fowler MD, College of Physicians and Surgeons, Columbia University, New York, NY

Intro: Without ongoing practice, acquired motor skills may deteriorate over time. The purpose of this study is to document the level of retention of laparoscopic skills over time.

Methods: Thirty-three general surgery PGY 1, 2, or 3 residents trained to established criteria and passed an exam for each of seven technical skills on a virtual simulator (LapSim® Surgical Science Ltd., Göteborg, Sweden). Six months later, the residents again tried to complete the seven skills each of three times. During the six months, the simulators were available, but additional practice was not required. The retesting process consisted of three attempts, the first of which was acclimatization. The results of the subsequent 2 exams were compared with baseline data.

Results: At retest, the number of residents passing clip application (7, 21%) and cutting tasks (18, 55%) were significantly lower than for the other 5 tasks ($p < 0.05$). In failed tests, instrument wandering and tissue damage were more common than increases in task time. Upper level residents were significantly more likely to pass than first year residents. Time of day did not influence passing rates. Differences in Task Performance

	Time diff	p	Path length diff	p	Tiss damage diff	p
Camera Nav	-6.36±1.71	$p<0.001$	-3.19±1.30	$p=0.08$	-0.19±0.081	$p=0.019$
Instrument Navigation	3.22±0.85 (L) 3.37±0.75 (R)	$p<0.001$	0.06±0.043 (L) 3.37±0.75 (R)	$p=0.025$ $p<0.001$	-2.02±0.20	$p<0.001$
Coordination	-5.55±2.98	$p=0.066$	-0.12±0.073 (start) -0.12±0.046 (end)	$p=0.103$ $p=0.008$	-2.73±0.37	$p<0.001$
Grasp	-3.72±2.02 (L) -3.24±1.46 (R)	$p=0.07$ $p=0.03$	-0.093±0.075 (L) -0.215±0.076 (R)	$p=0.22$ $p=0.006$	-2.29±0.26	$p<0.001$
Lift & Grasp	7.25±3.74	$p=0.055$	-0.047±0.11 (L) -0.070±0.10 (R)	$p=0.66$ $p=0.51$	-3.32±0.47	$p<0.001$
Cutting	-3.73±2.95	$p=0.21$	-0.15±0.041 (cut) -0.11±0.037 (grasp)	$p<0.001$ $p=0.004$	-1.99±0.32	$p<0.001$
Clip Apply	-31.7±8.73	$p<0.001$	-0.70±0.17 (L) -1.03±0.25 (R)	$p<0.001$ $p<0.001$	-42.9±4.8	$p<0.001$

Conclusions: We found that instrument and tissue handling variations were more consistently reduced relative to completion time in exams that were passed. Fine motor (more difficult) tasks demonstrated significant deterioration in performance over time compared with navigation and coordination (easier) tasks. Ongoing practice, either using the simulator or performing surgery, may be necessary to retain laparoscopic skills.

S076

EXPERTS CAN DO MORE THAN ONE THING AT A TIME: EFFECT OF DISTRACTION WHILE PERFORMING A SIMPLE LAPAROSCOPIC TASK IN EXPERT AND NOVICE

SURGEONS, Katherine E Hsu MD, Robert A Gizicki BS, Fung Ying Man BS, Liane S Feldman MD, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal, Quebec, Canada

INTRODUCTION: While operating, surgeons are required to make cognitive decisions and are often interrupted to attend to questions from other members of the health-care team. Technical automatization may be achieved by experienced surgeons such that these distractions have little effect on performance of either the surgical or cognitive task. This study assessed the effect of adding a distracting cognitive task on performance of a basic laparoscopic skill in novice and expert surgeons.

METHODS: Nine novice (med stud, PGY 1-2) and 7 expert (PGY4-5/fellow/attending) laparoscopic surgeons practiced the FLS laparoscopic peg transfer task until their scores stabilized. This task was repeated 5 times and the mean score recorded. Subjects were also tested on the number of addition questions they could answer correctly in one minute. This was repeated 5 times with the mean number of questions attempted and accuracy (%correct) recorded. The tasks were performed concurrently 5 times. Data are presented as mean (SD). In each group, baseline vs distracted performance was compared with paired t-test.

RESULTS: There were no baseline differences between the expert and novice groups in peg score (97(6) vs 94(9),



p=0.5), number of questions attempted in one minute (9(2) vs 11(2), p=0.14), number of correct answers (8(3) vs 10(2), p=0.19) or %correct (91(7)% vs 93(4)%, p=0.33). When comparing baseline to dual-task performance, experts had no decline in peg transfer score (97(6) vs 95(3), p=0.34), number of questions attempted in one minute (9(2) vs 8(3), p=0.27), number of correct answers (8(3) vs 8(2), p=0.38) or %correct answers (91(7)% vs 94(5)%, p=0.49). In contrast, dual tasking in novices was associated with a decrease in the number of questions attempted (11(2) vs 8(2), p<0.01) and the number of correct answers (10(2) vs 7(1), p<0.01), with no change in peg transfer score (94(9) vs 93(7) p=0.34) or %correct answers (93(4)% vs 90(5)%, p=0.21) compared to baseline. **CONCLUSION:** Distraction significantly decreased a novice's ability to process cognitively based math problems, while there was no effect on expert subjects. This suggests that experts have achieved a level of automatization of the peg transfer basic surgical skill, so that the cognitive distraction did not affect performance of either task. Experts were able to equally attend to both tasks while the novices attended to the surgical task at the expense of some aspects of performance of the cognitive task.

S077

COMPUTER-BASED LAPAROSCOPIC AND ROBOTIC SURGICAL SIMULATORS: PERFORMANCE CHARACTERISTICS AND PERCEPTIONS OF NEW USERS, David W Lin MD, John R Romanelli MD, Renee E Thompson MD, Michael E Ganey MD, Ron W Bush BS, Neal E Seymour MD, Baystate Medical Center, Department of Surgery

The expanding inventory of advanced surgical training devices now includes simulators for laparoscopic and robotic surgery. In order to define perceptions of the need and value of such devices, we evaluated the initial experience of surgeons using both in the course of performance of an advanced laparoscopic skill.

METHODS: At the 2006 SAGES meeting, 62 Learning Center attendees evaluated a new virtual reality (VR) robotic surgery simulator (RS) [SimSurgery, Oslo, Norway] as well as either a computer-enhanced laparoscopic [ProMIS (PM), Haptica, Ltd, Dublin, Ireland] or a VR simulator [SurgicalSIM (SS), SimSurgery and METI, Inc, Sarasota, FL]. Demographic and training data were collected and all were assessed during one iteration of laparoscopic suturing and knot-tying on RS and either PM or SS. An 8-question survey was used to determine users' impressions of task realism, interface quality, and educational value (5-point Likert scale).

Performance data [time, path length, smoothness (PM), errors (SS/RS)] were collected and comparisons made between user-defined groups and different simulation platforms (Mann-Whitney Test, ANOVA).

RESULTS: Task completion rate was greater for experts than nonexperts on all platforms (PM 100% vs 75%; SS 100% vs 36%; RS 93% vs 36%). Experts performed better than nonexperts on all performance measures on PM (p<0.05: time 154±16 vs 205±12; path length 820±97 vs 1287±97; smoothness 952±111 vs 1582±127). There were no significant differences between experts and nonexperts for SS and RS performance measures. Perception of value of haptic features was less for subjects with prior robot experience (n=10; p<0.05). Otherwise realism, interface quality, and educational value scores did not differ on the basis of prior simulator or robot use. Nonexperts found that robotic simulation better reflected clinical skill than did experts. Overall, subjective quality was scored higher for PM than for SS or RS.

CONCLUSIONS: The ability of performance metrics of the computer-enhanced simulator to discern predicted performance differences between experts and nonexperts was better than for VR devices with a single task iteration. Initial use of VR devices was associated with a lower overall perception of realism and educational value as compared to use of physical objects in the non-VR simulator. This may reflect the need for familiarization with the computer-generated environment before the educational potential of VR can be realized.

S078

LAPAROSCOPIC VIRTUAL REALITY SIMULATOR TRAINING LEADS TO A SHORTENING OF THE LEARNING CURVE ON REAL CASES, R Aggarwal MD, J Ward, I Balasundaram MD, A Darzi MD, Imperial College London

Introduction: It is now generally accepted for technical skills training to commence in the skills laboratory on simulated tissues. The aim is to reduce the length of the learning curve on real cases, which should lead to improved patient safety. Though simulator-based training has been shown to transfer to improved performance in the operating room, there have been no studies to date to analyze the persistence of this effect over time. The aim of this study was to assess the degree to which completion of a proficiency-based virtual reality (VR) training curriculum improves ongoing performance, when compared with traditional modes of training.

Methods: 20 novice laparoscopic surgeons were recruited to the study. All subjects underwent a baseline test of basic laparoscopic skill on a video-box trainer, followed by a half-day didactic session on laparoscopic techniques. Subjects were then equally and randomly divided into two groups: group A each completed five cadaveric porcine laparoscopic cholecystectomies (LCs) on a video-box trainer over a period of two weeks; group B completed a proficiency-based VR training curriculum on a laparoscopic simulator and then performed three cadaveric porcine LCs each. Assessment of laparoscopic technical skill on the LCs was by a validated motion analysis device which derives parameters of time taken, path length and number of movements, and video-based global rating scores (out of 35).

Results: There were no baseline differences in laparoscopic skill between the two groups. There were significant differences in performance on the first LC between groups A and B for time taken (median 4590 vs. 2165 secs, p=0.038), total path length (169.2 vs. 86.8 metres, p=0.001), total number of movements (2446 vs. 1029, p=0.009) and video rating scores (10 vs 22, p=0.009). The two groups achieved equivalence of performance at the fifth (group A) and third (group B) LCs for all parameters.

Conclusions: Training in skills laboratories has been shown to improve initial performance in the operating room, though the persistence of this effect has not been previously evaluated. In this study it is apparent that proficiency-based VR training can shorten the learning curve on a real procedure, leading to a more cost and time-effective mode of acquiring new skills.

S079

100% FLS TECHNICAL SKILLS CERTIFICATION PASS RATE FOLLOWING PROFICIENCY-BASED TRAINING, Daniel J Scott MD, E. Matt Ritter MD, Seifu Tesfay RN, Elisabeth A Pimentel BS, Alykhan Nagji BS, Gerald M Fried MD, University of Texas Southwestern Medical Center, Dallas, Texas. Uniformed Services University, Bethesda, Maryland, McGill University Health Center, Montreal, Canada.

Introduction: The Fundamentals of Laparoscopic Surgery (FLS) Program has been extensively validated as a high-stakes examination for certification purposes but optimal methods for skills training are lacking. The purpose of this study was to develop a proficiency-based FLS skills training curriculum and evaluate its effectiveness in preparing trainees for certification.

Methods: Novice medical students (n=21) were enrolled in IRB-approved protocols at 2 institutions. Trainees underwent approximately 2 hours of open knot-tying practice, viewed the FLS video tutorials, and were pre-tested by performing 1 repetition of each of the 5 FLS tasks, scored using standard testing metrics. Trainees then practiced the tasks in a distributed fashion over a 2-month period until proficiency was achieved for all tasks on at least 2 consecutive repetitions (10 additional reps were required for tasks 1 & 5) or for a maximum of 80 repetitions per task. Proficiency levels were based on the mean performance of 5 repetitions of each task by 2 experts. For training purposes, testing metrics were modified to allow on-the-fly scoring; to achieve proficiency, trainees were required to perform each task in a



specified amount of time while committing "allowable" errors (no dropped pegs, all cuts within 2mm of the circle pattern line, up to 1mm accuracy errors, no knot security errors). Trainees were post-tested using the high-stakes exam format. Data reported are mean \pm s.d.; analyses were by Mann-Whitney and Fisher Exact tests ($p < 0.05$ considered significant).

Results: No trainee passed the certification exam at pre-testing. Trainees achieved proficiency for 96% of the 5 tasks during training, which required 9.7 ± 2.4 hours (range 6-14) and 119 ± 31 repetitions (range 66-161). Trainees rated the proficiency levels as "highly appropriate" (4.7 ± 0.1 , 5-point scale). At post-testing, 100% of trainees passed the certification exam and demonstrated significant improvement compared to pre-testing for total score (468 ± 24 vs. 126 ± 75 , $p < 0.001$), self-rated laparoscopic comfort (89.4% vs. 4.8% , $p < 0.001$) and skill level (3.6 ± 0.9 vs. 1.2 ± 0.5 , $p < 0.001$, 5-point scale).

Conclusions: This proficiency-based curriculum is feasible for training novices and uniformly allows sufficient laparoscopic technical skill acquisition for FLS certification. This curriculum has now been endorsed by the SAGES FLS Committee and is planned for widespread implementation as part of the FLS Program.

S080

THE IMPACT OF KNOWLEDGE OF RESULTS IN SURGICAL SKILLS TRAINING., A. O'Connor MD, C. Cao PhD, S. Schwaizberg MD, Department of Mechanical Engineering, Tufts University.

Background: Concerns about the adequacy of advanced laparoscopic training continue to be raised despite a proliferation of training systems exist. The manner in which the training modules are structured to maximize learning has not been examined. There are many aspects to the accumulation of laparoscopic skills during training, one of which is Knowledge of Results (KR), i.e. the information provided to individuals about the outcomes of their motor responses in their environment. We studied the effects of KR on the learning curve of laparoscopic suturing and knot tying.

Aims: We evaluated the learning curves of 9 medical students with no previous laparoscopic surgical experience under three different conditions, each with different levels of knowledge of results. **Methods:** Subjects were randomly assigned to one of three groups. Each subject attended a training session for 1 hour each day, 6 days a week for 4 weeks. Group 1 (No feedback) received no knowledge of results (KR) and no performance feedback. Group 2 (feedback only) received factual KR following each training session, but no coaching. Group 3 (feedback and coaching) received KR and coaching. Learning curves were plotted based on task time, smoothness of instruments and instrument's path length. The task used was an intracorporeal suture/knot tying in the ProMIS laparoscopic simulator. Perceived workload for each session was recorded using a standardized NASA TLX workload score.

Results: The variability across each session for each student was calculated for each of the three parameters. There was statistical significance between the groups for all parameters (p -values 0.0002, 0.0002 and 0.009). Significant differences were found between groups 2 and 3 and group 1 (p values 0.0314-0.0410) Groups 2 and 3 learned significantly faster than those in Group 1, reaching performance plateaus at earlier sessions. There were no significant differences between groups 2 and 3 (p -values 0.1211, 0.1758 and 0.1375). Providing individuals with knowledge of results lowered their perceived workload, adding instructional feedback lowered this even further. These results demonstrate that KR is essential for efficient surgical skill acquisition. Individual coaching, a labor intensive proposition, reduces workload but has NO added beneficial effect on the speed of learning. These results provide a useful basis for developing efficient and cost effective surgical skills training curriculum.

S081

EXPERT BENCHMARK FOR THE GI MENTOR II, Roy Phitayakorn MD, Jeffrey M Marks MD, Harry R Reynolds MD, Conor P Delaney MD, Case Medical Center, Department of Surgery, Case Western Reserve University, Cleveland, OH.

BACKGROUND There is increasing interest in the use of virtual-reality simulators in general surgery residency training. Many simulators lack a benchmark against which trainees can measure competence and skill.

METHODS Surgeons who had performed over 1000 colonoscopies were evaluated on Module 1, Case 5 of the GI Mentor I or II? virtual reality endoscopy simulator (Symbionix, Cleveland). Participants were given five minutes to familiarize themselves with the simulator, and then performed the study case with standardized instructions. Metrics were recorded by the previously calibrated simulator.

RESULTS Twenty-three surgeons (21 male, 2 female) participated. Mean height was 69.6 ± 2.6 inches, mean age 51 ± 9 years, median surgical glove size 7.5, and surgeons had 18.4 ± 10.2 years of practice, and did 8 ± 6 colonoscopies weekly. Ten participants had advanced training in endoscopy, laparoscopy, or colorectal surgery; eight had used the simulator before, of whom six had used it once. Mean time to complete the study case was 13.6 ± 5.3 minutes and time to reach the cecum was 6.5 ± 4.3 minutes. Participants examined $92.3 \pm 3.6\%$ of the simulated colonic mucosa with a clear view of the lumen $89.5 \pm 4.2\%$ of the time. Total time the colon was looped was 22 ± 35 seconds (range=0-133). The overall efficiency of screening was $70.33 \pm 23.45\%$ (range=20 to 94%). Participants tended to mistake normal simulated colonic structures as pathology.

CONCLUSION Performance on a virtual reality endoscopic simulator has a wide amount of variability even among a group of experienced endoscopists. Expert benchmark tests should be performed on simulators that will be used for resident assessment prior to any attempts at certification of competence.

S082

3719 LAPAROSCOPIC TOTALLY EXTRAPERITONEAL HERNIA REPAIRS., Yuen Soon MD, Henry M Dowson MD, M E Bailey MS, Minimal Access Therapy Training Unit, Royal Surrey County Hospital, Guildford, UK

Introduction: Laparoscopic totally extraperitoneal hernia (TEP) repairs have been shown to be safe method of repairing inguinal hernias. United Kingdom's National Institute of Clinical Evidence technology appraisal in September 2004, a systematic review comparing 5560 patients in 37 randomised controlled trials suggested that laparoscopic hernia repairs are associated with decreased wound infection and haematoma. Its complication rates are otherwise similar to open surgery, recommending that laparoscopic hernia repairs are suitable for primary hernia repairs. In this large personal series we demonstrate that Laparoscopic TEP hernia repair may be performed safely with low complication rates.

Methods: Over the last 12 years at the Royal Surrey County Hospital and the Nuffield Guildford Hospital 3719 hernia repairs have been performed in 2737 patients under the care of a single surgeon. Patients were followed up by either clinical examination, postal questionnaire or telephone enquiry.

Results: 3719 hernia repairs were performed in 2737 patients. There were no major peri-operative or post-operative complications. There were no conversions to any open procedures. 8 hernia repairs were converted from TEP to TAPP (transabdominal preperitoneal hernia). 6 were for significant peritoneal tears and 2 were for obliterated preperitoneal space. There were 29 recurrences (0.77% of hernia repairs; 1.06% of patients). Significant haematomas occurred in 15 patients (0.5%) but none of which required drainage. Mesh infection occurred in 4 patients (0.15%). Chronic groin pain occurred in 22 patients (0.8%).

Conclusion: These results demonstrate that laparoscopic TEP hernia repairs may be performed safely with excellent results. It is the new gold standard in the treatment of inguinal hernia.



S083

PROSPECTIVE RANDOMISED TRIAL OF MESH FIXATION IN 500 LAPAROSCOPIC TOTALLY EXTRA-PERITONEAL HERNIORRHAPHIES., craig j taylor MD, laurent j layani MD, stephen i white MD, michael Ghush MD, liew victor MD, John Flynn Gold Coast Hospital, Queensland Australia, The Tweed Hospital, Tweed heads Australia

Background New and persistent groin pain is reported by a significant number of patients following laparoscopic totally extra-peritoneal hernia repair (TEP). Mesh fixation by staples has been implicated as a possible cause, but is widely believed necessary to stabilize the mesh prior to tissue incorporation, otherwise early hernia recurrence may result. This study investigates whether an association exists between stapled mesh fixation, chronic pain, and early recurrence.

Methods A prospective double-blinded randomised trial was conducted between Dec 2004 and Jan 2006 involving three institutions. Eligible patients with an inguinal or femoral hernia underwent a standardised TEP repair with unshaped polypropylene mesh. Intra-operative randomisation determined if mesh fixation was performed by spiral metal tacks or left entirely alone. Patients were recalled for physical examination and interview by a separate independent surgeon after a minimum of 6 months. The incidence of new groin pain and recurrence were compared.

Results 500 herniae in 360 patients were entered into the study. A new and persistent pain was reported at 6 post-operative months by 38% vs 23% (p 0.003), occurring at least once a week in 22% vs 15% (p 0.049), or several times per week in 16% vs 8% (p 0.009) for fixation vs no fixation respectively. Patients who had bilateral repairs were 5 times more likely to prefer the side without fixation (p 0.006). Hernia recurrence after 6 months was 0.4% vs 0% respectively (p 0.85). Fixation increased operative costs by approximately \$375AUD.

Conclusion Mesh fixation in TEP is associated with increased operative cost and persistent pain but no difference in the risk of hernia recurrence at 6 months.

S084

LAPAROSCOPIC TRANSPERITONEAL REPAIR OF INCISIONAL FLANK HERNIAS: A RETROSPECTIVE REVIEW OF 27 PATIENTS, Chris A Edwards MD, Bruce J Ramshaw MD, Archana Ramaswamy MD, Timothy Geiger MD, Kevin Bartow BS, Louis Jeannsonne, University of Missouri - Columbia

Introduction: Incisional hernias of the flank are uncommon defects with only small scattered case reports regarding the feasibility of laparoscopic treatment. These defects can be technically challenging due to difficulties in patient positioning and obtaining adequate mesh overlap and fixation. This difficulty is compounded by the rarity of the defect and difficulty with acquiring surgical experience in treating these difficult hernias. The purpose of this study is to present the largest known case series of laparoscopic repair of incisional hernia of the flank and to describe the surgical technique.

Methods: A retrospective chart review was performed from April 2002 to August 2006 at two university hospitals of three surgeons' experience. All patients who underwent a laparoscopic repair of a flank hernia were identified and reviewed with regards to short term outcomes.

Results: Twenty seven patients were identified with incisional flank hernia treated laparoscopically. The average defect size was 188 sq. cm. repaired with an average mesh size of 650 sq. cm. The mean OR time was 144 min. and mean LOS was 3.1 days. There were two re-operations within the cohort. One was for a new unrelated midline hernia 7 months after repair of the initial flank hernia and one re-operation for chronic pain with removal of a previously placed mesh. Neither patient had failure of the flank hernia repair. Two other patients were treated for chronic pain by an anesthesia pain service. There were no recurrences at a mean follow up of 3.6 months.

Conclusion: Laparoscopic repair of incisional hernias of the flank can be performed safely and effectively with good

short term outcomes. Important key technical details include adequate retroperitoneal dissection and wide mesh overlap. It is important to obtain inferior fixation to Cooper's ligament and the ileopubic tract for inferior hernias. It is also important to apply superior fixation to the costal margin with mesh overlap extending across the diaphragm for superior hernias near the costal margin.

S085

TRANSABDOMINAL PREPERITONEAL APPROACH FOR INCISIONAL / VENTRAL HERNIAS, Pradeep Chowbey MS, Chairman - Minimal Access & Bariatric Surgery Centre, Sir Ganga Ram Hospital, New Delhi (India)

Abdominal wall hernias in the lower abdomen, flanks and in close proximity to bony structures are considered difficult hernias to repair. We performed laparoscopic transabdominal partially extraperitoneal repairs (LTER) for 102 such hernias located in an inverted horse shoe shaped area of the abdominal wall (flanks and suprapubic area). A peritoneal flap was raised from the lower margin of the hernial defect for at least 5 cms till bone / ligament / fascia was clearly identified and dissected for secure fixation of lower margin of the mesh. There were 84 females and 18 males with mean age of 52.5 ± 8.7 years. Location of the hernias included lower midline scar 62, pfannensteil scar 10, lower paramedian scar 18, Lumbar hernias 12 (primary and acquired). Thirty Six repairs were for recurrent hernias and 39 patients had irreducible or partially reducible hernias. The mean hernia diameter was 6.38 ± 4.96cm and the average size of mesh required was 442 ± 198 cm². The mean operating time was 123.9 ± 25.7 min. The mean blood loss was 150 ± 80 cc. Postoperative hospital stay averaged 2.80 ± 1.39 days. Intraoperative and postoperative complications accounted for 18% and 12%. At a mean follow up of 34.2 ± 20 months, one patient had recurrence. LTER for selected abdominal wall hernias is feasible and safe. The main advantage appears to be an increased lower margin of mesh coverage for the hernial defect and more importantly secure fixation of the lower margin of the mesh to bone / ligament / fascia that adds to the strength of the repair.

S086

LAPAROSCOPIC VERSUS OPEN HERNIA REPAIR: 5 YEAR RECURRENCE RATES, Naveen Ballem MD, Rikesh Parikh MD, Eren Berber MD, Allan E Siperstein MD, Cleveland Clinic

Background: Current studies with 2-3 year follow-up favor laparoscopic ventral hernia repair due to lower recurrence rates, fewer wound infections, and shorter hospital stays. There is scant data in the literature for this group of patients regarding longer follow-up. This study compares the actual 5 year recurrence rates of laparoscopic vs. open techniques and determines factors that may affect recurrence.

Methods: A retrospective analysis of ventral hernia repairs at a tertiary center between Jan. 1996 and Dec. 2001 was performed. In this era, the method of repair often depended on which surgeon evaluated the patient. All patients were followed for a minimum of 5 years (median of 7.5 yrs). Demographic and clinical parameters were analyzed using Kaplan Meier analysis and Multivariate Cox Proportional Hazard Model.

Results: Of 331 patients, 119 underwent laparoscopic ventral hernia repair (LAP), 106 open hernia repair with mesh (O-M), 86 open suture repair (O-S), and 20 laparoscopic converted to open (LCO). Statistical analyses showed equal parameters among groups except defect sizes (mean ± SEM): LAP (9.8cm ± 1.2), O-M (11.2cm ± 3.3), LCO (16.6 ± 5.4) vs. O-S (4.6cm ± 1.6), p<0.02. Actual recurrence rates at 1 and 5 years were: LAP (15% and 29%), O-M (11% and 28%), O-S (10% and 19%), and LCO (35% and 60%). Multivariate analysis identified larger defects to have higher recurrence rates, particularly in the O-S group (p<0.02). With the exception of the LCO group, surgical technique did not predict recurrence, nor did body mass index, diabetes, smoking, or use of tacks vs. sutures.

Conclusion: This is the first study to compare 5 year actual recurrence rates between laparoscopic and open ventral



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hernia repairs. Contrary to prior reports, our longer term data indicates similar recurrence rates, except for higher rates in the laparoscopic converted to open group. Due to the continued recurrences over the period studied, longer term follow-up is necessary to appreciate the true rate of hernia recurrence.

S087

IS AGE A RISK FACTOR IN LAPAROSCOPIC INGUINAL HERNIA REPAIR? J. R Salameh MD, G. M Varkarakis, Departments of Surgery, University of Mississippi Medical Center and G.V. Sonny Montgomery VAMC, Jackson, Mississippi

INTRODUCTION: Laparoscopic totally extra-peritoneal (TEP) inguinal hernia repair is a safe and effective technique. We compared the outcome of laparoscopic TEP inguinal hernia repair between patients less and over 60 years of age.

METHODS: We retrospectively reviewed the records of all patients undergoing laparoscopic TEP inguinal hernia repair between October 2002 and February 2006 performed by one surgeon (JRS). 60 patients, all male, were identified and divided in two groups: Young, less than 60 years of age (30) and Elderly, 60 years of age and older (30). Mean age was 52 (range: 21 - 59) for the Young group and 71.7 (range: 60 - 89) for the Elderly group. Both groups were identical in terms of co-morbidities, bilateral hernias (33% vs. 40%), recurrent hernias (27% vs. 27%) and incidental femoral hernias (3.3% vs. 3.3%). Outcome variables were compared between the groups using Fisher's exact test.

RESULTS: All procedures were completed laparoscopically. Mean operative time was 85.2 minutes for the Young and 84.6 minutes for the Elderly and length of stay was 0.06 vs. 0.53 days respectively. Early outcomes were as follows:

Group	Intra-op compl.	Urin. Retention	Post-op compl.
Young (n=30)	0/30 (0%)	0/30 (0%)	5/30 (16.6%)
Elderly (n=30)	2/30 (6.6%)*	3/30 (10%)	4/30 (13.3%)
p	0.246	0.119	0.500

*Both intraop compl. were transient bradycardia

In the Young, 10% patients had pain that lasted more than 2 weeks versus 3.3% in the Elderly (p = 0.306). There were no recurrence or chronic pain (>12 weeks) in either of the two groups at a mean follow-up of 24.3 months.

CONCLUSIONS: Laparoscopic TEP inguinal hernia repair seems to be as safe and effective in elderly patients as it is in younger patients without detectable difference in early or late outcomes.

S088

RESULTS OF LAPAROSCOPIC REPAIR OF ENLARGED HIATAL HERNIA WITH ACELLULAR DERMIS, Alex Reznichenko MD, Philip L Leggett MD, Harvinderpal Singh MD, Michael Kia DO, Sherman Yu MD, Terry K Scarborough MD, Erik B Wilson MD, The University of Texas Health Science Center at Houston, Minimally Invasive Surgeons of Texas

Background: Hiatal hernias have traditionally been repaired with primary crural closure. However, significant recurrence rates have encouraged the use of mesh reinforcement for enlarged defects. Biosynthetic meshes such as acellular dermis are being more frequently used in repair due to the considered lower risk of infection and erosion. This study reports the outcomes of 36 patients receiving laparoscopic enlarged hiatal hernia repair with acellular dermis reinforcement.

Methods: From 2003 to 2006, 36 patients at two institutions with symptomatic enlarged hiatal hernias received laparoscopic surgical repair. The crural fascial edges were approximated with non-absorbable sutures, followed by buttressing the crural repair with acellular dermis. There were 8 patients with type I hernias, 17 with type II hernias, and 11 with type III hernias. Average age was 60 years with 23 females(64%). Data was registered in a database and retrospectively reviewed.

Results: Preoperative symptoms were noted as reflux in 22 patients(61%), dysphagia in 12 patients(33%) and postprandial pain in 19 patients(53%). Nine patients(25%) were diagnosed with Barrett's preoperatively. Funduplications were performed in all patients with 29 Nissens (81%), 6 Dors(17%), and 1 Toupet(3%) completed. There were no complications attributable to the use of acellular dermis intraoperatively or postoperatively and no perioperative mortality. Follow up of all patients averaged 3.5 months. Symptoms resolved in all patients, except 3 patients(8%) developed postoperative dysphagia; one was managed with 2 endoscopic dilations and resolved. Two patients(6%) developed delayed dysphagia at 3 months postoperatively and were diagnosed with recurrent hiatal hernias by endoscopy. Both patients were reoperated upon laparoscopically and repaired with no recurrent symptoms at 9 and 18 months.

Conclusion: Laparoscopic repair of enlarged hiatal hernia with acellular dermis is a safe and effective modality but does completely prevent recurrence. Longer follow up may reveal further recurrences. Additional studies of biosynthetic versus synthetic mesh are necessary to compare risks of recurrence to risks of infection or erosion.

S089

PEDIATRIC ROBOTIC SURGERY: A SINGLE INSTITUTIONAL REVIEW OF OUR FIRST 100 CASES, John J Meehan MD, Anthony Sandler MD, The Children's Hospital of Iowa, University of Iowa Hospitals and Clinics

Purpose: Robotic surgery is a new technology which may expand the variety of operations performed minimally invasively. We present a retrospective review of our first 100 consecutive robotic cases in children.

Methods: All procedures were performed using the 3 arm Da Vinci surgical robot. Additional non-robotic accessory ports were utilized dependant on the type of operation.

Results: Twenty-four different types of procedures were completed using the robot. Twenty (83%) of these procedures had never been attempted minimally invasively by the authors. Age ranged from 1 day to 23 years with an average age of 8.4 years. Weight ranged from 2.2 kg to 103 kg with a median weight of 27.9 kg. Twenty-two patients were less than 10.0 kg. Fifteen oncology patients underwent robotic resections. Solid tumors were successfully resected robotically in 6 of 6 thoracic cases and 5 of 9 abdominal cases.

Open conversion rate was 13%. One case (1%) was converted to thoracoscopic. No conversions to open surgery or complications occurred as a result of injuries or failures of the robotic instruments. However, four cases were opened due to equipment failures or injuries from traditional laparoscopic equipment. Completed abdominal procedures included fundoplication (35), cholecystectomy (16), splenectomy (4), total proctocolectomy with pull-through (3), adrenalectomy (2), Ladd's procedure (2), neuroblastoma resection (2), small bowel resection (2), Heller myotomy (2), neonatal Bochdalek CDH repair (1), rectal prolapse (1), Kasai (1), duodenal atresia (1), ovarian teratoma (1), ovarian cystectomy (1), mesenteric lymphangioma (1), hemicolectomy (1), and pyloroplasty (1). Completed thoracic procedures included mediastinal mass resection (4), neurogenic tumor resection (2), CCAM resection (1), bronchogenic cyst (1), intralobar sequestration (1), and pulmonary segmentectomy. Procedures attempted but unsuccessful robotically included a large gastric duplication, thoracic approach to a neonatal Bochdalek CDH, an intraabdominal retroperitoneal tumor, and pancreatic tumor resection.

Conclusions: Robotic surgery is safe and effective in children. An enormous variety of procedures can be accomplished including complex neonatal operations. The technology is ideal for thoracic procedures, particularly solid chest tumors. Subjectively, we found robotics enabling: it allowed us to perform many different MIS procedures we would not have otherwise attempted using standard MIS instruments.

**S090****VALIDATED ROBOTIC LAPAROSCOPIC SURGICAL TRAINING IN VIRTUAL REALITY ENVIRONMENT**, Ka-Chun Siu

PhD, Bernadette Brown-Clerk BS, Dimitrios Katsavelis MS, Irene H Lee MS, Dmitry Oleynikov MD, Nick Stergiou PhD, HPER Biomechanics Lab, University of Nebraska at Omaha, Omaha, NE, USA; Department of Surgery, University of Nebraska Medical Center, Omaha, NE, USA.

A virtual reality (VR) environment has been developed to improve training for laparoscopic surgery. Currently, only verbal training sessions and subjective skill assessments by expert surgeons are used to train and evaluate surgeons on the da Vinci Robotic Surgical System (Intuitive Surgical, Inc.). The simulated VR provides a subjective and quantitative approach to evaluate and improve surgical performance and efficacy. This study presents our preliminary data of the VR training environment for robotic laparoscopy. We compared the VR to the actual training environment using a bimanual carrying (BC) task to determine the validity of the VR simulation. Four volunteers simultaneously transferred two plastic pieces in opposite directions five times consecutively. This task requires significant bimanual coordination that mimics actual laparoscopic skills. Our VR is the first training simulation developed for robotic laparoscopic surgery. The VR was constructed using the simulation software Webots (Cybertonics Corp). The da Vinci instruments and training task platform were modeled as 3D objects using SolidWorks (Fig 2). This simulation was driven by the kinematic data from the robotic operating console through LabVIEW. The VR simulation mimics the motions of a simplified BC task. Data analysis included time to task completion, distance traveled, instrument tip speed as well as the range of motion (ROM) of the operator's wrist and elbow. Paired t-tests were used to compare the VR and real environment. As a result, there were no significant differences between the actual environment and the simulated VR with respect to robot performance, except the wrist ROM. Our preliminary data shows that the VR can be used for robotic laparoscopy training. A significant reduction in wrist performance may be attributed to an oversimplification of the BC task. Complexity of the VR should be improved to further investigate the effectiveness and reliability of the VR training environment.

S091

A LIFELIKE PATIENT SIMULATOR FOR TEACHING ROBOTIC COLORECTAL SURGERY, Russell K Pearl MD, Slawomir J Marecik MD, Raymond J Evenhouse MD, Leela M Prasad MD, Herand Abcarian MD, Cook County Colon and Rectal Surgery Residency Training Program, Chicago, Advocate Lutheran General Hospital, Park Ridge, IL

Patient simulators are playing an increasingly important role in training both surgical residents and practicing surgeons. We have created an innovative teaching model which allows the operator to practice robotic suturing techniques within the confines of the pelvis. The simulator consists of a plastic model of a human pelvic skeleton which has been mounted on a sturdy laminate covered base by an adjustable bracket designed to alter the pelvic angle over a wide range. A clear plastic replica of a patient with a distended abdomen (pneumoperitoneum) with its thighs abducted and elevated to simulate the lithotomy position was fashioned utilizing the vacuum molding technique and fixed to the adjustable pelvic skeleton so that the surface contours and pelvic bones move as a single unit. Several holes were drilled into the clear plastic "skin" to allow for the insertion of standard ports, and a larger aperture was created to accommodate a hand assist device. Lengths of 12 gauge solid copper wire fitted with metallic alligator clips were mounted to the base to hold small strips of pig intestine in proper alignment for suturing. A previously held suturing exercise utilizing surgical residents demonstrated the effectiveness of this tissue approximation method.

S092**EFFICACY OF REMOTE ROUNDING AND PATIENT CARE UTILIZING THE ROVER ROBOT**, Michael S Lofgren

MD, Stephen D Wohlgemuth MD, Eastern Virginia Medical School Department of Surgery

Introduction: This study was designed to assess the impact of remote, physician directed, robotic rounding on patient length of stay and satisfaction in the immediate postoperative period.

Methods: Patients undergoing laparoscopic gastric bypass (lap GBP) between December 2005 and June 2006 at a tertiary 569 bed hospital were enrolled in a prospective randomized trial. Patients were placed into one of two groups. The first treatment arm underwent a lap GBP on the day of admission. On post operative day (POD) 1, the patient underwent a radiographic swallow evaluation and was seen personally by an attending physician. Throughout the remainder of the day the patient would be re-evaluated by either a nurse practitioner or physician assistant. On POD 2 the patient would then again be seen by an attending physician and a determination would be made as to potential discharge or continued hospitalization. Any subsequent hospital days would repeat this same algorithm. The second treatment arm also underwent a lap GBP on the day of admission. On POD 1, the patient underwent the same radiographic swallow evaluation and was seen personally by an attending physician. Throughout the day the patient would have continued interaction with either a nurse practitioner or physician assistant. In the evening the patient would be re-evaluated by an attending physician through the use of the rounding robot. At the time of the robot rounding evaluation, a decision would be made as to potential discharge. If the patient remained hospitalized, each additional day would repeat the same algorithm. At the time of discharge, patients within the rounding robot arm of the study received a patient satisfaction questionnaire

Results: A total of 39 patients were enrolled in the study: 14 in the rounding robot arm and 25 in the control arm. 12 completed patient satisfaction surveys were returned. In the robot arm of the study the length of stay (LOS) was 3.42 days SD 2.03, 2.26-4.60 95% CI, in the non-robot arm the LOS was 3.16 days, SD 1.07 2.72-3.60 95% CI. When comparing the two groups, the two-tailed P value was 0.5894, -0.73 to 1.27 95% CI.

Conclusions: The use of supplemental robot based patient evaluation fails to demonstrate a significant difference in postoperative LOS. Although patient questionnaires indicate a high acceptance of the technology, further investigation is needed to assess the potential value of robotic postoperative patient assessment.

S093

IS THE 4TH ARM AN USEFUL TOOL IN ROBOTIC GENERAL SURGERY?, G. Pernazza MD, J. H Palep MD, G. Caravaglios MD, A. Coratti MD, F. Sbrana MD, F. M Bianco MD, P. C Giulianotti MD, "Misericordia" Hospital - ASL 9 - Grosseto, Italy

Aim of the study was to evaluate the clinical impact of the fourth robotic arm of the da Vinci Intuitive Surgical System.

MATERIAL & METHODS: 650 procedures have been performed since October 2000. The first 100 cases were excluded from the study as part of the learning curve. So we considered 276 procedures performed with the three-arms system (3As) till October 2004 and 274 procedures performed till date with the four arms system (4As).

Data concerning operative arms positioning, operative time, intraoperative complications and system failures were systematically collected and compared considering the most significant procedures performed with and without the fourth arm.

RESULTS: The 4As procedures were shorter than 3As ones, but the difference was statistically significant only in Nissen funduplications ($p < 0.05$), gastric resections ($p < 0.005$) and minor hepatic resections ($p = 0.001$).

No intraoperative complications were recorded in the 4As group.



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In the 3As group we observed a liver injury due to an over-retraction by the assistant (Nissen fundoplication). The complication required a conversion to open surgery to be controlled.

CONCLUSION: The 4As seems to offer many potential advantages in robotic surgery. Improving of operative time may be an interesting aspect but not the most important one.

A clear potential is the opportunity to perform a "solo-surgery" technique, without the need of an assistant surgeon, especially in low complexity procedures such as cholecystectomy and oesophagogastric junction procedures.

Some difficult technical steps of major operations like hepatic or pancreatic resections are clearly improved and made safer by the dynamic but stable and under surgeon control retraction.

The 4th arm utility in thoracic and colonic surgery seems to be questionable because the 4As is more cumbersome and more difficult to setup in relation to the small size of the operative field (chest) and the need of multiple cooperation (colon).

In rectal surgery, when performing TME, the 4As seems to be advantageous in retracting the mesorectum.

S094

VISUAL CLUES ACT AS A SUBSTITUTE FOR HAPTIC FEEDBACK IN ROBOTIC SURGERY, Monika E Hagen* MD, John J Meehan** MD, Isan Ihnan* MD, Philippe Morel* PhD, University Hospital Geneva*, University of Iowa**

BACKGROUND: The lack of haptic feedback (HF) in robotic surgery is one of the major concerns of novice surgeons to that field. The superior visual appearances acquired during robotic surgery may give clues that make HF less important. We tested the null hypothesis that visual clues are not effective substitutes for HF in robotic surgery and are not creating the perception of HF.

AIM: The aim of this study was to clarify if the lack of HF is compensated by superior visualization in robotic surgery and creation of a perception of HF.

METHODS AND DESIGN: We surveyed 40 individuals on their perceptions of the need for HF when performing robotic surgery. 3 groups were compared. The 1st group of 20 surgical inexperienced students and doctors (age 25 to 35) took part in a dexterity study using the da Vinci surgical system in a dry lap for the first time. The 2nd group included 8 moderately experienced laparoscopic surgeons (age 30 to 45) using the robot in their first to fifth operations (22 procedures, each procedure assessed). The 3rd group included 10 surgical experts (8 American, 2 European; - 2 pediatric surgeons, 4 urologists, 4 abdominal surgeons) with substantial experience of robotic surgery (Range: 150 to above 600 cases). Visual analog assessment with a scale from 1 to 10 was made of the following questions: perception of HF, how much HF was missed and how much the absence of HF impaired their level of comfort with the procedure. Robotic experts were also asked if complications have occurred due to the lack of HF.

RESULTS: 50% of the 1st group, 55% of the 2nd group and 100% of the 3rd group reported the experience of the perception of HF (Difference between group 1 and group 3: $p < 0.05$). The 1st group missed HF for 6,5 (on a scale from 1 to 10), the 2nd group for 4,3 and the 3rd group for 4 now and 7,2 when they first started robotic surgery (Difference between group 1 and 3: $p < 0.05$; group 3 first and now: $p < 0.05$). The lack of HF caused discomfort for group 1 of 4; 4, 4 for group 2 and 2,6 for group 3. 1 complication (perforation of gallbladder) was reported by the robotic experts due to the lack of HF.

CONCLUSION: The data support the conclusion that even beginners quickly find that visual clues are effective substitutes for haptic feedback in robotic surgery by creating the perception of haptic feedback. With more experience, perception of haptic feedback and the level of comfort with robotic surgery increases significantly.

S095

COMPARISON OF PATIENT-CENTERED OUTCOMES AFTER LAPAROSCOPIC NISSEN FUNDOPLICATION PERFORMED FOR GASTROESOPHAGEAL REFLUX DISEASE OR PARAESOPHAGEAL HERNIA, L Mark MD, A Okrainec MD, L E Ferri MD, L S Feldman MD, S Mayrand MD, G M Fried MD, McGill University

INTRODUCTION: Patients undergoing laparoscopic Nissen fundoplication (LNF) with paraesophageal hernias (PEH) are older and less healthy than those with gastroesophageal reflux disease (GERD). We evaluated whether outcomes relating to GERD symptoms and quality of life (QOL) were impacted by the presence of PEH.

METHODS: 150 patients (41 PEH) were evaluated before and one year after LNF. Outcomes evaluated were heartburn (0-5), dysphagia (0-5), disease-specific QOL (GERD-HRQL, 0-45), and general health-related QOL (SF-12 physical and mental component scores, PCS and MCS). Data (mean \pm SD) were compared using t-tests. (Table: *= $p < 0.05$ GERD vs. PEH; **= $p < 0.05$ Preop vs. 1-yr postop.)

RESULTS: Preoperative data for GERD-HRQL, heartburn, and dysphagia were available for 136 patients, with 96% one year follow-up. SF-12 data were collected for 99 patients with 100% follow-up. PEH patients were older at 68.5 \pm 10.3 years ($p = 0.000$). Preoperative GERD-HRQL and heartburn were significantly worse in the GERD group ($p = 0.000$ each). Preoperative PCS scores were higher in GERD patients ($p = 0.045$). At one year, GERD patients showed significant improvement in GERD-HRQL ($p = 0.027$). GERD and PEH patients showed improved dysphagia ($p = 0.046$ and $p = 0.000$, respectively) and MCS scores ($p = 0.000$ each group.) There was no statistical difference in GERD-HRQL, heartburn, or dysphagia scores between GERD and PEH patients postoperatively. Postoperative PCS score showed improvement in GERD patients ($p = 0.000$), and was significantly higher compared to PEH patients ($p = 0.002$.)

CONCLUSION(S): LNF provides excellent control of GERD symptoms and QOL in patients with GERD or PEH.

S096

LAPAROSCOPY SHOULD BE THE APPROACH OF CHOICE FOR ACUTE APPENDICITIS IN MORBIDLY OBESE, Esteban Varela MD, Ninh Nguyen MD, University of Texas Southwestern and University of California Irvine

Objective: The morbidity associated with open appendectomy in obese patients may be significant, particularly wound related complications. This study determines outcomes in obese patients undergoing laparoscopic (Lap) and open appendectomies for acute appendicitis using an administrative database of academic centers.

Methods: Using ICD-9 diagnosis and procedure codes we obtained data from the University HealthSystem Consortium database for 67,347 patients who underwent appendectomies between 2002 and 2006. A total of 1,671 morbidly obese patients had appendectomies (2.5%). Outcomes included patient's length of stay (LOS), costs, morbidity and mortality.

Results: Data for appendectomies in morbidly obese patients. Means \pm SD; ?= $p < 0.05$ by t-test; *= $p < 0.05$ by Z-test;

Variables	Open (n=903)	Lap (n=768)
Mean LOS (days)	4.4 \pm 3.7	2.9 \pm 2.9 ?
Mean costs (K\$)	10,4 \pm 11,9	8,6 \pm 6,6 ?
Mortality	0	0
Morbidity	16.3	9.0 *
Infection (%)	2.7	1.1 *

Conclusion: Compared to open appendectomy, laparoscopic appendectomy performed in morbidly obese patients is associated with lower cost, shorter length of stay, lower morbidity, with a similar mortality. Laparoscopic appendectomy for the treatment of acute appendicitis in the obese population has distinct clinical advantages compared to open appendectomy and should be the approach of choice.



S097

LAPAROSCOPIC ANTECOLIC ROUX-EN-Y GASTRIC BYPASS WITH CLOSURE OF INTERNAL DEFECTS LEADS TO FEWER INTERNAL HERNIAS THAN RETROCOLIC APPROACH,

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Introduction: Laparoscopic Roux-en-Y gastric bypass has been reported to have a higher rate of postoperative internal hernias than open gastric bypass. Despite closure of the mesenteric defects, internal hernias are reported to occur in up to 5% of cases. To minimize this complication, an antecolic antegastric approach to the anastomosis of the Roux limb and gastric pouch has been used. In contrast to the retrocolic retrogastric technique, which creates three mesenteric defects, the antecolic approach produces only two defects: Peterson's and the jejunojejunostomy. It is expected that this approach will result in fewer internal hernias.

Aims: To compare the rate of internal hernias among patients undergoing laparoscopic Roux-en-Y gastric bypass using a retrocolic retrogastric versus an antecolic antegastric approach.

Methods: We reviewed the experience of a single surgeon, using the above two techniques for laparoscopic gastric bypass, from August 2001 to September 2005. Only Roux-en-Y procedures were included in this analysis. Patients were followed for a minimum of one year postoperatively, and were encouraged to report any symptoms, treatments, or hospitalizations. The retrocolic retrogastric approach was used on 274 patients and the antecolic antegastric approach on 205 patients. All defects were closed at the time of surgery. With the antecolic approach, Peterson's defect was closed from the root of the mesentery of the Roux limb and the transverse colon mesentery up to the transverse colon.

Results: Among the 274 patients who underwent retrocolic retrogastric technique, seven (2.6%) developed a symptomatic internal hernia. No internal hernias were reported amongst the 205 patients who underwent the antecolic antegastric method. Thirty-five of 479 patients (7%) required diagnostic laparoscopy for post-operative abdominal pain. No internal hernias were found in this group; however, 15 patients were found to have cholelithiasis and underwent laparoscopic cholecystectomy. Using chi-square analysis, use of an antecolic approach was associated with a decreased rate of internal hernias ($p < 0.025$).

Conclusion: The antecolic antegastric approach to laparoscopic Roux-en-Y gastric bypass is associated with fewer postoperative hernias than the retrocolic retrogastric approach. The frequency of hernias using either technique is low if meticulous attention is paid to closure of all mesenteric defects.

S098

IMPROVED RESULTS FROM LOW VOLUME CENTER IN NEW YORK STATE - SHOULD VOLUME CRITERIA FOR CENTERS OF EXCELLENCE BE REVISITED?

Ashutosh Kaul MD, Thomas Sullivan BS, Michael Parker MD, Edward Yatco MD, Thomas Cerabona MD, New York Medical College

Aim of this presentation is to highlight the improving results of bariatric surgery in low volume centers in New York State and to initiate a debate on evidence based criteria for centers of excellence. We analyzed 12-year data (1991-2003) from statewide planning and Research Cooperative Systems (SPARCS) database maintained by New York State. Bariatric surgery procedures identified by DRG were scrutinized by patient demographics and complications and institution based on volume (low volume (LV) 0-49, Medium volume (MV) 50-124 and High Volume (HV) over 125 cases per year.

24, 534 patients underwent bariatric surgery with volume jumping from 500 in 1991 to around 8000 in 2003, a 16-fold increase. There was dramatic improvement in results in all volume centers with mortality falling from a peak of 1.1% in 1994 to 0.1% in 2003. Non-significant predictors of mortality

included DM, prior MI, hepatic disease and hypertension. The average mortality rates from 2000 to 2003 were LV 0.67%, MV 0.2% and HV 0.26%. The results showed dramatic improvements in low volume centers from 1% in 2000 to 0.4% in 2003. Incidence of postoperative complications in LV also was improving though results were better in higher volume centers during that period. (LV 11.3%, MV 10.1%, HV 7.1%).

The incidence of reintubation in LV and MV was nearly the same (LV 1.63%, MV 1.6% and HV 0.76%). The incidence of blood transfusions over the 12-year period was LV 2.4%, MV 2.4% and HV 1.8%. Analysis showed significantly higher postoperative GI complications and pulmonary complications in lower volume centers.

It was seen that though Higher volume centers still had the best results, lower volume centers were rapidly closing the gap with their results in last two years came closer to levels obtained in higher volume centers. This could be due to better training, more fellowship trained surgeons and the learning curve. The dramatic improvements in results in New York State from lower volume centers are encouraging.

In light of these dramatic improvements in results from lower volume centers it is important to have further data and to possibly revisit the present volume levels for center of excellence. Increased GI and pulmonary complications in LV centers could be concentrated to improve results. Different preoperative patient selection criteria and special emphasis on factors leading to postoperative GI and pulmonary complications could be studied.

S099

THORACOSCOPIC ESOPHAGEAL MOBILIZATION DURING MINIMALLY INVASIVE ESOPHAGECTOMY: A HEAD-TO-HEAD COMPARISON OF PRONE VERSUS DECUBITUS POSITIONS, Thomas Fabian MD, Mario Katigbak MD, Jerry Martin MD, Alicia McKelvey MD, John Federico MD, Hospital of St. Raphael, Yale University School of Medicine Department of Thoracic Surgery

Background: The thoracoscopic portion during minimally invasive esophagectomy (MIE) is generally performed in the left lateral decubitus position. Recently there has been increasing interest in esophageal mobilization in the prone position; potential benefits of this technique include improved operative time, surgeon ergonomics and operative exposure. We sought to objectively compare thoracoscopic mobilization of the esophagus in the left lateral decubitus position versus the prone position and identify potential differences between the two techniques.

Methods: A retrospective review of a prospective MIE database identified 19 patients undergoing thoracoscopic esophageal mobilization with cervical anastomosis during a 12-month period (June 2005-June 2006). Of these, 8 cases were performed in the left lateral decubitus position and 11 cases performed in the prone position.

Results: The patients were comparable in age, stage of tumor and percent undergoing neoadjuvant therapy. There was no statistically significant difference between decubitus position and prone position with regard to lymph nodes dissected 14.3 vs. 14.9 ($p = 0.767$), complications 6/8 vs. 7/11 ($p = 0.062$), length of stay 13.4 vs. 12.1 days ($p = 0.738$), or intraoperative blood loss 84cc vs. 73cc ($p = 0.556$) respectively. One patient in the decubitus group died within 30-days as an outpatient not considered related to thoracoscopic mobilization technique. Operative times were significantly shorter in the prone versus the decubitus group (88 versus 133 minutes, $p = 0.0142$).

Conclusions: Prone thoracoscopic esophageal mobilization appears equal to decubitus thoracoscopic esophageal mobilization with respect to blood loss, number of lymph nodes dissected, and complications, but offers a significant reduction in surgical time.



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S100

THE SYSTEM OR THE SURGEON? NSQIP-CONFIRMED OUTCOMES AVOIDING THE LEARNING CURVE AT A UNIVERSITY-BASED TRAINING PROGRAM, Bruce Schirmer MD, Sang K Lee MD, C. Joseph Northup MD, Michael S Miller BS, Virginia B Simpson RN, F. Beth Turrentine MSc, Jan Dix MS, Anna D Miller RN, University of Virginia

OBJECTIVE: We hypothesized that a comprehensive university-based training program, as exemplified by a program evolving to perform laparoscopic bariatric surgery, could demonstrate the importance of the system as being at least as important as the surgeon in achieving successful surgical outcomes.

METHODS: Outcomes of laparoscopic Roux-en-Y gastric bypass (LRYGB) procedures were reviewed for the period 1999-2004. Data were taken from an institutional database, whose input was by individuals not involved in the surgical operation. For the years 2003-2004, the institutional NSQIP program data were reviewed and compared to the institutional database. Outcomes of cases performed by attendings (AT) were compared to cases performed by fellows and residents (F/R).

RESULTS: AT performed 101 procedures for an 82.2% female population, age 40.5+1.0 years, weight = 304.0+4.9 lbs, BMI = 48.6+0.7, with 2.45+.16 comorbidities. F/R performed 711 procedures for an 82.6% female population that was older (42.5+0.4, p=.042) with higher BMI (57.6+0.3, p<.001) and more comorbidities (2.78+.06, p=.036). F/R procedures took less time (198.7+2.8 vs. 237.5+8.2 min, p<.001), while AT patients had shorter hospital stays (2.94+.13 vs. 3.78+.27 days, p=.004). Intraop complications, blood loss, % conversion to open, reoperation rate, postoperative complication rate, leak rate, 30 day and total mortality, and 1—5 year % excess weight loss were similar for both groups. NSQIP data (n=528) confirmed comparable values to the database for hospital stay (3.12+.22 days), postop complication rates (14.6%), and 30 day mortality (0.38%) for the years analyzed.

CONCLUSION: The performance of LRYGB by fellows and residents in this setting produced excellent outcomes, comparable to that of attendings. These data demonstrate avoidance of the learning curve for new surgeons seen in other settings, and emphasize the importance of the system over the surgeon in contributing to safe surgical outcomes.

S101

DO ELDERLY PATIENTS BENEFIT FROM LAPAROSCOPIC COLORECTAL SURGERY?, Benjamin Person MD, Susan Cera MD, Juan J Noguerras MD, Dana R Sands MD, Eric G Weiss MD, Anthony M Vernava III MD, Steven D Wexner MD, Cleveland Clinic Florida, Weston, FL

Background: The aim of study was to analyze the short-term outcomes of laparoscopic (LAP) colorectal surgery performed in the elderly population compared to younger patients and to those who underwent laparotomy.

Methods: A retrospective analysis of patients who underwent elective sigmoid colectomies for diverticular disease or ileo-colic resections for benign disorders was undertaken. Resections by both LAP and laparotomy were included; patients in whom a stoma was created were excluded. There were 2 groups: age younger than 65 years (Group A) and age 65 years or older (Group B). Parameters analyzed included demographics, body mass index (BMI), length of operation (LO), length of incision (LI), length of hospital stay (LOS), morbidity and mortality.

Results: From 7/1990 to 6/2006, 641 patients (M/F - 292/349) underwent these procedures; 407 patients in group A and 234 patients in group B. There were significantly more males in group A (207/407 - 51%) compared to 85/234 (36%) in group B (p=0.0004). There were significantly more LAP procedures in group A (244/407 - 60%) than in group B (106/234 - 45%) ? p=0.0003. The conversion rates in both groups were similar: 61/244 (25%) in group A, and 25/106 (24%) in group B (p=0.78). The LO was similar in both groups: LAP - 179 (70-410)min in group A and 175 (45-300)min in group B (p=0.9); converted - 217 (100-415)min in

group A and 203 (120-390)min in group B (p=0.4); laparotomy - 143 (40-320)min in group A and 138 (45-420)min in group B (p=0.6). The LI in patients in group B who underwent LAP procedures was significantly shorter than in group A - 5.8 (3-12)cm vs. 6.4 (3-12)cm (p=0.04). The LOS was significantly shorter in patients in group A who underwent laparotomy: 7.1 (3-17) days vs. 8.7 (4-22) days in group B (p<0.0001), and LAP: 5.3 (2-19) days vs. 6.4 (2-34) days in group B (p=0.01). In patients in both groups LOS in the LAP group was significantly shorter than in the open group. There were no significant differences in morbidity or mortality.

Conclusions: The longer LOS and slightly higher incidence of complications may be related to the higher incidence of co-morbidities in the elderly population. However, elderly patients who undergo LAP procedures have a significantly shorter LOS and fewer complications compared to elderly patients who undergo laparotomy. Thus, laparoscopy should be considered in all elderly patients in whom either ileo-colic or sigmoid resection is planned.

S102

LAPAROSCOPIC VS OPEN PROCTECTOMY FOR RECTAL CANCER: WHAT IS THE REAL DIFFERENCE? A MATCHED CASE-CONTROL STUDY OF CLINICAL AND ONCOLOGIC OUTCOMES, Marat Khaikin MD, Badma Bashankaev MD, Susan Cera MD, Dana R Sands MD, Eric G Weiss MD, Juan J Noguerras MD, Anthony M Vernava III MD, Steven D Wexner MD, Cleveland Clinic Florida, Weston, FL

Introduction: This study aimed to compare clinical and oncologic outcomes of laparoscopic (LP) and open proctectomy (OP) for rectal cancer.

Methods: Data were reviewed from 2004 to 2006. LP was case-matched to OP by stage, surgery, ASA.

Results: 32 patients with LP were compared to 50 with OP. OP had a significantly higher BMI than LP (29.1 vs 25.3; p=0.005). LP had stage II and III in 81.3% and OP in 76% (p>0.05). uT3 stage prior to surgery was in 78.1% of LP and in 74% of OP (p>0.05). LP was performed for lower rectal cancer in 56% and OP in 46% (p<0.05). LP patients underwent neoadjuvant chemoradiation in 56% compared to 62% of OP (p>0.05). Anastomosis was performed in 84% and 94%, respectively (p=0.1). Diverting ileostomy was done in 74% and 78.7%, respectively (p=0.2). The procedure was successfully completed by laparoscopy in 28 patients (87.5%) whereas in 4 patients (12.5%) the procedure was converted to laparotomy. The median operative time was 240 minutes in LP and 185 minutes in OP (p=0.01). There was no significant difference in blood loss. The morbidity rates were 25% and 38%, respectively (p=0.1). Neoadjuvant chemoradiation resulted in 44.9% of complete tumor response, correlating with complete pathologic response in 90.9%.

	Laparoscopy	Laparotomy
LOS (d)	6	7
1st BM (d)*	3	4
Lymph nodes (n)	18.7 (3-52)	19.7 (3-96)
Rad margin(cm)	1.4 (0.1-4)	1.8 (0.4-5)
Dist margin(cm)	2.4 (0.1-7)	2.6 (0.1-6.5)

*p<0.05; BM=bowel movement; LOS=length of stay

Conclusions: LP for rectal cancer is feasible in 87.5% and despite a longer operative time than OP, is safe with the advantage of faster bowel function recovery. LP does not compromise oncologically adequate resection or significantly differ from OP in short-term outcomes.

S103

LAPAROSCOPIC RECTAL RESECTION FOR RECTAL CARCINOMA WITH AND WITHOUT NEO-ADJUVANT LONG COURSE RADIOTHERAPY, C K Byrnes MD, F Keane MD, P Neary MD, Adelaide & Meath Hospital, Dept Surgery, Dublin, Ireland

Introduction To assess the impact of neo-adjuvant radiotherapy on the feasibility and short-term outcome of laparo-



scopic rectal resection.

Methods Details of patients with a rectal tumour whom underwent a rectal resection were retrieved from a prospectively entered database. Those who underwent a local trans-anal resection were excluded unless they subsequently had a colonic resection. Data were analysed for demographics, tumour type/stage, operative details, stoma formation, pathological details, length of stay, and complication rates.

Results 43 patients underwent a rectal resection for a malignant rectal tumour over a one year period. Based on the initial multi-disciplinary assessment; including clinical assessment, pathological type, pelvic CT and MRI and endo-rectal USS, 22 had long course neo-adjuvant radiotherapy followed by surgery and 21 underwent surgery without radiotherapy. Age and sex distribution of the two groups were similar. Pathological T stage averaged 2.4 in the neo-adjuvant group and 2.7 in the non neo-adjuvant group. There were 2 complete pathological responses in the neo-adjuvant group.

Laparoscopic to open conversion rates in both groups were similar; two of 16 in the neo-adjuvant group, and one of 16 in the non-neo adjuvant group. The average nodal yield was lower in the neo-adjuvant group compared to the non neo-adjuvant group (7.8 vs.11.3; p=0.018), but was similar between the open and laparoscopic approaches (8.0 vs. 9.7; p=0.33). Optimal mesorectal excision was reported in all low-rectal resections. Major complications included one marginal-artery thrombosis in the laparoscopically performed non-neo-adjuvant group, requiring further surgery. Other complications included haemorrhage, cardiac failure, chest and wound infections were similar in both groups. The postoperative hospital stay was a median of 10 days in the non-neo-adjuvant group and 13 in the neo-adjuvant group (p=0.79). The median length of stay was significantly shorter for those undergoing a laparoscopic procedure than an open approach (10 days versus 18 days; p<0.05).

Conclusion Laparoscopic anterior and abdomino-perineal resection following neo-adjuvant radiotherapy can be carried out with an acceptably low conversion and complication rate and is similar to that without neo-adjuvant therapy and/or open surgery. Overall length of stay was significantly reduced by laparoscopic surgery.

S104

CLINICAL OUTCOME OF THE LAPAROSCOPIC SURGERY FOR ADVANCED COLORECTAL CANCER, Takeshi Naitoh MD, Takashi Tsuchiya MD, Hiroshi Honda MD, Masaya Oikawa MD, Yasuhiro Hasegawa MD, Sendai City Medical Center, Department of General Surgery

[Backgrounds] Laparoscopic colorectal cancer surgery has been widely accepted because of less pain, faster recovery and good cosmetic results. Although several authors presented results of prospective studies which support advantages of laparoscopic colorectal cancer surgery, an oncological validity of this surgery is not well analyzed yet, specially for advanced cancer. The aim of this study is to assess the clinical outcome of the laparoscopic surgery for advanced colorectal cancer in our hospital.

[Patients and Methods] During June 1999 and Aug. 2006, we operated more than 1200 cases of colorectal cancer patients. Of those 321 patients underwent laparoscopic colorectal surgery. Among these cases, we assessed a pathological staging, an operative time, estimated blood loss, and clinical outcome, retrospectively.

[Results] Male female ratio was 188:133, and mean age of these patients was 64.3 year-old. Among these cases, 107 tumors were located in the cecum or ascending colon, 28 in the transverse colon, 9 in the descending colon, 92 in the sigmoid colon, and 85 in the rectum. Among 52 cases of rectal cancer, 27 cases were localized in Rs, which is recto-sigmoid region, 48 in Ra, which is rectum above the peritoneal reflection, and 10 in Rb, which is rectum below the peritoneal reflection according to the Japanese classification of colorectal cancer. Mean operative time was 181 min., and mean estimated blood loss was 61 ml. No operative mortality was recognized. Of those cases, 121 cases were recognized as pathological Dukes B2 and C cases; 44 as

Dukes B2, 77 as Dukes C. They all underwent curative R0 operation. With the mean follow up period of 34 months, 14 cases (11.6%) had recurrence of the disease; 3 in Dukes B2 (6.8%), 11 in Dukes C (14.3%). Site of the recurrence were as follows; 9 in the liver, 4 in the lung, 2 in the peritoneum, 1 in the lymph node. Four cases were died of cancer recurrence, so far (3.3%).

[Conclusion] Although further evaluation is mandatory, laparoscopic surgery for advanced colorectal cancer is safe and would be oncologically adequate procedure.

S105

ARE THERE ANY DIFFERENCES OF LAPAROSCOPIC RESECTION ACCORDING TO COLORECTAL CANCER LOCATION?, Shigeki Yamaguchi MD, Shuji Saito MD, Masayuki Ishii MD, Hirofumi Morita MD, Koji Morimoto MD, Hiroyuki Tomioka MD, Yusuke Kinugasa MD, Atsuyuki Maeda MD, Division of Colon & Rectal Surgery, Shizuoka Cancer Center

Purpose: Purpose of this study was to examine short term results according to colorectal cancer location.

Patients: Since September 2002 of hospital opening to August 2006, 981 colorectal cancers were removed. Laparoscopic procedure was indicated in stage I & II of colon cancer and stage I of rectal cancer by our hospital guideline. Consecutive 348 patients with laparoscopic resection were enrolled in this study.

Results: Mean age was 64.3, and they were 211 men and 137 women. Location was; 1) cecum and ascending colon (CA): 82 (C: 24, A: 58), 2) transverse and descending colon (TD): 58 (T: 40, D: 18), 3) sigmoid colon (S): 124, 4) rectum (R): 84 (recto-sigmoid: 52, upper rectum: 18, lower rectum; 14). Preoperative stage was diagnosed by CT scan as I: 186, II: 148, III: 14. Mean operating time and blood loss count of each procedures were as follows; CA: 185min. 46g, TL: 212min. 50g, S: 201min. 37g, R: 271min, 75g. Overall conversion rate was 4.6% (16/348) caused by adhesion (5 cases), cancer invasion (4 cases), poor view (3 cases), marginal artery injury (2 cases), Stapler trouble (2 case). Each conversion rate was; CA: 3.7%, TL: 5.2%, S: 3.2%, R: 7.1%. Median and mean length of postoperative stay was 8 / 9.0 days, and each stay was; CA: 7 / 8.5, TL: 7 / 7.6, S: 8 / 8.6, R: 8 / 10.9. There was no death and 12.4% (43/348) of the patients had postoperative complications, 5.5% of them major. Major complications were anastomotic leak: 8, ileus: 8, cholecystitis: 1, colon perforation: 1, hypoxia: 1. Those occurred in; CA: 2.4%, TD: 3.4%, S: 4.0%, R: 11.9%. Anastomotic leak was seen in 7.1% of proctectomy.

Conclusions: Based on oncologic principle, any location of colorectal cancer was feasible to do laparoscopic procedure. However proctectomy took more time and occurred more complications than colectomy.

S106

HAND-ASSISTED AND LAPAROSCOPIC-ASSISTED SURGERY: A COMPARISON OF PATIENT CHARACTERISTICS AND OUTCOMES IN A MINIMALLY INVASIVE COLORECTAL PRACTICE., Y N You MD, I Hassan MD, R R Cima MD, D W Larson MD, E J Dozois MD, J H Pemberton MD, S A Barnes PhD, Division of Colon and Rectal Surgery, Mayo Clinic, Rochester, MN.

INTRODUCTION: Laparoscopic surgery (LAP) has significant patient benefits but is technically challenging. Hand-assisted laparoscopic surgery (HALS) allows tactile feedback and has a shorter learning curve. We investigated the characteristics and short term clinical outcomes of HALS and LAP patients (pts) since the introduction of HALS to our minimally invasive colorectal practice.

METHODS: Prospectively collected data on 258 pts undergoing HALS (n=109) or LAP (n=149) during a calendar year (2004) were analyzed for patient and disease characteristics, operative parameters, and perioperative outcomes.

RESULTS: HALS and LAP pts were similar in age (51 vs. 54 yrs), gender (56 vs. 52% male), body mass index (26 vs. 26 kg/m²), co-morbidities (84 vs. 85% with one or more) and diagnosis (83 vs. 80% benign), but differed in incidence of previous surgery (49 vs. 30%; P=0.008). A significantly



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greater proportion of HALS pts underwent complex procedures and extensive resections (P<0.001;Table). Rates of conversion (15 vs. 11%, P=0.44), intra-operative complications (4 vs. 1%, P=0.17), 30-day morbidity (18 vs. 11%, P=0.12) and surgical re-intervention (2 vs. 1%, P=0.58) did not differ. Recovery measured by days to flatus was not different [mean (std) 3(2) vs. 3(2) days, P=0.26], although HALS pts had longer operative times [276(96) vs. 211(107) min, P<0.0001] and a day longer stay in hospital [6(3) vs. 5 (3) days, P=0.0009].

CONCLUSIONS: Patients undergoing HALS had more complex procedures but enjoyed similar short-term outcomes as LAP pts. HALS therefore may permit the expansion of a minimally invasive practice to include more challenging procedures while maintaining patient benefits.

Procedure	HALS (n=109)	LAP (n=149)	P-value
PC/AC	55 (50%)	27 (18%)	
Left-sided	34 (31%)	36 (24%)	<0.001
Right-sided	15 (14%)	58 (39%)	
Other	5 (5%)	28 (19%)	

PC= Proctocolectomy, AC= Abdominal colectomy

S107

TRANS-ANAL EXTRACTION VS. LAPAROSCOPIC-ASSISTED REMOVAL: WHICH IS BETTER FOR SPECIMEN REMOVAL DURING LAPAROSCOPIC LEFT COLON RESECTIONS?
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BACKGROUND: Specimen removal for laparoscopic colon resections can be accomplished in several ways. We report our experience for trans-anal specimen extraction versus laparoscopic-assisted specimen removal for laparoscopic resections of the left colon or rectum.

METHODS: 1063 laparoscopic colon resections involving left colon or rectum were performed from 1996 to 2006. Trans-anal extraction was performed for specimens less than 5cm in diameter. All other specimens were removed through an incision on the abdominal wall.

RESULTS: 664 of our 1063 laparoscopic left-colon resections were able to be completed with trans-anal specimen extraction (62%). For both techniques, 47% of cases were for benign disease and 53% of cases were for colorectal malignancy. EBL was 94cc for trans-anal extraction, but was 204cc for the incision group. Anastomotic leak occurred once in the trans-anal extraction group and 7 times in the incision group (p=0.01). Abdominal abscess requiring intervention occurred once in the trans-anal extraction group and 4 times in the incision group (p=0.05). Incisional hernia was noted once in the trans-anal extraction group and 6 times in the incision group (p=0.01). Post-operative wound infections occurred once in the trans-anal extraction group and six times in the incision group (p= 0.01). Transient incontinence was noted in 14 of the 664 patients in the trans-anal extraction group (2%) but did not occur in the incision group (p=0.01). 12 of these patients had complete resolution of their incontinence and 2 patients (0.2%) had bowel movement frequency at one year follow-up. Both of these patients had received neoadjuvant chemoradiation therapy and neither required additional intervention for incontinence.

CONCLUSIONS: Trans-anal specimen extraction can be performed effectively in 62% of laparoscopic colon resections involving the left colon or rectum. Compared to laparoscopic-assisted specimen removal via an incision on the abdominal wall, trans-anal extraction results in less blood loss. There is a higher incidence in post-operative anastomotic leaks, incisional hernias, abdominal abscesses, and wound infections in patients undergoing laparoscopic-assisted specimen removal compared to trans-anal extraction. Transient incontinence occurs in 2% of the patients completed with trans-anal extraction.

S108

DOES EXTRACTION SITE LOCATION IN LAPAROSCOPIC COLORECTAL SURGERY IMPACT ON INCISIONAL HERNIA RATE?
Alex Omiccioli, Ravinder Singh MD, Susan G Hegge MD, Craig A McKinley MD, The Centre for Minimal Access Surgery (CMAS-McMaster University and CMASnorth-North Bay District Hospital)

Introduction: Incisional hernias are a common post-operative complication in abdominal surgery. Major risk factors for their development include wound infection, obesity, and age. The objective of this study was to evaluate the impact extraction site location has on incisional hernia rates in Laparoscopic Colo-rectal Surgery (LCS).

Methods: A prospective study of 208 consecutive patients who underwent laparoscopic colorectal surgery between March 2002 and July 2006 was performed. In order to be included in the study, patients were required to have had an extraction site on the abdominal wall. Patients were excluded if they were lost to follow-up or converted to open. In the remaining 175 patients, mean follow-up was 20 months. Extraction site incisions were classified into two groups: midline or off-midline. Midline wounds involved sharp division of the linea alba and were closed with a single layer of # 1 Vicryl (Ethicon Inc). Off-midline incisions involved sharp division of the anterior and posterior sheaths with blunt spreading of the muscular layers and were closed in two layers with #1 Vicryl (Ethicon Inc.). Risk factors including wound infection, body mass index (BMI), age, diabetes, and mean follow-up were evaluated in both the midline and off-midline groups.

Results: The incisional hernia rate for the entire series was 5.7 %. Incisional hernia rates for the midline (77 patients) and off-midline (98 patients) groups were 13.3% and 0%, respectively (statistically significant, p=0.001). There was no clinically significant difference in age, follow-up time, BMI, and wound infection rate between the two groups.

Conclusion: In our series, the midline extraction site resulted in a significantly higher incisional hernia rate than the off-midline extraction sites. We therefore recommend using an off-midline blunt muscle splitting extraction site when performing LCS.

S109

CHOICE OF APPROACH FOR APPENDICECTOMY: A META-ANALYSIS OF OPEN VERSUS LAPAROSCOPIC APPENDICECTOMY, John M Bennett BA, Alex P Boddy BA, Michael Rhodes MD, Norfolk and Norwich University Hospital NHS Trust

Introduction: Although laparoscopic appendicectomy has been performed since 1983, the optimal approach for appendicectomy is still under debate. Unlike laparoscopic cholecystectomy the benefits of laparoscopy for appendicectomy have not been as apparent.

Method: A systematic review and meta-analysis of all randomised controlled trials between 1995 and 2006. Studies were analysed in two subgroups (pre-2000, post-2000) to examine for changes in outcomes with the expansion in laparoscopic training. Analysis was performed using weighted mean differences and Peto odds ratios (ORs), using a random effects model.

Results: Thirty six studies met the criteria for analysis. Operation time was 20 minutes longer in the laparoscopic arm pre-2000, decreasing to 5 minutes longer post-2000. Hospital stay was shorter by 0.41 days pre-2000 and 0.89 days post-2000. Laparoscopy showed a constantly lower risk of post-operative wound infection (Peto OR 0.48 and 0.59) and a change in favour of laparoscopy for post-operative ileus risk (Peto OR 1.65 and 0.41). The OR of developing an intra-abdominal abscess remains high for laparoscopy (Peto OR 2.19 and 2.33).

Conclusion: The meta-analysis shows improvement in the outcomes of laparoscopic appendicectomy with the data for operation time, hospital stay, return to normal activity, wound infection and ileus demonstrate the superiority of the laparoscopic approach.



S110

LONG-TERM RESPONSE OF RADIO-FREQUENCY ENERGY DELIVERY (SECCA PROCEDURE) FOR THE TREATMENT OF FECAL INCONTINENCE, Sander R Binderow MD, Atlanta Colon and Rectal Surgery, PA

Purpose: To evaluate the safety and long-term response of radio-frequency energy delivery (Secca Procedure) for the treatment of fecal incontinence.

Methods: Community based study in which patients who suffered from unmanageable fecal incontinence and previously failed conservative management underwent the Secca procedure to the anal canal muscle. Patient response to treatment including satisfaction, frequency of fecal incontinent (FI) episodes, procedure recommendation were evaluated at baseline and 12 to 24 months following the procedure and results were analyzed using the Students paired t test.

Results: Forty nine patients (aged 61.8 (range 28-84) years) that have reached more than one year follow-up (12 to 24 months) were studied, including 38 females (77.5%). The mean follow-up in this group was 18 months. At follow-up, the frequency of fecal incontinence episodes per week improved significantly from a median of 7.0 to 1.0. (p<0.0015). Sixty three percent of patients exhibited at least a 50% reduction in weekly FI episodes and 69% greater than 30%. In this responder group, the observed mean improvement is 83.25% (p=0.00148). Sixty seven percent of patients reported satisfaction with the procedure outcomes. Six patients (12%) were completely dissatisfied and went on to receive further surgical intervention (SNS, Colostomy) which resulted in some improvement in symptoms. There were no long-term complications following the Secca procedure.

Conclusions: At a mean of 18 month follow-up there was sustained significant clinical improvement in both the frequency of FI episodes and patient satisfaction following the Secca procedure. The Secca is a safe and durable procedure that is an option for failed conservative management. We may also consider this as a potential treatment in combination with conservative therapies in the earlier phases of management of fecal incontinence.

S111

MEDICALLY-SUPERVISED DIETS ARE NOT SUPERIOR TO OTHER DIETARY INTERVENTIONS PRIOR TO WEIGHT LOSS SURGERY, Dan Eisenberg MD, Alain Ramirez BS, Andrew J Duffy MD, Joshua I Hrabosky PhD, Kurt E Roberts MD, Robert L Bell MD, Yale University School of Medicine

Objectives: The insurance industry is placing increasing demands on patients considering weight loss surgery (WLS). A recent, arbitrary directive of many health insurers is a 6-month, medically-supervised, diet prior to a person being considered a candidate for WLS. However, there are no data in the medical literature to support this practice. The aim of this study is to determine the efficacy of non-surgical weight-loss programs in patients being considered for laparoscopic Roux-Y gastric bypass (LRYGB), and specifically to determine the impact of a 6-month medically-supervised diet.

Methods and Procedures: Demographics of all patients undergoing LRYGB were entered into a longitudinal, prospective database. Prior to surgery, all patients had undergone numerous dietary interventions. The most successful preoperative dietary intervention and the amount of weight lost during that intervention, was recorded for each patient. Six prominent subgroups were examined, which comprised the 6-month medically-supervised diet, diet pills, dietician counseling, low calorie diets, group diet programs (e.g. Weight Watchers) and meal replacement programs (e.g. Optifast). Between-subjects ANOVA and Dunnett's C post-hoc analysis were performed comparing the relative efficacies of the preoperative dietary interventions on 293 patients, who conformed to one of the six aforementioned subgroups

Results: The most successful preoperative dietary intervention was group diet programs (41%), followed by meal

replacement (18%), diet pills (13%), 6-month medically-supervised diet (11%), low calorie diets (9%), and dietician counseling (7%). Patients who received medically-supervised diets did not report greater percent weight loss preoperatively (M = 15.5, SD = 8.8) than patients who received any other type of dietary program (M = 14.7, SD = 8.6), F(1, 352) = .27, n.s. A post-hoc Dunnett's C analysis further revealed that those who received medically-supervised diets did not differ from any of the other groups in percent weight change prior to LRYGB.

Conclusions: Although most diets fail in morbidly obese patients, the practice of dieting is important prior to any patient undergoing weight loss surgery. In this study, the 6-month medically-supervised diet was not more efficacious than other strategies designed to induce weight loss in the morbidly obese patient. It should not be mandatory prior to weight loss surgery.

S112

DO HOSPITAL COSTS DIFFER FOR ELECTIVE BARIATRIC SURGICAL PROCEDURES PERFORMED IN PATIENTS OVER 60 YEARS OLD?, S J Belsley MD, J Afthinos MD, D J Stephens MD, J K Saunders MD, H Schmidt MD, A Trivedi MD, D Ewing MD, R Capella MD, V Iannace MD, D Davis MD, A Wasielewski RN, S Moran RN, G H Ballantyne MD, Hackensack University Medical Center and St. Luke's - Roosevelt Hospital Center

INTRODUCTION: Medicare's recent endorsement of Roux-en-Y gastric bypass recognizes bariatric surgery as a treatment for the health problems associated with morbid obesity in the elderly population. The potential benefits and costs need to be further elucidated.

AIMS: To compare the initial hospital costs for elective bariatric procedures in patients below the age of sixty and above.

METHODS: Retrospective review of prospectively maintained hospital records were evaluated for elective laparoscopic and open bariatric surgical procedures performed at Hackensack University Medical Center between June 1998 and July 2006. Data analysis was performed with SPSS 13.0.

RESULTS: A total of 5365 patients underwent elective bariatric surgery. 268 patients (5.0%) were aged sixty or over (75.6% female and 24.4% male). Although older patients had a greater number of medical comorbidities (2.46 vs. 1.38 p <.01), cost nor total mortality at 0.13% was related to patient age.

	Age < 60 yrs	Age => 60 yrs	P Value
Cost (US\$)	10,042.90	10,203.07	0.625
OR Time (min)	92.4	89.7	0.403
LOS (days)	2.92	2.72	0.177
APR Score	1.06	1.15	<.01
ASA Score	2.49	2.59	0.042

CONCLUSION: Initial hospital costs for elective bariatric surgical patients do not differ between younger patients and those aged sixty and above. Further studies evaluating the long term cost-effectiveness of bariatric surgery are needed.

S113

USE OF LOCAL ANESTHETIC INFUSION PUMP IN LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS: A PROSPECTIVE DOUBLE-BLINDED RANDOMIZED PLACEBO CONTROLLED TRIAL, T LaMasters MD, J Lau MD, H Lemmens MD, J Morton MD, Stanford Departments of Surgery and Anesthesia

Background: Continuous infusion of local anesthetic into surgical wounds has been shown to decrease pain medication usage and narcotic related complications like apnea. Patients undergoing laparoscopic roux-en-Y gastric bypass (LRYGB) with a transabdominal EEA staple technique may complain of incisional pain at the enlarged left lower port site. We hypothesized that the use of the ON Q pain pump in the left lower port site of the LRYGB would decrease post op pain and medication use.

Methods: A prospective randomized double blind study was



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conducted. The patients were randomized to receive either a 72 hour infusion of 0.5% Bupivacaine or 0.9% saline using the On-Q pain pump infiltrated into the left lower port site wound. Standardized pain scores and medication utilization were recorded at four time periods during the hospital stay. There were no complications. Continuous variables were analyzed by matched Students' T test.

Results: Fifty patients were recruited and all surgeries were completed laparoscopically with no complications. Both cohorts had statistically similar demographics (Saline/Maraine): age (42/47), % female (85/64), and BMI (51/50). There was no significant difference in POD# 3 pain scores (Saline, 1.4/Maraine, 1.1, p=.64). There was a trend toward decreased cumulative narcotic utilization between the study patients and placebo respectively, 8.4 mg vs. 4 mg, p=.06.

Conclusions: This study demonstrated infusion of local anesthetic into a single port site using the On-Q pain pump does not decrease postoperative pain scores but demonstrated a trend towards decreased cumulative pain medication usage following LRYGB. Further study may further substantiate this trend and demonstrate the utility of local anesthetic infusion pumps in decreasing pain medication utilization and related complications.

S114

HIATAL HERNIA REPAIR AT THE INITIAL LAPAROSCOPIC ADJUSTABLE GASTRIC BAND OPERATION REDUCES THE NEED FOR REOPERATION.

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Background: Intractable reflux, either due to gastric prolapse or concentric pouch dilatation has been the most common indication for reoperation or band removal after laparoscopic adjustable gastric banding (LAGB). We have previously found that a simple hiatal hernia repair (HHR) leads to remission of these symptoms minimizing the need for band removal. We have subsequently added crural repair/HHR at the initial operation, where indicated. In this study we have compared the rate of reoperation in patients who underwent LAGB alone, or with concurrent HHR.

Study design: A retrospective review of a prospective database of all patients undergoing LAGB was performed, to determine the incidence of reoperation in the two groups.

Results: Between July 2001 and August of 2006, 1,298 patients underwent LAGB and 520 patients underwent LAGB with concurrent HHR (LAGB/HHR). The mean initial weight and BMI were 128 kg (range 71.1-245.7) and 45.4kg/m² (range 28-80). Average follow up for the LAGB and LAGB/HHR groups was 24.8 and 20.5 months respectively. Rate of reoperation for HHR alone, or with band slip or concentric pouch dilatation, for LAGB and LAGB/HHR groups was 5.55% and 1.73% respectively (p< 0.001). Total reoperation rate for slip, HHR and pouch dilatation was 7.86% and 3.46% respectively (p<0.001). There was no significant difference in rate of slip repair alone between groups, 2.31% and 1.73% (p<0.44).

Conclusions: Adding HHR to LAGB where indicated significantly reduces reoperation rate. Every effort should be made to detect and repair HHR during placement of the band, as it will decrease future need for reoperation.

S115

POUCH ENLARGEMENT (PE) AND BAND SLIPPAGE (BS): IS IT NECESSARY TO REMOVE THE BAND?

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Background: the laparoscopic adjustable gastric banding (LAGB) is a safe and effective alternative for the treatment of morbid obesity. However, it is reported to have a high incidence of long-term band-associated complications (i.e. PE-pouch enlargement/BS-band slippage) that presumably lead an insufficient weight loss. Therefore, band removal (BRE) and additional bariatric surgery are proposed.

Objectives: a) to demonstrate that surgical treatment of these complications can be safely performed; and b) weight loss after band repositioning (BR) is satisfactory.

Methods: retrospective analysis of prospective collected data. Between 3/2001 and 7/2006, 795 patients underwent LAGB at our institution. Barium swallow was performed pre, postoperatively and during the adjustments.

Results: PE or BS occurred in 156 patients; 86% were female. The mean age was 39±10 years. PE occurred in 139 (17%) patients; 13 (9%) of them were reoperated (BR: 9 (69%) and BRE: 4 (31%) patients). BS occurred in 17 (2%) patients; all of them required surgical treatment (BR: 13 (76%) and BRE: 4 (24%). Mortality was 0%.

Initial BMI	45±7		
Time to Reop	16±9 months		
F/u after Reop	17±4 months		
	Before Reop.	After Reop.	p
BMI(kg/m ²)	34±7	35±7	NS
% EWL (*)	51±26	46±25	NS

(*)%EWL: % excess weight loss

Conclusion: This data suggest that; a) surgical treatment of PE and BS is safe. B) BR is feasible and offers the possibility of maintaining the weight loss, without adding the risk implied in the conversion from LAGB to a more hazardous procedure.

S116

EFFECT OF ESOPHAGEAL DILATATION ON WEIGHT LOSS AT 1 YEAR AFTER LAPAROSCOPIC GASTRIC BANDING,

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BACKGROUND: Esophageal dilatation is a complication that can occur after Laparoscopic Adjustable Gastric Banding (LAGB). There are few studies in the literature which describe the clinical and weight loss effects. The aim of this study is to assess whether a correlation exists between esophageal dilatation and weight loss at 1 year after LAGB.

METHODS: We performed a retrospective charts review of all LAGB performed at Columbia University from March 2001 to August 2005. The one year follow-up was considered when between 10 and 14 months after surgery. Esophagus of 35 mm or greater was considered dilated. Parameters considered before surgery and at 1 year were: weight, excess weight, BMI, % Excess Weight Loss (%EWL) and esophageal dilatation as captured in the radiology reports.

RESULTS: Of 254 patients, 125 had follow-up and esophagogram performed at one year. Of these, 17 were found to have esophageal dilatation with an average of 38 mm (35-49 mm). Dilated patients presented with higher pre operative BMI and weight. There were no significant differences between 1 year weight loss and % EWL, how ever dilated patients experience significantly higher reflux symptoms.

CONCLUSION: In our practice the incidence of dilation is 14%. Presence of dilatation did not impact %EWL at 1 year. At this time point GERD symptoms started to appear. Further follow-up studies are warranted to assess the impact of dilatation of future weight loss in these patients.

S117

LAPAROSCOPIC REVISIONAL BARIATRIC SURGERY, Harvinderpal Singh MD, Benjamin Clapp MD, Michael Kia DO, Steven Glorsky MD, Hardar Spivak MD, Terry Scarborough MD, Sherman Yu MD, Eric Wilson MD, The University of Texas Health Science Center at Houston

Background: With laparoscopic Bariatric surgery becoming standard of care, need for laparoscopic revisional surgery is increasingly being encountered because of inadequate weight loss or complications. Revisional bariatric surgery is generally considered to be more difficult. This study com-



compares the outcomes of converting various initial bariatric surgeries to a laparoscopic Roux-en-Y gastric bypass (RYGBP).

Methods: A retrospective review was performed of patients undergoing conversion from previous bypass surgery to laparoscopic RYGBP. Ninety six laparoscopic revisional RYGBPs were performed by 4 surgeons over 4 years. Initial bariatric surgeries included vertical banded gastroplasty (VBG, n=40), nonadjustable gastric band (n=19), Lap Band (n=33) and open RYGBP (4). The operative time, blood loss, change in BMI at six month, length of stay and the rate of conversion to an open procedure were examined between the different types of procedures.

Results: Operative time for Lap Band revision was 105 minutes compared to 384, 283 and 370 minutes for nonadjustable band, VBG, and open RYGBP revisions respectively. The Lap Band also had less blood loss, less than 30 cc, compared to 199 cc, 170 cc, and 83 cc respectively. The Lap Band also had the least length of stay at 2.8 days vs. 5.6, 4.4 and 4.75. The six month post procedure change in BMI was similar, 8.5. Finally, the conversion to open procedure was also the least amongst the Lap Band group (1 of 33) vs. nonadjustable band (2 of 19), VBG (4 of 40), or open RYGBP (1 of 4). Overall, there was no mortality and one leak.

Conclusion: Laparoscopic conversion to RYGBP is safe and effective, with low mortality and modest blood loss. Revision of the Lap Band had the least operative time, length of stay, and blood loss. However, revisional surgery is technically challenging requiring additional operative time and has higher conversion rates to open procedures.

S118

LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS VERSUS REBANDING AFTER FAILED LAPAROSCOPIC GASTRIC BANDING: A THREE YEAR FOLLOW-UP, Markus K Müller MD, Nicolas Attigah MD, Stefan Wildi MD, Dieter Hahnloser MD, Pierre-Alain Clavien MD, Markus Weber MD, Department for Visceral and Transplant Surgery, University Hospital Zurich, Switzerland

Background: More than 130,000 Laparoscopic Adjustable Gastric Banding (LAGB) have been used for the treatment of morbid obesity during the last decade. Complications and failures are increasingly reported in the long-term follow-up. The aim of the current study was the assessment of two different salvage operations, laparoscopic Roux-en-Y bypass (LRYGB) and laparoscopic gastric rebanding after failed LAGB with a 3-years follow-up.

Patients and Methods: 74 consecutive patients with a failed LAGB underwent either laparoscopic gastric rebanding or LRYGB at our department. There were 16 male and 60 female patients with a mean age of 43, 1 years. The indication for reoperation was an increasing BMI and band related problems like pouch dilatation, band slippage and penetration after LAGB. The mean preoperative BMI was 46,1 kg/m² (±7,7). Successful salvage operations were assessed by postoperative changes of the BMI, impact on comorbidities and the need for further reoperations (secondary failure).

Findings: Patients after LRYGB had a significantly better weight loss than patient with a rebanding (-6.1 kg/m² ± 4,5 kg/m² vs. +1.5 kg/m² ± 6.6 kg/m²; p<0.001). 45% of the patients (n = 20) in the rebanding group underwent further operative revision because of device related problems, e.g. slippage and band penetration, or unsatisfactory weight loss. Only 6 patients (20%) with LRYGB were reoperated. Thus, the secondary failure rate in the rebanding group was significantly higher compared to the bypass group (p=0,028). Furthermore the LRYGB group showed also a significant better control of serum cholesterol in the analysis.

Conclusion: This study confirms previous findings that LRYGB is superior in terms of weight loss and complications compared to rebanding as salvage procedure. We therefore strongly propose that LRYGB should be performed as salvage procedure in the setting of a failed LAGB.

S119

GASTRIC BANDING AS A SALVAGE PROCEDURE FOR PATIENTS WITH WEIGHT LOSS FAILURE AFTER ROUX-EN-Y GASTRIC BYPASS, Ryan M Gobble MD, Christine J Ren MD, Manish S Parikh MD, Matthew R Greives BA, George A Fielding MD, Department of Surgery, New York University School of Medicine

This study reviews the outcomes after laparoscopic-adjustable gastric band (LAGB) placement in patients with weight loss failure after Roux-en-Y gastric bypass (RYGB).

All data was prospectively collected and entered into an electronic registry. Characteristics evaluated for this study included pre-op age and body mass index (BMI), gender, conversion rate, operative (OR) time, length of stay (LOS), percent excess weight loss (EWL), and post-operative complications.

9 patients (7 females, 2 males) were referred to our program for weight loss failure after RYGB (4 open, 5 laparoscopic). Mean age and BMI pre-RYGB were 40 years [24 - 48 years] and 52.9 kg/m² [41.2 - 71 kg/m²], respectively. Mean EWL after the RYGB was 40% [28 - 49%]. All patients were referred to us for persistent morbid obesity due to weight loss failure or weight regain.

Average time between RYGB and LAGB was 3.8 years [1.8 - 5.5 years]. Mean age and BMI pre-LAGB were 45 years [29 - 61 years] and 41.2 kg/m² [36 - 51 kg/m²], respectively. Vanguard bands were placed laparoscopically in most patients. There was one conversion to open. Mean OR time and LOS were 79 minutes and 29 hours, respectively. The 30-day complication rate was 0% and mortality was 0%. There were no band slips or erosion, however, 1 patient required reoperation for a flipped port. The average follow-up after LAGB was 10-months (1-18 months) with a mean BMI of 35.6 [25.4 - 42.6 kg/m²] and an overall mean EWL of 59% [32 - 74%]. Patients undergoing LAGB after failed RYGB lost an additional 19.2% EWL [9-46%].

Our experience shows that LAGB is a safe and effective solution to failed RYGB.

S120

ENDOLUMINAL THERAPY FOR THE TREATMENT OF OBESITY (INTRAGASTRIC BALLOON), José A Sallet MD, João B Marchesini MD, Pablo Miguel MD, José A. Sallet, João B. Marchesini, Pablo Miguel, Carlos E. Pizani, Maurélio L. B. Ribeiro, Álvaro M. Ferraz, , Fabio L. Bonaldi, Paulo C. Sallet, Dyker S Paiva, Roberto Tussi

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Background: Intra-gastric balloon has been used in obese patients as a restrictive gastric procedure inducing early satiety and weight loss. This prospective study assesses both the safety and effectiveness of the intra-gastric balloon (BIBá) in the treatment of obese patients.

Method: From November 2000 to April 2006, after the Brazilian Ministry of Health's approval of BIB protocol 1126 overweight and obese patients were treated with the intra-gastric balloon. 938 of them completed a 6-month follow-up: 310 male (BMI= 42.8±10.7 Kg/m²) and 628 female patients (BMI= 35.5±7.8 Kg/m²) (mean BMI= 38.5±9.8 Kg/m²). All patients were encouraged to take part in a multidisciplinary program involving clinical, psychiatric, physical training, and dietary approaches.

Results: After a 6-month follow-up subjects showed significant reductions in percent excess weight loss (%EWL= 44.8±30.5%) and percent of total weight loss (%TWL= 12.5±6.7%). The main side effects were nausea/vomiting (472 cases, 42%), and epigastric pain (236 cases, 21%), requiring prosthesis removal in 25 patients (28%). Minor



complications were reflux esophagitis (123 cases, 11%) and symptomatic gastric stasis (91 cases, 8%) which were clinically controlled. Balloon impaction occurred in 2 cases (0.12%) and in one patient (0.14%) there was spontaneous deflation of the balloon leading to a small-bowel subocclusion which was solved by laparoscopy.

Conclusion: The intragastric balloon (BIB®) is effective to temporarily control obesity, inducing a %EWL of approximately 45%. It is not associated with mortality and shows minimal risk of major complications. Results regarding subsequent follow-up (after BIB removal) are necessary to a better assessment of its effectiveness.

S121

LAPAROSCOPIC SLEEVE GASTRECTOMY WITH ILEAL TRANSPOSITION (S.G.I.T): A NEW SURGICAL PROCEDURE AS EFFECTIVE AS GASTRIC BYPASS FOR WEIGHT CONTROL IN A PORCINE MODEL.

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Introduction: Bariatric surgery has evolved in multiple forms in the last decades combining food restriction and malabsorption. The aim of this study was to develop a new technique based on food restriction and early stimulation on the distal gut maintaining the alimentary tract continuity.

Methods: Thirty three Yorkshire pigs, weight 22.2 + 5.4 kg (X+DS) were randomly assigned into 4 laparoscopic procedures: Ileal Transposition (T1) (IT, n=8); Sleeve Gastrectomy with Ileal Transposition (T2) (SGIT, n=9); Roux-en-Y gastric Bypass (T3) (RYGP, n=8); Sham operation (T4) (SHAM=8). Firing 45mm linear staplers over a 60 F boogie resecting the greater curvature and fundus performed sleeve gastrectomy. Ileal transposition was performed by isolating a 100 cm ileal segment proximal to the ileocecal valve and reanastomosed by dividing the proximal jejunum 15 cm distal to the ligament of treitz. Creating a proximal gastric pouch and a 300cm alimentary limb performed gastric Bypass. Sham operation was performed by bowel transections and reanastomosis in the ileum and proximal jejunum together with gastrotomy and closure. Animals were followed evaluating weekly weight increase and food intake. We used ANOVA and Bonferroni (Dunn) tests to detect differences between groups.

Results: We observed significant differences in mean weight after 18 weeks between SGIT (30.9 + 13.4 kg) and SHAM (72.5 + 10.7 kg) (p=0.0002), RYGB (28.6+2.5 kg) and SHAM (p= 0.0001), IT (56.1+ 13.4 kg) and SHAM (p= 0.0081). No differences were observed between RYGB and SGIT. We also

observed significant differences in food intake (grams per day) in the third month between SGIT (1668 + 677 g) versus SHAM (3252 + 476 g) (p=0.0006), and RYGB (2011+ 565 g) versus SHAM (p=0.039). No differences were observed in food intake between SGIT and RYGB.

Conclusion: SGIT proved to be as effective in the short term as RYGB on weight progression with no bypass of the proximal gut.

S122

LAPAROSCOPIC TREATMENT OF THE METABOLIC SYNDROME FOR NON-MORBID OBESE TYPE 2 DIABETES MELLITUS PATIENTS, Aureo L De Paula PhD, Antonio L Macedo MD, Nelson Rassi MD, Sergio Vencio MD, Alfredo Halpern PhD, Cesar A Machado MD, Vladimir Schraibman MD, Hospital de Especialidades, Goiania, Brazil

Introduction: The objective of this study is to evaluate the results of the laparoscopic transposition of a segment of ileum to the jejunum in order to treat the metabolic syndrome in patients with Type 2 Diabetes Mellitus (T2DM) and BMI below 35kg/m². The criteria of the NECP was used.

Method: The laparoscopic procedures were done to 60 patients. 24 were female and 36 male. Mean age was 51.7 years (27-66). Mean BMI was 30.1 (23.6-34.4). All patients had the diagnosis of T2DM for at least 3 years and evidence of stable treatment with oral hypoglycemic agents and or insulin for at least 12 months. Mean duration of T2DM was 9.6 years (3-22). Arterial hypertension was diagnosed in 70% of patients (mean number of drugs - 1.6) and hypertriglyceridemia in 70%. HDL was altered in 51.7% of patients and the abdominal circumference in 68.3%. Two techniques were performed, consisting of an ileal interposition (II) in the proximal jejunum and a sleeve gastrectomy (II-SG) and an II associated to a diverted sleeve gastrectomy (II-DSG).

Results: The II-SG was performed in 32 patients and the II-DSG in 28. Mean post-operative follow-up was 7.4 months. Mean BMI was 23.8.kg/m². 52 (86.7%) patients achieved adequate glycemic control. Hypertriglyceridemia was normalized in 71.4% of the patients. HDL above 40 for men and above 50 for women was achieved by 90.3% of the patients. Abdominal circumference below 102cm for men was reached by 86.1% of the patients and below 88cm for 41.7% of the women. Arterial hypertension was controlled in 90.5%. The patients that did not normalize their glucose were using oral hypoglycemic agents.

Conclusions: The laparoscopic II-SG and the II-DSG seem to be promising procedures to be used for the control of T2DM and the metabolic syndrome. A longer follow-up period is needed.



V01

LAPAROSCOPIC COMPONENT SEPARATION, Michael J Rosen MD, Case Medical Center

A single staged approach for resection of infected mesh, component separation, and definitive abdominal wall reconstruction has been successfully reported by our group. The extensive subcutaneous dissection and division of perforator vessels can result in skin flap necrosis and complex postoperative infections. This video details the technique of minimally invasive component separation at the time of resection of infected prosthetic material. This patient underwent resection of exposed Composix mesh and laparoscopic component separation.

This video demonstrates that laparoscopic component separation can safely be performed with excellent short term results. While wound infections are not uncommon in the resection of infected prosthetic material, the complexity of these infections are greatly reduced with a laparoscopic component separation.

V02

STRATEGIES IN THE MANAGEMENT OF LESIONS AMENABLE TO PARTIAL NEPHRECTOMY, Marc Zerey MD, Jacob M McClean MS, B Todd Heniford MD, Pierce B Irby MD, Kent W Kercher MD, Chris M Teigland MD, Carolinas Medical Center, Departments of General Surgery and Urology

Hand-assisted laparoscopic partial nephrectomy provides a minimally invasive surgical option for patients presenting with low-stage renal tumors.

We illustrate our surgical technique including port placement, mobilization of adjacent viscera, dissection and control of the renal artery, identification and excision of the tumor, and measures taken to ensure hemostasis. In addition we demonstrate our approach to more challenging endophytic lesions requiring repair of the collecting system and lesions adjacent to the hilum, requiring segmental renovascular control. Furthermore, an approach to the performance of a heminephrectomy is demonstrated.

We conclude our video with a summary of baseline demographics, tumor characteristics, and short-term outcomes for all hand-assisted laparoscopic partial nephrectomies performed to date at our institution.

V03

TRANSGASTRIC LEFT ADRENALECTOMY IN A SURVIVED PORCINE MODEL AFTER TRANSGASTRIC CHOLECYSTECTOMY, Stefano Sereno MD, Antonello Forgiione PhD, Michele Simone MD, Silvana Perretta MD, Ali Alzahrani MD, Bernard Dallemagne MD, Jacques Marescaux MD, IRCAD-EITS, University Louis Pasteur, Strasbourg, France

INTRODUCTION The aim of this study was to evaluate the feasibility and technical limitations of multiple transgastric surgeries in a survival animal model.

METHODS A 30 kg female pig was prepared with 48 fasting and oral antibiotics. Under general anaesthesia, we performed a transgastric cholecystectomy with a two working channels 16 mm diameter video-gastroscope (PV-TG-2 KARL STORZ, Tuttlingen, Germany). The gastrotomy was closed with endoscopic clips (EZ-clip OLYMPUS, Tokyo, Japan) and the pig was kept alive.

One week later the success of the gastrotomy closure was assessed by laparoscopy and endoscopy and a transgastric adrenalectomy was performed.

RESULTS 1. Assessment of the gastric closure and peritoneal cavity: The laparoscopic exploration showed several adhesions which involved the cholecystectomy site, the liver, the diaphragm and the spleen, but no signs of bleeding, infections or perforation. The endoscopy confirmed the tight closure of the gastrotomy.

2. Re-operation with transgastric approach: After mechanical cleaning of the stomach a new gastrotomy on the posterior gastric wall was performed. We then entered the peritoneal cavity and easily identified the anatomical landmarks to the left adrenal gland. The dissection started along the upper pole of the left kidney opening the retroperitoneal space.

The transgastric left adrenalectomy was completed under endoscopic view. The left adrenal gland was extracted through the mouth of the pig and the new gastrotomy was closed with endoscopic clips. The animal was immediately sacrificed.

CONCLUSIONS Multiple transgastric operations such as cholecystectomy and adrenalectomy are feasible in the animal model. Successful closure of gastrotomies with endoscopic clips is possible but challenging and difficult to reproduce.

V04

LAPAROSCOPIC DUODENOJEJUNOSTOMY FOR SUPERIOR MESENTERIC ARTERY SYNDROME, E M Pauli MD, R Nain MD, T R Shope MD, Penn State Milton S. Hershey Medical Center

Superior Mesenteric Artery (SMA) Syndrome is a rare cause of proximal intestinal obstruction in adults. This video abstract presents the case of a 53 year-old woman with radiographic and endoscopic documentation of extrinsic duodenal compression by her SMA. We review her pre-operative evaluation, discuss imaging modalities for diagnosis and demonstrate our technique for performing a laparoscopic side-to-side stapled duodenojejunostomy.

V05

3D VIRTUAL REALITY AND SELECTIVE VASCULAR CONTROL FOR LAPAROSCOPIC LEFT HEPATIC LOBECTOMY, D. Mutter MD, B. Dallemagne MD, C. Bailey MD, L. Soler PhD, J. Marescaux MD, IRCAD-EITS / University Louis Pasteur, Strasbourg, France

Background: Careful control of haemostasis is particularly important in laparoscopic hepatic surgery, since a bloodless operative field allows to perform safer and smoother procedures. We present the case of selective vascular control for a left lateral segmentectomy facilitated by the use of 3D virtual reality.

Materias and Method: A 67 year old male patient presenting a 3.5 cm hepato-cellular carcinoma (HCC) located between segment II and III of the liver was referred for hepatic resection. Preoperative 3D reconstruction was used for planification of the procedure and virtual resection. Transplant was contra-indicated due to previous head and neck cancer surgery.

Methods: Five ports were used. The first step was a primary control of the hepatic pedicle. 3D reconstruction demonstrated the position of the division of the left hepatic artery. This was identified and divided at its division between the segment IV and the left lobe. The portal vein was divided at its same division. This resulted in a typical colour change of the left lateral segment as well as a small decrease in size. The bi-segmentectomy was completed using harmonic dissectors (Autosonix®, Tyco Healthcare), bipolar cautery, clips and application of Endo GIA vascular staples (Tyco Healthcare) on the portal pedicles. The left hepatic vein was finally isolated and controlled. After section, the specimen was placed in a bag and extracted after enlargement of the camera port. Follow-up was uneventful and there was no elevation of hepatic enzymes or postoperative ascites. The patient left the hospital on the 5th postoperative day.

Conclusion: 3D reconstruction allowed perfect simulation of the procedure. This facilitated the comprehension of vascular anatomy and control of the left lateral segment arteries and veins, thus preventing intra-operative bleeding. The use of this approach should be recommended where possible.

V06

ROBOTIC MICRODISSECTION OF THE HEPATIC HILUM FOR HEPATECTOMIES, P. C Giulianotti MD, F. M Bianco MD, F. Sbrana MD, G. Pernazza MD, J. H Palep MD, Ospedale della Misericordia - Grosseto - Italy

Robotic assisted surgery overcomes the limitations of standard laparoscopy techniques by giving us 3D stable vision, accuracy of dissection and a fixed operating field which transforms the procedure in to a bench-like microsurgery. The main advantages being the improved quality of dissec-

tion of the portal pedicle avoiding a Pringles manouver and the possibility to recognise accurately the anatomical variants which help avoid bile duct and vascular injuries. In this video we have shown three examples of difficult hilum dissections dealt with robotic surgery .

V07

LAPAROSCOPIC SEGMENT III LIVER RESECTION FOR ISOLATED COLORECTAL METASTASIS, Janos Taller MD, Gordon Wisbach MD, Brett Langenberg DO, Jay Grove MD, Naval Medical Center, San Diego

Laparoscopic liver resection for malignancies remains controversial despite an increasing acceptance of the treatment for benign tumors. In selected group of patients, when the technique is appropriately performed by a surgical team, expert in liver and laparoscopic surgery, the technique appears to be safe and consistent with oncologic principles. Our patient is 64 year-old female with Stage IV adenocarcinoma of the colon. 3 months prior to presentation, she underwent an open right colon resection for a cecal mass and biopsy of a solitary liver lesion. Her case was presented to the combined medical tumor board which recommended segmental liver resection followed by adjuvant chemotherapy for best long-term survival. Anatomically, pre-operative CT scan and PET imaging confirmed a single focus of metastatic disease in segment III of the liver and she was scheduled for a laparoscopic segment III liver resection.

Our video abstract summarizes the various techniques we used to safely excise segment III of the liver utilizing laparoscopic technique. A combination of cautery, ultrasonic dissector, blunt dissection and endoscopic stapling were all used at various phases of the operation to resect the specimen and maintain vascular control of hepatic vessels. A small portion of the anterior wall of the stomach was also excised with the specimen because of apparent invasion by the liver metastasis after the previous open biopsy. Operative time was 280 minutes, EBL was 250 mls. She was observed overnight in the ICU and transferred to the ward on POD#1. Because of her gastrotoomy repair, her diet advance was delayed until POD#3. She was discharged home on POD#5 tolerating a regular diet, without complications. She resumed her normal activity after 2 weeks. Final pathology revealed complete excision of her metastatic disease with negative margins.

For laparoscopic liver resection to be effective, specific training and access to adequate technology are required. In addition, the rules for oncological surgery must be followed for minimally invasive operations, just as in open surgery. At present, good candidates for laparoscopic liver resection are patients with peripheral lesions requiring limited hepatectomy (minor resections involving 2 or fewer segments).

Further prospective evaluation is required to assess the results of laparoscopic liver surgery and its place in major liver resections.

V08

LAPAROSCOPIC UNROOFING OF LARGE SPLENIC CYSTS, Aaron M Lipskar MD, Brian P Jacob MD, Brian Katz MD, Anthony Vine MD, Mark Reiner MD, Mount Sinai Medical Center

Splenic cysts are a rare entity. Percutaneous aspirations and ethanol injections have high recurrence rates. Traditional surgical management has been splenectomy. Due to the morbidity of splenectomy, spleen-sparing procedures are more favorable. From July of 1999 to July of 2006 we have performed seven laparoscopic unroofing procedures for symptomatic splenic cysts. In this video we describe our laparoscopic technique for cyst unroofing. The video is based on a 43 year old female with a history of blunt trauma and persistent left upper quadrant pain who was found to have a 10x9 centimeter simple splenic cyst.

V09

ROLE OF PANCREATIC DUCT STENT PLACEMENT AND INTRAOPERATIVE ULTRASOUND FOR LAPAROSCOPIC ENUCLEATION OF PANCREATIC HEAD INSULINOMA,

Leaque Ahmed MD, Peter D Stevens MD, Joseph Grossman BA, John A Chabot MD, William B Inabnet MD, Columbia University Medical Center

A 20 year old Female with Hypoglycaemic Symptoms was found to have elevated Insulin and Proinsulin levels. CT scan showed a mass in the head of Pancreas. Since the mass was close to the Pancreatic duct the patient underwent preoperative Pancreatic duct stent placement to help in locating the duct during surgery.

The patient underwent Laparoscopic enucleation of the Insulinoma guided by Laparoscopic Ultrasound and Intraoperative Insulin assay successfully. The patient did very well and was discharged home on POD 3. Insulin level after surgery was 4 micromoles/ML.

V010

LAPAROSCOPIC SUBTOTAL PANCREATECTOMY, Dan I Giurgiu MD, Scripps Mercy Hospital

Minimally invasive approaches to malignant pancreatic tumors remains controversial. However, many benign pancreatic solid tumors can be resected safely via a laparoscopic approach. This case represents a large cystadenoma which replaced the body and tail of the pancreas. High quality preoperative imaging is crucial for determining resectability. Complete subtotal pancreatic resection with splenectomy is performed using advanced laparoscopic techniques.

V011

MINIMALLY INVASIVE ESOPHAGEAL LEIOMYOMA ENUCLEATION - THORACOSCOPIC AND LAPAROSCOPIC APPROACHES, Kathy Hsu MD, Liane S Feldman MD, Gerald M Fried MD, Lorenzo E Ferri MD, McGill University

Leiomyomas represent the most common tumor amongst the relatively rare benign neoplasia of the esophagus. Although there is increasing interest in endoscopic therapies, surgical enucleation remains the standard of treatment for these tumors. Traditionally this has necessitated a thoracotomy, however with the advent of improved minimally invasive techniques and instrumentation, many of these tumours are amenable to thoracoscopic or laparoscopic enucleation. This video will employ three cases to highlight important features and helpful hints in the minimally invasive management of these benign tumours of the esophagus.

V012

LAPAROSCOPIC TRANSHIATAL ESOPHAGO-GASTRECTOMY AFTER INGESTION OF CAUSTIC AGENT, Giovanni Dapri MD, Jacques Himpens MD, Elie Capelluto MD, Guy Bernard Cadiere PhD, Department of Gastrointestinal Surgery, European School of Laparoscopic Surgery, Saint-Pierre University Hospital, Brussels, Belgium

Esophago-gastric perforation is a surgical emergency associated with high morbidity and mortality. There is no consensus regarding the appropriate management of this life-threatening condition. We discuss a laparoscopic transhiatal esophago-gastrectomy performed in a 43-years-old man, presenting at the Emergency Unit, after ingestion of a corrosive fluid. Abdominal CT-scan showed a pneumoperitoneum with subdiaphragmatic fluid. A gastroscopy showed a necrosis of the middle and lower esophagus with a perforation of the gastric fundus. Laparoscopic exploration confirmed the presence of free peritoneal fluid and the necrosis of the upper part of the stomach. The procedure started with the dissection of the stomach along the greater curvature, respecting the gastro-epiploic vessels. The stomach



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was separated from the first duodenum by a firing of blue linear stapler. Dissection continued along the lesser gastric curvature. Lower esophagus was completely freed and hiatus opened by medial vertical section of the crus. Esophagus was proximally freed along the descending aorta up to the left inferior pulmonary vein. A partially opening of the esophagus allowed the introduction of the scope inside and the necrosis of the lower and middle part of viscera was confirmed. Hence a subtotal esophagectomy was decided; the stomach was divided from the lower esophagus by a firing of blue linear stapler and retrieved from the abdomen in a plastic bag. A left cervicotomy was performed and the upper esophagus was freed and stripped. After esophageal resection, an esophagostomy was realized in the left part of the neck. A laparoscopic jejunostomy was performed and the procedure ended with the placement of 3 drains, in the hiatus, near the spleen and near the duodenal section. Patient developed a postoperative pancreatitis, resolved by medical therapy without a necrosis of the upper esophagus and pharynx. After 6 months a digestive reconstruction with coloplasty was realized.

V013

LAPAROSCOPIC REPAIR OF A COMBINED PARAE-SOPHAGEAL AND MORGAGNI HERNIA, Jonathan P Pearl MD, Michael J Rosen MD, Jeffrey M Marks MD, Jeffrey L Ponsky MD, Raymond P Onders, University Hospitals of Cleveland, Case Western University School of Medicine

Combined paraesophageal and Morgagni hernias are rare, with only 5 reported in the literature. In our case, a 62 year old woman presented with abdominal pain. A CT scan revealed findings consistent with a combined paraesophageal and Morgagni hernia. At operation, the right subcostalsternal hernia contained transverse colon, which was easily reduced. The Type III paraesophageal hernia was repaired in a standard fashion. The Morgagni hernia was repaired using transfascial permanent sutures, as the defect was in close proximity to the pericardial sac. The patient recovered uneventfully and was free from symptoms at 6 month follow-up. This case contributes to the existing literature and demonstrates the versatility of laparoscopic diaphragm hernia repairs.

V014

BAND EROSION: LAPAROSCOPIC REMOVAL OF LAP-BAND, A Gallo, R Bueno MD, C Galvani MD, S Horgan MD, V Gorodner MD, S Ayloo MD, University of Illinois @ Chicago Bariatric surgical procedures can be categorized into three groups, malabsorptive, malabsorptive/restrictive and purely restrictive. Laparoscopic gastric banding falls in the purely restrictive gastric procedure. It offers the advantage of minimally invasive surgery, adjustability and reversibility.

The incidence of band erosion with penetration into stomach is documented in literature ranging from less than one percent to three percent. In this video we submit a case of band erosion. Patient presented for lap band adjustment with non-specific symptoms of nausea and vomiting of couple of months duration. Her esophagogram showed double lumen of contrast. As a consequence, an upper endoscopy was performed which revealed erosion of lap-band into the stomach.

As patient was clinically stable, she was scheduled for a laparoscopic removal of lap-band with intraoperative upper endoscopy. This video demonstrates the upper endoscopy and simultaneous laparoscopic removal of lap-band through the same incisions used for its placement. The stomach was repaired with laparoscopic suture placement and a omental patch placed on top of the repair along with fibrin glue and a JP drain. An upper GI study demonstrated no extravasation of contrast and the patient was discharged postoperative day one.

V015

LAPAROSCOPIC REVISION OF NISSEN FUNDOPLICATION TO ROUX-EN-Y GASTRIC BYPASS IN A MORBIDLY OBESE PATIENT, Kambiz Zainabadi MD, Anita Courcoulas MD, Omar Awais DO, Ioannis Raftopoulos MD, Division of Minimally Invasive, Bariatric and General Surgery, University of Pittsburgh, PA.

This is a 50 year-old female who underwent a successful laparoscopic Nissen fundoplication 5 years ago but had significant weight gain postoperatively. An Upper GI series and an upper endoscopy showed an intact wrap without a hiatal hernia or GERD. At the time of revision the patient's weight was 256.5 lbs with a BMI of 42.2 Kg/m². Operative time (OT) was 287 min and length of stay (LOS) was 5 days. The patient's recovery was uneventful with the exception of a small pulmonary embolism. At 3 month follow-up she lost 46 lbs and her BMI decreased to 35.1 Kg/m². Our experience includes 9 (8 females, 1 male) patients with a mean age of 49.6 years and mean preoperative BMI of 38 Kg/m² who underwent successful laparoscopic revision of Nissen fundoplication to Roux-en-Y gastric bypass (RYGB) with a mean OT of 331 min and LOS of 5.2 days. Minor or major complications occurred in 7/9 (77.8%) patients without mortality. At a mean follow-up of 20.5 (3-44) months the mean BMI decreased to 27.8 Kg/m². In conclusion, laparoscopic revision of Nissen fundoplication to RYGB is technically feasible and should be considered in patients who 1) gained significant weight after a successful antireflux procedure and meet the NIH guidelines for bariatric surgery, 2) meet the NIH guidelines for bariatric surgery, presenting with recurrent GERD symptoms after one or more failed funduplications in the past, or 3) had a Nissen-Collis gastroplasty in the past and recurrent GERD symptoms and are with ischemia of the gastric fundus at re-exploration. Keys for a successful outcome include: 1) lysis of all adhesions between the liver and the stomach facilitating the placement of the liver retractor and exposure and identification of vital structures during dissection. 2) Complete dissection and take-down of the wrap which prevents stapling over the fundoplication and creating an obstructed and septated pouch. 3) Dissection of the angle of His and the esophageal hiatus to allow exposure of crura as well as recognition, complete reduction and repair of a hiatal hernia if present. 4) Dissection of the fat pad near the gastroesophageal junction off the gastric wall to allow assessment of the pouch size.

V016

LAPAROSCOPIC REPAIR OF A PERFORATED MARGINAL ULCER TWO YEARS AFTER GASTRIC BYPASS, Edward H Chin MD, Herron M Daniel MD, Umut Sarpel, Hazzan David MD, Mount Sinai School of Medicine

We present the case of a 43-year-old female who underwent a laparoscopic gastric bypass in 2003 for morbid obesity. Two years later, she had maintained significant weight loss, but developed acute abdominal pain, followed by nausea and emesis. In the emergency room, she had diffuse tenderness, tachycardia, and leukocytosis. After initial resuscitation, a CT was performed, which showed free air above the liver and thickened small bowel loops. She was brought emergently to the operating room for laparoscopy. At surgery, turbid fluid and inflamed small bowel loops were seen. A perforated marginal ulcer was discovered in the Roux limb. The perforation was oversewn primarily, and patched with omentum. The repair was tested by intraoperative endoscopy. A gastrostomy tube was also placed within the gastric remnant as enteral access. The patient did extremely well postoperatively, with an uneventful postoperative course. She was discharged on the fourth postoperative day. The gastrostomy tube was removed at one month, and she remains well since surgery. Marginal ulcer has been reported from 0.6-16% after laparoscopic gastric bypass. Etiologies include gastro-gastric fistula, excessively large gastric pouch containing antral mucosa, h. pylori infection, and smoking.



V017

LAPAROSCOPIC SLEEVE GASTRECTOMY, Vadim Sherman MD, Philip R Schauer MD, Cleveland Clinic, Department of General Surgery

Patients with a high BMI (> 60) and/or associated high risk medical conditions have the greatest to gain from procedures such as Roux-en-Y gastric bypass (RYGB) and biliopancreatic diversion with duodenal switch (BPD-DS), but the increased risk of postoperative complications often renders them poor surgical candidates. To this end, investigators have attempted various bridging procedures designed to impart an effective weight loss and reduce the risk of complications in the subsequent, definitive weight loss procedure. This includes laparoscopic sleeve gastrectomy (LSG). The second stage would involve completion to RYGB or BPD-DS. Technique: in general, 75-80% of the greater curvature is excised, leaving a tubularized stomach. Port placement is the same as for a standard RYGB. The lesser sac is entered by opening the gastro-colic ligament. A point on the greater curve, on the antrum, is chosen as the starting point, about 10 cm from the pylorus. A laparoscopic stapler, with a blue load (3.5 mm staple height), is introduced and fired on the antrum, towards the angle of His. A 42French bougie is then passed transorally into the pylorus, placed against the lesser curvature. The stapler is fired consecutively along the length of the bougie until the angle of His is reached. The short gastric vessels and the greater curvature ligaments (gastro-splenic and gastro-colic) are divided with ultrasonic dissection to complete the resection. Patients undergoing this procedure have dramatic weight loss and reduction of comorbidities, allowing progression to second stage weight loss surgery and decreased risk of complications. Presentation of this technique is timely as there is a growing amount of data promoting LSG as a potential sole weight loss surgery for patients with low BMIs.

V018

PERCUTANEOUS ENDOSCOPIC ASSISTED SURGERY: AN INNOVATIVE MODIFIED VERTICAL GASTROPLASTY FOR WEIGHT LOSS, Royd Fukumoto MD, Julio Teixeira MD, St Luke's Roosevelt Hospital Center, Columbia University

Objective: This is a description of a novel approach of endoluminal surgery for weight loss. The procedure was designed as a minimally invasive method of treating morbid obesity. The predicted population eligible for this approach includes patients who are medically unstable for traditional laparoscopic or open weight loss procedures.

Methods: Visualization for the procedure is provided mainly via a gastroscope. Access to the gastric cavity is provided by one trans-abdominal port placed percutaneously under endoscopic visualization. Using this port, 5mm or 10mm laparoscopic instruments are introduced into the gastric cavity. A tunnel of gastric mucosa is then created along the posterior stomach from the gastro-esophageal junction towards the pylorus. This tunnel is created by over-sewing gastric mucosa around the retroflexed gastroscope. After the tunnel is created, inspection of the entire gastric cavity can be performed using both the gastroscope and a laparoscope placed via the one working port. A foley catheter is then inserted into the stomach via the trans-abdominal port and left as a temporary gastrostomy tube. This tube can be used for enteral feeding or gastric decompression in the immediate post-operative period. The foley catheter is then removed 10-14 days later or once a fistula tract has formed.

Conclusions: This is envisioned as a bridge procedure that will allow patients to lose an initial amount of weight, eventually enabling them to tolerate standard weight-loss operations.

V019

PERCUTANEOUS MANAGEMENT OF COMMON BILE DUCT PATHOLOGY AFTER ROUX-EN-Y GASTRIC BYPASS, Syed Husain MD, Ahmed R Ahmed MD, Nael Saad MD, Nikhil C Patel MD, David L Waldman MD, William O'Malley MD, University of Rochester

Biliary pathology is common in morbidly obese population. As the number of patients undergoing bariatric surgery increases, surgeons are likely to encounter an increasing frequency of biliary disease post Roux en Y gastric bypass. This represents a unique therapeutic challenge as the bypassed stomach limits endoscopic access to the Ampulla of Vater. This precludes endoscopic therapies like endoscopic retrograde cholangio pancreaticography (ERCP), endoscopic common bile duct (CBD) stone retrieval and sphincterotomy. In this presentation, we discuss two representative cases of CBD stones and sphincter of Oddi dysfunction which were managed percutaneously. Therapeutic options include percutaneous choledochoscopy, percutaneous stone retrieval and percutaneous sphincteroplasty. Both of the presented cases had excellent symptom resolution and we were able to avoid surgical intervention in both cases. We surmise that percutaneous access to the biliary tree is a viable minimally invasive alternative in patients who have undergone Roux en Y gastric bypass.

V020

ENDOSCOPIC DELIVERY AND RETRIEVAL OF A NOVEL DUODENAL-JEJUNAL SLEEVE IN A PORCINE MODEL, Michael E Tarnoff MD, Ketih S Gersin MD, Anthony Lembo MD, Tufts-New England Medical Center, Boston, MA; Beth Israel Deacones Medical Center, Boston, MA; Carolinas Medical Center, Charlotte, NC

This video introduces the learner to a novel endoscopic duodenal-jejunal bypass sleeve. Through a combination of animation and video, the program highlights an overview of the device as well as the key steps in complete endoscopic delivery and retrieval in a porcine model.

V021

GASTRO-GASTRIC FISTULA CLOSURE: A NEW MINIMALLY INVASIVE APPROACH, Gonzalo M Torres-Villalobos MD, Todd A Kellogg MD, Rafael S Andrade MD, Daniel B Leslie MD, Robert P Gallegos MD, David W Hunter MD, Michael A Maddaus, Sayeed Ikramuddin, Departments of Surgery and Interventional Radiology, University of Minnesota, Minneapolis, MN, USA

We present the video of a novel technique for gastro-gastric fistula (GGF) repair. A 44-year-old woman was found to have a fistula between her gastric pouch and remnant 18 years after Roux-en-Y gastric bypass for morbid obesity. She previously underwent attempted repair, which was complicated by abdominal sepsis post-operatively. Upper gastrointestinal series, abdominal CT scan and upper endoscopy confirmed the diagnosis of GGF. Under endoscopic and fluoroscopic guidance, two ports were inserted percutaneously into the stomach. The fistula was closed with a percutaneous, trans-gastric, totally extraperitoneal approach. She remains well four months after this intervention. This procedure appears to be a safe and effective minimally invasive approach for closure of GGF after gastric bypass. This is the first description of an intragastric, percutaneous closure of a GGF after gastric bypass in the medical literature. Further experience with this technique is needed to define the selection criteria, limitations, advantages, and disadvantages.

V022

LAPAROSCOPIC REMNANT GASTRECTOMY: A NOVEL APPROACH FOR THE TREATMENT OF GASTRO-GASTRIC FISTULA FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS SURGERY, Jayaraj Salimath DO, Ian S Soriano MD, David Pinto MD, Samuel Szomstein MD, Raul Rosenthal MD, The Bariatric Institute, Cleveland Clinic Florida

BACKGROUND: Gastro-gastric fistula is a rare but serious complication following laparoscopic roux-en-y gastric



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bypass surgery. Various treatment options have been proposed. Safe resection of the gastro-gastric fistula is the mainstay of treatment. We present a video showing a laparoscopic remnant gastrectomy as a novel approach in the treatment of gastro-gastric fistula.

METHODS AND RESULTS: We present a 30-year-old female who presented one year after a laparoscopic ante-colic, ante-gastric divided roux-en-y gastric bypass with recurrent episodes of epigastric pain, nausea, vomiting and recent weight regain. A gastrograffin swallow demonstrated multiple fistulas between the gastric pouch and the gastric remnant. She underwent diagnostic laparoscopy, division of the gastro-gastric fistula medial to the fistula tract and remnant gastrectomy. The fistula was extracted en-bloc with the gastric remnant.

CONCLUSIONS: In experienced hands, laparoscopic remnant gastrectomy with en-bloc fistula resection can be performed safely with complete resolution of the gastro-gastric fistula and associated symptoms.

V023

NOTES: TECHNICAL PROBLEMS AND SOLUTIONS, Yoav Mintz MD, John Cullen MD, David Stuart MD, Eric Falor, Mark A Talamini MD, Department of General Surgery, University of California San Diego.

Natural Orifice Trans Endoscopic Surgery (NOTES) is now practiced world wide. In the past few years multiple groups confronted this challenge. Some groups study the basic concepts such as infection control and immune response and others develop the technique for performing surgical procedures in this fashion. Many technical problems are encompassed in this technique with the current available instruments and should be recognized. Close collaboration with industry is mandatory in order to allow for the development of the necessary tools. The unique technical problems in NOTES include: blindly performed primary incisions; uncontrolled pneumoperitoneal pressure; no support for the endoscope in the abdominal cavity; inadequate vision; insufficient illumination; limited retraction and exposure; and the complexity of suturing and performing a safe anastomosis. The hybrid technique serves as a temporary approach to solve these problems and allows the continuing development of this technique until industry provides the necessary tools to overcome these problems. In this technique pneumoperitoneum is achieved and controlled using a Veres needle and the standard laparoscopic insufflator. The most significant advantage of this technique however is having an independent vision using the standard laparoscope. This interim phase of development enabled our group to gain expertise and perform various procedures such as bilateral tubal ligation, oophorectomy, liver biopsy, cholecystectomy, splenectomy and small bowel resection and anastomosis. The most difficult technical problem and fundamental requirement to justify the NOTES approach is to have a safe method for portal closure with near zero leak rate and related complications. Several methods are currently studied using prototype instruments designed by industry with collaborating physicians. Our group decided to use laparoscopic instruments through an additional natural orifice in order to achieve these goals. Dual Natural Orifice surgery enables the insertion of long and inflexible instruments to the peritoneal cavity and hence the ability to safely resect bowel, perform anastomosis and securely sealing the stomach incision. The above mentioned problems and possible solutions are discussed and presented in various NOTES procedures.

V024

COMPLETE ENDOSCOPIC CLOSURE OF GASTROTOMY FOLLOWING NATURAL ORIFICE TRANSLUMENAL ENDOSCOPIC SURGERY (NOTES) UTILIZING THE NDO PLICATOR, Jeffrey Marks MD, Michael McGee MD, Raymond Onders MD, Amitabh Chak MD, Christina Williams MD, Judy Jin MD, Steve Schomisch, Jeffrey Ponsky MD, Case Western Reserve University

Creating a method for secure closure of the gastrotomy following Natural Orifice Transluminal Endoscopic Surgery

(NOTES) is vital to the advancement of this emerging technology. This video displays the use of the NDO Plicator, a device developed for endoscopic treatment of gastroesophageal reflux disease (GERD), to facilitate closure of the defect following NOTES in a porcine model.

The device was fired three times, leaving three pledged suture bundles to close the gastric defect. Following closure, the animal was explored and the integrity of closure was assessed by in vivo contrast fluoroscopy and ex vivo burst pressure. The physiologic relevance of gastric bursting pressure is not known; therefore corollary studies with longer term evaluation in animals are necessary prior to proceeding to clinical trials.

V025

NEW AUTOMATED TECHNOLOGY FOR NOTES TRANSMURAL ACCESS, Marvin Ryou MD, Derek G Fong MD, Reina Pai MD, David W Rattner MD, Jude S Sauer MD, Christopher C Thompson MD, Brigham & Women's Hospital; Massachusetts General Hospital; Boston, MA, USA

The goal of this on-going research is to develop and test a new family of devices to enable the safe, effective and rapid production of closeable transmural access sites for NOTES interventions. This video presents the current design and functional considerations of these automated devices. Each device incorporates an elongated rigid or flexible shaft to guide a multifunctional distal tip, which provides a specialized tissue holding vacuum manifold and two needles for remote purse string suture placement, an integrated precise transmural tissue cutting blade and a channel to assist, if desired, in guide wire passage through the new access site. An ex vivo porcine small intestine model is shown to illustrate the concurrent outside perspective and gastroscopic view of this technology and approach. New video is presented of an initial remote gastrotomy closures study comparing four different techniques for closing access site wounds. Four pigs survived well after having intraperitoneal NOTES procedures performed through anterior rectal transmural access sites made and closed with these automated devices. Successful findings from necropsy with colonoscopy at two weeks are highlighted. These encouraging early results support the potential of this technology and approach for safe and reliable NOTES transmural access site control. Further research and development are planned.

V026

A NOVEL PERCUTANEOUS ENDOSCOPIC SLEEVE GASTROPLASTY (PESG) USING THE ENDOSCOPIC FULL THICKNESS PLICATOR, James Ellsmere MD, Rabi Kundu MD, Daniel B Jones MD, Douglas Pleskow MD, Ram Chuttani MD, Gastroenterology and Minimally Invasive Surgery, Beth Israel Deaconess Medical Center

Background: Endoscopic procedures are attractive because they can be performed with minimal morbidity under conscious sedation in an outpatient setting. A percutaneous endoscopic sleeve gastroplasty (PESG) may have a role in treating gastroesophageal reflux or as a restrictive weight loss procedure. We hypothesize that it is feasible to perform percutaneous endoscopic sleeve gastroplasty using the full thickness endoluminal plicator.

Methods: We developed the procedure using six ex-vivo porcine stomachs mounted in a model of the abdomen. We then performed non-survival surgery on three 30kg swine under an approved protocol. The animals were kept NPO for 24h prior to surgery. Following general anesthesia, two 24F PEGs were placed using a standard pull technique through the abdominal wall, in the midline and the left mid-clavicular line. The Plicator (NDO Surgical, Mansfield, MA) was then used to place a full thickness endoluminal plication 10mm lateral to the GE junction. Subsequently, the anterior and posterior stomach wall just lateral to the Plicator instrument were plicated at 10mm intervals creating a full thickness, tunnel-like gastroplasty along the lesser curve. The stomach wall was retracted into the arms of the Plicator prior to each firing using 5mm diameter tissue graspers placed through the PEGs. Five plications were performed in total. The shaft of the 15mm diameter Plicator effectively

acted as a sizing dilator. Following the procedure the animals were euthanized and a necropsy was performed. The gastroplasty was assessed endoscopically and fluoroscopically.

Results: The length of the gastric tube was 50mm. The diameter was 18mm. The suture line was full thickness and intact. There were no injuries to adjacent organs or extraluminal leaks. With the outlet occluded, the gastroplasty could be distended with 20cc of saline.

Conclusion: Percutaneous endoscopic sleeve gastroplasty is technically feasible and may prove durable. It may also prove to be simpler and less morbid than open and laparoscopic approaches.

V027

TRANSGASTRIC SALPINGECTOMY IN A PORCINE ANIMAL. A N.O.T.E.S. PROCEDURE, Manoel Galvao Neto MD, Almino Ramos MD, Josemberg Campos MD, Paulo Amaral MD, Eduardo Moura MD, Manoela Galvao MD, Andrey Carlo MD, Marcelo Falcao MD, Gastro Obeso Center - Sao Paulo - Brazil

BACKGROUND: The Natural Orifice Transluminal Surgery (N.O.T.E.S.) is a evolving field of interest in surgery. Its development still requires research and development of models in order to train and develop this approach. The authors developed a porcine model of transgastric salpingectomy using regular therapeutic endoscopic instruments with purposes of training and development future human techniques and will be presented it in a video.

METHOD: After Animal ethics and research committee clearance, an acute trial was done to develop the model and a survival trial it's up to begin. On the acute model, the animal is under general anesthesia, intubated and monitored; A double channel colonoscope is orally introduced; transgastric approach is obtained by identifying the anterior gastric wall with palpation of the abdomen; a site over the liver shadow is choose; the gastric wall is than perforated with a strait papilotome using monopolar, followed by a guide-wire over whom an (up to 15mm) dilatation balloon will be slide and positioned at the middle of its length on the gastric perforation; a direct vision hydrostatic dilatation is performed and the colonoscope is gentle push in to abdominal cavity aiming its way throughout the balloon; once in the abdomen, a pneumo peritoneum is obtained by means of a tube is connected proximally at one of the colonoscope channels and distally to a lap insufflator, set to 12mmHg of pressured; after abdominal cavity recognition, the endoscope is positioned on the way that aloud a direct vision of the operation field on the inferior abdomen; A Verres needle is passed under endoscopic view and the insufflation tube is connected to it in order to clear the colonoscope channel to be used in surgical field; by bi-manual instrumentation with forceps the fallopian tube is identified; the meso is clipped proximal and distally and divided with endoscopic scissors; An endoloop is applied at tube bases and then proximally sectioned with monopolar energy; The fallopian tube is collected and placed in to the stomach to be withdraw orally; on the acute study the gastrotomy were not closed and the animal submitted to euthanasia; on the future chronic (survival) study the gastrotomy will be closed with different types of instruments. All attempts achieved success with a mean of 95min (60-135min) in 5 animals

CONCLUSION: Transgastric Salpingectomy in a porcine model is reliable and achievable and could help develop N.O.T.E.S. procedures

V028

COMBINED TRANSRECTAL AND TRANSGASTRIC NATURAL ORIFICE TRANSLUMENAL ENDOSCOPIC SURGERY (NOTES) IN THE PORCINE MODEL, Michael F McGee MD, Jeffrey M Marks MD, Amitabh Chak MD, Raymond P Onders MD, Steve J Schomisch BS, Jaime M Andrews BS, Conor P Delaney MD, Case Medical Center, Case Western Reserve University, Department of Surgery, Department of Gastroenterology, Cleveland, Ohio, USA

Most NOTES procedures utilize a transgastric approach. It has been hypothesized that using other access points may

improve access, visualization, and possibly ease closure techniques. Transgastric access requires endoscopic retroflexion to visualize and perform surgeries on the upper abdominal quadrants. A transrectal approach would eliminate the need for retroflexion and the resultant video image inversion and transposed movements of the endoscope. Multiple methods can gain NOTES access from a transrectal access point and are demonstrated. Combined transgastric and transrectal NOTES results in coordinated movements which provide better triangulation and retraction than single scope methods. Using a two scope method, a cholecystectomy is performed akin to a laparoscopic procedure in a porcine model.

V029

TRANSVAGINAL LAPAROSCOPIC CHOLECYSTECTOMY: LAPAROSCOPICALLY ASSISTED, Marc Bessler MD, Peter D Stevens MD, Luca Milone MD, Nancy J Hogle MS, Evren Durak MD, Dennis Fowler MD, Department of Surgery, Minimal Access Surgery Center, Columbia University College of Physician and Surgeons

Natural Orifice Transluminal Endoscopic Surgery (N.O.T.E.S.) is currently being explored as the next frame shift in minimally invasive surgery. Transgastric human appendectomy as well as peritoneoscopy, splenectomy and cholecystectomy in animal models have been reported in the literature. The aim of our experiment was to determine the feasibility and technical aspects of transvaginal flexible endoscopic cholecystectomy.

After approval from Columbia's IACUC, a Transvaginal Laparoscopically assisted Endoscopic Cholecystectomy was performed on four 30 kg Yorkshire pigs. Only one trocar was used for laparoscopic grasper to retract the fundus of the gallbladder. A 12 mm dual channel therapeutic gastroscope was inserted into the vagina either with or without a flexible shape lock device to provide rigidity and additional degrees of freedom. After the abdomen was entered from the vaginal posterior wall, the gallbladder was visualized with the endoscope, grasped with endoscopic forceps and handed to the laparoscopic grasper. The cystic structures were visualized and dissection was started. After the peritoneum over the duct and artery was opened with an endoscopic hook cautery device a blunt endoscopic grasper was used to dissect the tissues around the duct until the cystic duct was isolated. Controlling the cystic duct with clips as in laparoscopic cholecystectomy presents difficulty using the currently available endoscopic clips because they meet and occlude tissues only at the very distal tips. Given failure of the clips to occlude the duct we proceeded to use an endoscopic loop ligature. The artery was isolated and divided using the hook to dissect tissues behind it. Several techniques are used to accomplish this dissection. These include linear and rotational deflection of the tip of the scope, while tissue is grasped through the second channel, advancing and withdrawing the cautery hook along grasped tissue and the hook and pull technique, where tissue is grasped and drawn back towards the scope. Once the gallbladder is completely freed from the liver it is grasped and retracted either into the over tube or directly brought out through the vagina to be removed from the abdomen.

Aside from leakage of bile from the gallbladder there were no intraoperative complications. Operative time ranged between 110 and 155 minutes. Based on our experience in the porcine model, we believe that a Transvaginal Endoscopic Cholecystectomy is feasible in humans.

V030

LAPAROSCOPIC REPAIR OF A TRAUMATIC LUMBAR HERNIA, David A Iannitti MD, John L Polhill MD, Walter L Biffi MD, William W Hope MD, William L Newcomb MD, Carolinas Medical Center, Charlotte, North Carolina

This video demonstrates a laparoscopic repair of a traumatic lumbar hernia. Salient points include patient positioning, port placement, hernia reduction, and mesh placement. Patient background and clinical follow-up are included.



V031

LAPAROSCOPIC RETROPERITONEAL REPAIR OF A RIGHT SIDED BOCHDALEK HERNIA, Michael J Rosen MD, Lee E Ponsky MD, Case Medical Center

Bochdalek hernias are rare congenital diaphragmatic defects. We report a case of a 50 year old male with chronic shortness of breath who was diagnosed with a right sided Bochdalek hernia. This hernia was repaired using a laparoscopic retroperitoneal approach.

V032

LAPAROSCOPIC LOW ANTERIOR RESECTION (TME) FOR CARCINOMA OF THE RECTO-SIGMOID COLON, Barry Salky MD, Scott Nguyen MD, Mount Sinai Medical Center

This is a 48-year-old female with a rectal adenocarcinoma. TME with low anastomosis is demonstrated.

V033

LAPAROSCOPIC NO-TOUCH RESECTION OF A T4 COLON CANCER, Minia Hellan MD, John Wang MD, Alessio Pigazzi MD, City of Hope

Introduction: Laparoscopic colectomy for cancer is widely accepted. However, resection of a colonic tumor infiltrating other organs is controversial. In our video we describe a medial-to-lateral en-bloc resection of a T4 cecal tumor infiltrating the abdominal wall.

Procedure: Two 12 mm and two 5 mm ports are inserted. The ileocolic pedicle is identified, isolated and divided with an endovascular stapler. The right mesocolon is held upward and bluntly dissected off the retroperitoneum towards the abdominal wall and rostrally above the duodenum and the head of the pancreas. The middle colic vein and right branch of the middle colic artery are now divided using the ligasure device. The gastrocolic ligament, hepatic flexure and the remaining peritoneal attachment along the white line of Toldt are taken down until the whole right colon and hepatic flexure are free except at the area of tumor attachment to the anterior abdominal wall. During this whole process no manipulation of the tumor whatsoever occurred. The mid-transverse colon and terminal ileum are divided intracorporeally. Now the clearly visible tumor mass is dissected off the abdominal wall including a wide margin of muscle and fascia. Attention is paid not to grasp the tumor itself but only surrounding normal tissue. The specimen is finally removed using an endocatch bag. An intracorporeal side-to-side anastomosis is now performed between the ileum and transverse colon. The patient tolerated the procedure well and was discharged home on POD 2. Final pathology revealed a T4N0 (0/15) tumor with a diameter of 5.2 cm. All margins were free of tumor with a minimum circumferential margin of 1.1 cm.

Conclusion: This video aims to demonstrate that selected cases of locally advanced colon cancer can be removed laparoscopically according to established oncologic principles.

V034

LAPAROSCOPIC TOTAL PROCTOCOLECTOMY, Poh-Koon Koh MD, Bonnie Ritson, Feza H Remzi MD, Department of Colorectal Surgery, Cleveland Clinic Foundation, Ohio

This video presentation showcases the technique of laparoscopic total proctocolectomy employed by the authors in the surgical treatment of patients with Crohn's colitis refractory to medical therapy. The technical manoeuvres for dissection are highlighted and the positioning of both the patient and the surgical team necessary for the conduct of this advanced laparoscopic procedure are also depicted. This technique allowed the entire colon and rectum to be removed without a need for any abdominal incision and avoids a perineal wound. It is both aesthetically pleasing and reduces the post-operative pain for the patient.

V035

AN UNUSUAL APPLICATION OF ENDOLUMINAL SURGERY: TRANSANAL ENDOSCOPIC MICROSURGERY FOR TREATMENT OF RECTAL PSEUDOCANCER (CONGENITAL RECTAL WEB), Lauren Kosinski MD, John Marks MD, Hsiao-Ling Shen MPH, Gerald Marks MD, Lankenau Hospital and Institute for Medical Research

This video illustrates a novel application of the transanal endoscopic microsurgery (TEM) technique to the management of a congenital rectal web initially thought to be a rectal malignancy for which abdominoperineal resection had been recommended. TEM enhances access to and visualization of the lesion. A 270-degree, full-thickness excision with primary suture repair at the 5-cm level of the true rectum is demonstrated.

V036

LAPAROSCOPIC RESECTION RECTOPEXY FOR RECTAL PROLAPSE, Daniel A Lawes MD, Jonathon E Efron MD, Tonia M Young-Fadok MD, Mayo Clinic, Scottsdale, Arizona.

We present a video of a laparoscopic resection rectopexy performed in a 31 year old female. This lady had one prior pregnancy with normal vaginal delivery 8 years previously. She presented to the gynecologists for stress incontinence and to the colorectal surgeons with a 2 cm rectal prolapse. On examination she was also found to have a grade 3 rectocele, a grade 3 cystocele and a grade 4 uterine prolapse. It was decided to perform laparoscopic resection rectopexy and subsequent vaginal hysterectomy and colposuspension. The video demonstrates the characteristic highly redundant sigmoid colon and very mobile uterus. The steps in mobilizing the sigmoid colon are shown as is the ability for a laparoscopic approach to facilitate bloodless, nerve sparing dissection of the rectum under direct vision all the way to the pelvic floor. In addition the video demonstrates the close approximation of the posterior vaginal wall and anterior rectal wall in patients with a rectocele and the care required to dissect in the rectovaginal septum. Extra-corporeal resection of the sigmoid colon is performed using a laparoscopic tacking device, the pararectal tissues are fixed to the sacral promontory.

The patient made an uneventful post-operative recovery and was discharged home on day 4.

V037

LAPAROSCOPIC TRANSCYSTIC COMMON BILE DUCT STONE EXTRACTION FOLLOWING PREVIOUS LAPAROSCOPIC CHOLECYSTECTOMY, Subramaniam Sadhasivam MD, Matthew T Baker MD, Shanu N Kothari MD, Gundersen Lutheran Medical center, La Crosse, Wisconsin.

The laparoscopic transcystic duct approach to clearance of common bile duct stones is well described. Laparoscopic transcystic duct exploration of the common bile duct, in a patient with a previous laparoscopic cholecystectomy, to our knowledge, has not been reported.

We present a case of a 64 year old female who had undergone an uneventful laparoscopic cholecystectomy in 2001 at a referring institution. She presented with abdominal pain and elevated liver function tests in 2005 to our institution.

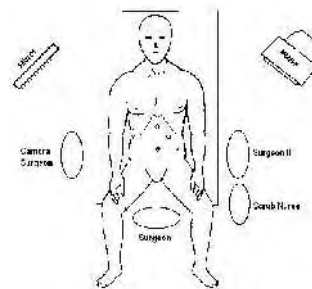
Ultrasound confirmed the presence of a stone in the common bile duct. Endoscopic retrograde cholangiopancreatogram was unsuccessful due to presence of a duodenal diverticulum and percutaneous transhepatic cholangiogram failed due to lack of dilated biliary radicals.

The video describes the intra-operative anatomy, laparoscopic ultrasound technique used to identify the cystic duct and common bile duct, intra-op cholangiogram demonstrating CBD stone and technical aspects of removing the stone. In conclusion, laparoscopic transcystic removal of a common bile duct stone in a patient with a previous laparoscopic cholecystectomy is a feasible and safe procedure.

V038

AN INNOVATIVE TECHNIQUE FOR LAPAROSCOPIC CHOLECYSTECTOMY IN SITUS INVERSUS TOTALIS, S. P. Dembla MS, D. D. Poddar MS, Shubha Garg, Gaurav Mittal, Anubhav Goel, Jaipur Golden Hospital, Delhi, India

Situs Inversus Totalis is an uncommon condition. After the inception of Laparoscopic Cholecystectomy; minimal access surgery is the gold standard for treatment of gall stone disease. Diagnosis as well as surgery is challenging in case of Situs Inversus Totalis. Here we report a case of Gall Stone disease (Acute cholecystitis and cholelithiasis) in a patient with Situs Inversus Totalis. We modified our approach by placing a mirror on right shoulder of the patient and monitor at left shoulder level, in a manner that reflection of monitor image could be seen in mirror. This innovation proved to be very helpful in orientating the anatomy during surgery. The Surgery was done in French technique, Surgeon standing between legs of the patient.



Here we present the video of the surgery in monitor and mirror recorded at the same time.

V039

LAPAROSCOPIC DUODENOJEJUNOSTOMY FOR BENIGN DUODENAL OBSTRUCTION, Aaron Eckhauser MD, William Richards MD, Vanderbilt University Medical Center

This video is of RF, a 59 year old male who presents with benign duodenal obstruction. The patient underwent a radical right nephrectomy in 1974 for renal cell carcinoma with postoperative radiotherapy. He developed significant scarring in the 3rd portion of his duodenum causing satiety, nausea and vomiting.

His preoperative upper GI series shows a massively dilated stomach with a normal pylorus and a very narrowed 3rd portion of the duodenum.

We chose to do a duodenojejunostomy rather than a gastrojejunostomy for several reasons. First, we wanted to preserve the pylorus. Also, we wanted to prevent marginal ulceration, bile reflux gastritis and improve nutrition.

The patient underwent nasogastric tube decompression and rapid sequence intubation prior to surgery.

The video shows an extensive dissection in the right upper quadrant. The pylorus and the 2nd portion of the duodenum are sutured to a loop of jejunum approximately 30cm from the ligament of Trietz. A stapled anastomosis was created using a 45-mm endo-GIA stapler. The enterotomy is closed in 2 layers using a running 2-0 vicryl suture. The distal jejunum is clamped after the anastomosis and assessed for any leaks.



The patient initially required TPN and NGT decompression postoperatively because of his massively dilated and atonic stomach. He was advanced to a regular diet and weaned off of TPN as tolerated. He is currently without nausea, vomiting or satiety and has gained 5 lbs since surgery.

V040

PEDIATRIC ROBOTIC EXCISION OF A CHOLEDOCHAL CYST, John J Meehan MD, Children's Hospital of Iowa, University of Iowa Hospitals and Clinics

One potential indication for robotic surgery in children is for complex hepatobiliary procedures. The articulating instrumentation coupled with the 3-dimensional imaging may allow surgeons to perform this minimally invasive procedure more effectively in small children. We present a video demonstration of a resection of a large choledochal cyst with Roux-en-Y choledochal jejunostomy done entirely intracorporeally using a surgical robot. We used a 12 mm 3-dimensional camera and two 5 mm robotic instrument ports. We also used one 5 mm accessory port for liver retraction and one additional 10 mm port for accessory instruments. The procedure lasted 5 and 1/2 hours, and she had no complications. She was discharged on post-operative day #2.

V041

LAPAROSCOPIC MORGAGNI HERNIA REPAIR: REPORT OF TWO CASES; ONE CONCOMITANTLY WITH SLEEVE GASTRECTOMY, Suthep Udomsawaengsup MD, Stacy Brethauer MD, Carolina Goncalves MD, Adrian Dan MD, Jeffrey Landers MD, Sam Rossi MD, Vijaya Nirujogi MD, Bipan Chand MD, Philip Schauer MD, The Cleveland Clinic Foundation, Cleveland

Background: Morgagni hernia is a relatively rare hernia that can result in symptoms of respiratory compromise, gastroesophageal reflux, and abdominal pain. Laparoscopic repair of Morgagni hernias can be challenging due to the adjacent thoracic structures and anatomic limitations for mesh fixation.

We present two cases of laparoscopic Morgagni hernia repair. Both involve incarcerated transverse colon and omentum within the hernia sac resulting in severe symptoms. The specific techniques for mesh fixation around the defects are demonstrated.

One patient is morbidly obese and underwent concomitant laparoscopic sleeve gastrectomy.

V042

LAPAROSCOPIC ESOPHAGEAL DIVERTICULECTOMY AND LONG MYOTOMY FOR DIFFUSE ESOPHAGEAL SPASM, Barry Salky MD, Alfred Trang MD, Mount Sinai Medical Center

Symptomatic epiphrenic diverticuli should be resected in conjunction with esophageal myotomy. The primary disturbance is the motility disorder. Diffuse esophageal spasm is an unusual cause of epiphrenic diverticulum. This video will demonstrate the approach to the lower mediastinum, diverticulectomy, myotomy and partial fundoplication in the treatment of diffuse esophageal spasm.

V043

THE HILL-NISSEN HYBRID PROCEDURE: A NEW ANTIREFLUX OPERATION, Jeraldine S Orlina MD, Ralph Aye MD, Brian Louie MD, Subashini Daniel MD, Swedish Medical Center

The laparoscopic approach has become the gold standard in the treatment of medically resistant GERD and paraesophageal hernias. Patients suffering from severe reflux and Barrett's esophagus, however, have been shown to have failure rates as high as 60% at ten years. Likewise, cases of giant paraesophageal hernia repairs have shown recurrence rates as high as 40%.

We have specifically examined two both well established therapies for GERD, the laparoscopic Nissen fundoplication and the laparoscopic Hill repair, in an effort to glean the positive aspects of each method and thus design a more superior, durable, and effective procedure.

We propose a hybrid procedure that combines the critical aspects of both techniques to create a superior surgical result. This procedure would include the collar-sling sutures of the Hill repair as well as the "floppy" wrap of the modified Nissen fundoplication. This would provide fixation of the GE junction below the diaphragm and recreate the normal anatomy of the gastroesophageal valve. Furthermore, the added security of a wrap as a means to augment the lower esophageal sphincter would be present. Finally, the "tightness" of the repair can be evaluated by intra-operative manometry and modified accordingly.

By combining complementary components of the Nissen fundoplication and the Hill repair, we hope to provide a more durable and effective solution to the problem of increased rates of recurrence in patients with Barrett's esophagus and giant paraesophageal hernias.

V044

LAPAROSCOPIC DUODENAL DIVERTICULECTOMY, Heather L Evans MD, John C Bennett MD, Bruce D Schirmer MD, Christopher J Northup MD, University of Virginia Health System

Internal duodenal diverticulum (IDD) is a rare congenital anomaly characterized by incomplete luminal formation of the duodenum. We present a case of a 25 year old woman with progressive severe abdominal pain and nausea. An upper gastrointestinal series (UGI) demonstrated the "wind-sock" sign, a barium filled sac lying entirely within the duodenum surrounded by a narrow radiolucent line (figure 1, "A"). Upon laparoscopic exploration, the cystic duct was cannulated and a common bile duct stent advanced through the ampulla under intraoperative endoscopic guidance.

After a Kocher maneuver was performed, the IDD was everted through a lateral duodenotomy. The lumen within the IDD was identified lateral to the ampulla and a circumferential excision of the IDD was undertaken with successive fires of an endostapler. After the duodenotomy was closed in two layers, the CBD stent was removed and a cholecystectomy performed. A post-operative UGI failed to demonstrate leak or obstruction at the staple line (figure 1, "B"). Six months later, the patient is asymptomatic. While there are several published cases of laparoscopic excision of external duodenal diverticuli, as well as those of endoscopic excision of IDD, we believe this is the first report of a giant IDD removed via laparoscopy.

V045

LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS IN A PATIENT WITH SITUS INVERSUS, Eraj M Basseri MD, Neel R Joshi MD, Mark D Gaon MD, Gregg K Nishi MD, Theodore m Khalili MD, Cedars-Sinai Medical Center

Kartagener syndrome (KS) was first recognized in 1933 as the clinical triad of situs inversus, chronic sinusitis, and bronchiectasis. In the US the frequency of KS is 1 case per 20,000 live births. Situs inversus occurs randomly in half these patients, therefore present in 0.01% of the population. Typically patients will have a normal life expectancy, despite the complete mirror image reversal of thoracic and abdominal organs. Clinical manifestations include chronic upper and lower respiratory tract disease resulting from ineffective mucociliary clearance. Males demonstrate infertility secondary to immotile spermatozoa. A 3-5% incidence of congenital heart disease is observed in these patients, usually with transposition of the great vessels.

We present the case of a 36 year-old morbidly obese male with known situs inversus who underwent laparoscopic Roux-en-Y gastric bypass surgery for the purpose of weight loss. There is only one account of this advanced laparoscopic procedure being performed in the literature.

The patient is a 36 year-old male with a past medical history including Kartagener syndrome, hypertension, sleep apnea, and morbid obesity. He has been overweight for the majority of his adult life and has failed multiple medical weight loss programs. His current BMI is 53.6. Using criteria established by the National Institute of Health, he was clearly a candidate for bariatric surgery. We performed routine pre-operative evaluation including a thorough cardiopulmonary



work-up, as well as an upper GI study to evaluate his intraabdominal anatomy.

Prior to the operation, the team of surgeons carefully outlined the steps of the operation. In the operating room, the primary surgeon stood on the left of the patient, while two assistant surgeons stood to the right, a mirror image reversal of the standard operative position. Although very challenging, the standard Roux-en-Y gastric bypass was performed safely in 175 minutes. Post-operatively the patient had no complications and was discharged home on day 2. The patient is currently 6 months from surgery and doing well. He has lost approximately 50% of his excess body weight and is no longer taking anti-hypertensive medications or on CPAP for his sleep apnea. This is a case of an advanced laparoscopic procedure performed successfully in a patient with an exceedingly rare anatomic anomaly.

V046

LAPAROSCOPIC MANAGEMENT OF ADJUSTABLE GASTRIC BAND SLIPPAGE, Ian S Soriano MD, David Pinto MD, Samuel Szomstein MD, Raul J Rosenthal MD, The Bariatric Institute, Cleveland Clinic Florida

BACKGROUND: Band Slippage with associated pouch dilatation is a known complication of the adjustable gastric band. Surgical revision is the mainstay of treatment, with majority of the procedures being able to be completed laparoscopically. Numerous laparoscopic maneuvers may be utilized to allow maintaining the band-in-situ. We present a video showing laparoscopic management of a slipped adjustable gastric band.

METHODS and RESULTS: We present a 32-year-old female who was seen in our clinic 2 years after undergoing laparoscopic placement of a adjustable gastric band (Lap Band, Inamed). A gastrograffin swallow showed pouch dilatation and band slippage. She was taken to the operating room and underwent successful laparoscopic gastric band repositioning and gastro-gastric re-implantation.

CONCLUSIONS: As experience in laparoscopy and specifically adjustable gastric band placement grows, preserving the band and management of complications via a laparoscopic approach will likely be the standard of care.

V047

VERTICAL SLEEVE GASTRECTOMY USING INTRAOPERATIVE EGD, Richard K Johnson MD, Stephen Scott MD, Roger de la Torre MD, University of Missouri

This is a seven minute video that demonstrates a gastric sleeve procedure as performed at the University of Missouri. The video addresses the procedure, the indications, and a general overview of the salient operative points of the procedure.

V048

LAPAROSCOPIC DUODENAL SWITCH FOR MORBID OBESITY: TECHNICAL ASPECTS WHEN USING A TRANSDUODENAL CIRCULAR STAPLER FOR COMPLETION OF A CONSISTENT DUODENO-ILEAL ANASTOMOSIS., Michel Gagner MD, Dept. of Surgery, New York-Presbyterian Hospital, Weill Medical College of Cornell University, New York, NY

Performance of a consistent and strong duodeno-ileal anastomosis during laparoscopic duodenal switch is crucial to avoid any leaks or strictures. This video demonstrates the latest technique using a circular anvil after transduodenal insertion.

Seven trocars are used in the subcostal and upper abdomen. A sleeve gastrectomy is performed with a linear stapler using 60 mm long cartridges (and 4.8 mm staple height) with absorbable reinforcements. Transection of the duodenum with closure of the duodenal stump is performed with a linear stapler 60 mm long, 3.5 mm thick staples and absorbable reinforcements. The anvil of a circular stapler EEA-21 is introduced in the proximal duodenum and secure with a 3-0 Monofilament non-absorbable purse-string. After transection of the ileum at 250 cm from the ileo-cecal valve, the EEA is invaginated into the ileum for an antecolic end to side duodeno-ileal anastomosis. The blind end of the ileum

is then closed with a linear stapler. A methylene blue test with an orogastric tube is performed, and extra sutures of absorbable 3-0 monofilament are positioned at the superior and inferior corners. The common channel of 100 cm is connected with the end of the biliopancreatic limb, side to side with a combination of linear stapler and running sutures.

Both mesenteric defects (Entero-enterostomy and Petersen's) are closed with running non-absorbable sutures. No leaks have been noticed in the last 4 years using this technique.

This technique is feasible, reproducible and consistent. It avoids leakage at the anastomosis and also prevents strictures and ulceration at the upper anastomosis.

V049

LAPAROSCOPIC CORTICAL SPARING ADRENALECTOMY FOR PHEOCHROMOCYTOMA, Edward H Chin MD, Donald Baril MD, Kaare Weber MD, Celia Divino MD, Mount Sinai School of Medicine

A 32-year-old female with asthma was hospitalized for pneumonia in 2/06. She underwent a CT scan of the chest which revealed an incidental finding of a bilateral adrenal masses. On further questioning, she admitted to palpitations and flushing. She was normotensive. Biochemical workup was significant for elevated urinary norepinephrine and normetanephrines, and plasma catecholamine level. MIBG scan showed positive uptake in the left adrenal gland consistent with pheochromocytoma. T2 weighted MRI showed bilateral adrenal masses, left greater than right. After adequate alpha blockade with phenoxybenzamine, the patient underwent a laparoscopic left adrenalectomy. Pathology revealed a 3.5 cm pheochromocytoma. The patient then underwent a right cortical-sparing adrenalectomy to avoid complete adrenal insufficiency and Addisonian crisis. The choice of operation was made realizing the potential for increased bleeding, which was further complicated by the patient's Jehovah's Witness beliefs, which prohibit transfusion of any blood products. At surgery, a small, well-circumscribed mass of the inferior right adrenal gland was found, and excised in its entirety. A postoperative ACTH-stimulation test showed appropriate cortisol response. Pathology revealed a 1.5 cm pheochromocytoma, and the patient recovered uneventfully. Cortical-sparing adrenalectomy has been reported with success rates of 65-100% in avoiding exogenous steroid dependence. Bilateral pheochromocytoma remains the most common indication. Risks for both recurrence and malignancy require lifelong follow-up in these patients.

V050

LAPAROSCOPIC RESECTION OF 15CM PARAGANGLIOMA, James A Lee MD, Joseph Grossman BA, Quan-Yang Duh MD, University of California, San Francisco; Columbia University

This is a video of a laparoscopic resection of a 15 cm paraganglioma adjacent to the left kidney that was plastered to the left renal vein. The patient is a 45 year old woman with classic symptoms and significantly elevated catecholamines on 24 hour urine testing.

V051

LAPAROSCOPIC LEFT ADRENALECTOMY WITH TRANSORAL TRANSGASTRIC EXTRACTION, Michel Gagner MD, Luiz A De Carli MD, Gerson Junqueira MD, Plauto Beck MD, Antonio N Kalil MD, Jose I Sanseverino MD, Luca Milone, Dept. of Surgery, New York-Presbyterian Hospital Weill Medical College of Cornell University, New York, NY and Santa Casa Hospital, Porto Alegre, R.S., Brazil.

Laparoscopic adrenalectomy for endocrine tumors requires a sizable extraction for complete pathological examination, which creates an enlarged tract for extraction. This video demonstrates a transoral transgastric extraction, which permits the use of smaller laparoscope and instruments, avoiding a large flank incision for extraction.

A 49 y.o. woman with a left adrenal cortisol-producing tumor was positioned in a complete lateral decubitus position. Three trocars of 5 mm were inserted in the left sub-



costal area. Ultrasonic shears of 5 mm were used for adrenal dissection from the retroperitoneum. Ligation of the vein was achieved with free silk ties. A thin plastic bag was inserted through the trocar tract, and after insertion of the adrenal tumor, the opening was tied with a silk free tie. A 10 mm gastroscope distended the gastric fundus for an anterior gastrotomy. The opening of the bag was snared and pulled through the gastrotomy, with laparoscopic counter traction, permitting a transoral transgastric extraction. Gastrotomy closure was done with a running suture laparoscopically. The patient was discharged without incident on the 3rd postoperative day, after careful observation. This technique is feasible and permits extraction of larger adrenal tumors without the need for a larger abdominal incision (> 5 mm), with possibly lesser risk of herniation and postoperative pain.

V052

LAPAROSCOPIC HARVESTED OMENTAL FLAP FOR STERNAL WOUND DEHISCENCE, Ashutosh Kaul MD, Thomas Sullivan BS, Alex Rakhlin MD, Edward Yatco MD, Thomas Cerabona, New York Medical College

This video highlights the technical steps in creation of an omental flap for management of sternal dehiscence using minimally invasive surgical techniques. Sternal dehiscence is associated with a high mortality rate. The greater omentum seems to be the ideal tissue due to its vascularity, high lymphatic content, its long pedicle and malleability. It also provides a large size and bulk to fill up spaces. There are four key components in flap creation. First is colo-epiploic detachment of the omentum along an avascular plane, followed by division of anastomotic branches between Barkow's and gastro-epiploic arcade. The flap is then mobilized from its gastric attachments pedicled on rt. gastro-epiploic artery. It is then transposed into the mediastinum. This case was of a morbidly obese male who developed sternal wound infection after five-vessel bypass using both internal mammary vessels. He had undergone two unsuccessful sternal debridements and had developed mediastinitis with necrotic sternal bone edges. We created an omental flap using minimally invasive surgical techniques. This flap was then transposed into the mediastinum where it was placed over the heart and skin closed over it. The patient did well and on follow up the overlying skin has completely healed. This video highlights that laparoscopic omental flap creation can be safely done even in morbidly obese patients with multiple co-morbidities. This approach may provide advantages over an open approach and possibly widen indications for use of omental flaps.

V053

DIPHRAGMATIC HERNIA OF UNKNOWN ETIOLOGY, Vered Avidan MD, Umut Sarpel MD, L B Katz MD, Mount Sinai School of Medicine

Diaphragmatic hernias are generally classified as congenital (e.g. Bochdalek, Morgagni) or traumatic. The later are sometimes diagnosed years after the inciting event. We present a case of acute diaphragmatic hernia of unknown etiology. The patient recalled no recent or remote blunt or sharp thoracoabdominal injury other than a CABG surgery, after which he had a normal chest x ray. The patient presented to a primary care facility with acute gastric volvulus that lead to the diagnosis of a diaphragmatic hernia, and was transferred to our hospital for further care. The diaphragmatic defect was big enough to allow herniation of the stomach, spleen and splenic flexure of the colon. The video takes the viewer through the stages of reduction and repair of the defect, all done laparoscopically. We demonstrate the absence of hernia sac, typical of diaphragmatic hernia (as oppose to hiatal hernia), and the absence of adhesion, hinting that not only the patient's symptoms were

acute, but possibly also the defect itself. We discuss the difficulty of reducing the hernia content, especially the spleen, and the means we used for its reduction. Finally, we present the postoperative course including the immediate development of re-expansion pulmonary edema.

V054

MINIMALLY INVASIVE REPAIR OF TRAUMATIC HYPOPHARYNGEAL INJURY, Mark D Gaon MD, Eraj M Basseri MD, Ryan Osborne MD, Gregg K Nishi MD, Theodore M Khalili MD, Cedars-Sinai Medical Center

The treatment of traumatic pharyngeal injuries typically involves and extensive open neck dissection. We present a video of blunt traumatic injury to the posterior hypopharynx which was repaired in a minimally invasive fashion using traditional laparoscopic instruments. The patient is a 22 year old female who reportedly fell forward and hit the anterior midline of her neck against the edge of a table. She presented to the emergency department with complaints of dysphagia and a hoarse voice. Examination of the oral cavity was normal. A gastrograffin swallow demonstrated significant subcutaneous air tracking down to the mediastinum, an abnormality of the posterior hypopharynx, but no free extravasation of contrast. A CT scan of the neck with oral contrast confirmed the findings of the swallow study. The patient was taken to the operating room where an exam under anesthesia was performed with rigid laryngoscopy and esophagoscopy. Small mucosal tears of the right false cords and aryepiglottic fold were noted, as well as a full thickness perforation of the posterior hypopharynx. Through this defect, the prevertebral fascia was visible. Conventional repair of this injury would require an open neck dissection. However, we attempted and successfully repaired the defect through the rigid esophagoscope using a 5mm laparoscope, laparoscopic needle driver, and extracorporeal knot pusher. The repair was completed primarily with a series of four interrupted absorbable sutures. The patient tolerated the procedure well and was discharged home on the second postoperative day but was kept NPO and on tube feeds for 5 days. On the fifth postoperative day, rigid laryngoscopy was repeated which showed an intact repair. The nasogastric tube was removed and the patient was started on a diet which she tolerated well. The patient is currently doing well 5 months postoperatively and has no complaints or residual effects from her injury.

V055

SURGICAL TEAM TRAINING ON A BENCH MODEL, M H Whitfore MD, D V Martinec, B Zheng PhD, L L Swamstrom MD, The Oregon Clinic

Video provides a brief introduction of the apparatus and tasks employed in the Legacy Inanimate System for Endoscopic Team Training (LISSETT) program. The construct validity of using LISSETT for team training is presented. The (LISSETT) formulates two team-obligated tasks on a commercially available laparoscopic training box. The first task requires an individual to manipulate the laparoscope appropriately while his/her teammate transports an object between 3 pegs located separately. The second task demands an individual to remove an obstacle above a suturing site and control the laparoscope while his/her teammate performs an intracorporeal suture. The team performance differences between a dedicated team and an undedicated team on the LISSETT tasks are highlighted in the video. The experienced surgeon provided specific instructions for camera driving. Manipulated by the experienced doctor, the laparoscope was moved smoothly and always kept the surgical site in center. In contrast, the surgical site was frequently moved out of the scene by the novice in the undedicated team. The experienced surgeon performed more supportive movements for his/her teammate, but the inexperienced surgeon in the undedicated team failed to do so. A total of 22 teams assembled by surgeons with different surgical experiences were included in the study of construct

validity for LISETT. Scatter plot is displayed to show correlation between LISETT score and surgical experience score. LISETT scores correlated positively with surgeon's experience ($r = 0.776$, $p < 0.001$). Teams constructed by experienced surgeons (staff surgeons and fellow, $n = 5$) performed significantly better (89.1 ± 4.3) than intermediate (fellow and senior residents 77.3 ± 9.3 , $n = 8$) and inexperienced group (junior residents and medical students 40.2 ± 17.8 , $n = 9$). Teams being rated with above-average exhibited higher LISETT scores (81.3 ± 10.8 ; $n = 6$) than the intermediate (62.2 ± 26.3 ; $n = 12$) and the below-average teams (58.6 ± 19.9).

The video ends by discussing the significance of using a bench model on training of team skills outside the OR.

V056

LAPAROSCOPIC SLEEVE GASTRECTOMY FOR WEIGHT LOSS IN MORBID OBESITY, O Tucker MD, D Pinto MD, T Escalante-Tattersfield MD, S Szomstein MD, R Rosenthal MD, The Bariatric Institute, Cleveland Clinic Florida, Florida, USA
Surgery is the most effective treatment for weight loss and improvement in some comorbid conditions in patients with morbid obesity. Laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic adjustable gastric banding (LAGB) are the most commonly performed bariatric procedures in the United States. Laparoscopic Sleeve Gastrectomy (LSG) has only recently been accepted as a primary restrictive bariatric procedure. We offer LRYG, LSG, and LAGB to all patients who fulfill the NIH Consensus Conference guidelines for weight loss surgery. As our experience with LSG is expanding we are attempting to identify definitive indications for LSG in our patient population. In this video, we present our technique of LSG and describe our current indications. We use a 7 trocar technique for LSG with identical port placement to our LRYGB procedure. Following induction of anesthesia and endotracheal intubation, the abdominal cavity is accessed through a 1-cm supraumbilical incision with a direct visual approach using a bladeless trocar. The abdominal cavity is insufflated with carbon dioxide to a pressure of 15 mmHg. The operating ports are inserted under direct vision. The left liver is retracted cranially, and the angle of His identified with exposure of the left crus of the diaphragm. A point on the greater curvature approximately 5 cm proximal to the pylorus is identified as the distal extent of the resection. An ultrasonic coagulator is used to divide the vessels along the greater curve up to the angle of His. A 52 Fr bougie is inserted transorally to the level of the distal stomach. Linear cutting staplers are used to vertically transect the stomach creating a narrow gastric tube with an estimated capacity of 150 mls. The staple line is oversewn with a running 2/0 silk suture. The resected stomach is placed in a specimen bag and extracted. A single 19-gauge French Blake drain (Johnson & Johnson, New Brunswick, NJ) is placed adjacent to the stomach. All patients have a routine gastrografin swallow study on postoperative day 1 and are commenced on oral fluids if normal.

V057

LAPAROSCOPIC LIGATION OF LUMBAR ARTERIES: MANAGEMENT OF PERSISTENT TYPE II AORTIC ENDOLEAKS, G. Brent Sorensen MD, William D Jordan MD, Ronald H Clements MD, University of Alabama, Birmingham
Abdominal aortic aneurysms are a significant source of morbidity and mortality in the United States. Over 60,000 are repaired each year. A new technology called Endovascular Aneurysm Repair, or EVAR, has emerged as a therapeutic option for repair of these aneurysms. This approach is currently being used in approximately one in three aortic aneurysm repairs. With this new technology has come a new set of complications - endoleaks. Type II endoleaks occur from retrograde flow into the aneurysm sac from aortic branches. This backflow can lead to increased aneurysm size, and potentially rupture. These endoleaks are usually managed with endovascular or percutaneous techniques. Failure of these techniques classically has been

treated with open ligation of the arteries. We describe a technique of laparoscopic ligation of the lumbar arteries to control a type II endoleak. Real-time fluoroscopy and CT angiography are used to localize the correct location of the endoleak. This technique provides a safe, durable, low-morbidity option in the management of persistent type II endoleaks.

V058

LAPAROSCOPIC ASSISTED RESTORATIVE PROCTOCOLECTOMY FOR FAMILIAL ADENOMATOUS POLYPOSIS, Jill Genua MD, David Vivas MD, Steven D Wexner MD, Cleveland Clinic Florida, Weston, Florida

This video displays a laparoscopic assisted restorative proctocolectomy with loop ileostomy for familial adenomatous polyposis (FAP). The patient is a 17-year-old female who presented with a 2-year history of rectal bleeding. Upper and lower GI endoscopy revealed adenomatous polyps and, accordingly, the patient was scheduled for restorative proctocolectomy. Results: After mechanical and antibiotic bowel preparation and preoperative antibiotic prophylaxis, the patient was placed in the supine modified lithotomy position. Bilateral ureteric catheters were placed; the abdomen, pelvis and perineum were prepped in a standard method. Using 5, 10-12 mm ports (infraumbilical camera port, left iliac fossa, left upper quadrant, right iliac fossa and right upper quadrant), the entire left and right colon were mobilized. The gastrocolic omentum was divided. The right colic, left and right branches of middle colic, and the inferior mesenteric vessels were individually divided with a 35-mm endoscopic linear cutter. The upper two-thirds of the rectum were mobilized laparoscopically. Total mesorectal excision was performed under direct vision through a Pfannenstiel incision with manual and visual guidance from both abdominal and perineal fields. A 30-mm stapling device was placed 2 cm cephalad to the dentate line. A 45-mm stapler was used to divide the terminal ileum. A 20 x 20 cm J-pouch was fashioned using 4 sequential firings of the 55-mm stapler and a 33-mm anvil was placed within the lumen using a pursestring. A 33-mm circular stapler was introduced through the anus to create the pouch anal anastomosis. A drain was left in the pelvis and a loop ileostomy was created 60 cm cephalad to the pouch. The patient had an uneventful postoperative course and was discharged home on postoperative day four. Pathology revealed more than 100 tubular and tubulovillous adenomas without dysplasia or invasive carcinoma.

V059

THORACOSOPIC LYMPHADENECTOMY FOR ESOPHAGEAL CANCER, Masayuki Higashino MSc, Masashi Takemura MSc, Shinya Tanimura MSc, Yosuke Fukunaga MSc, Department of Gastroenterological Surgery, Osaka City General Hospital

Three hundred and two esophageal cancer patients underwent thoracoscopic esophagectomy since July 1995. This operation facilitates magnification of the mediastinal region resulting safe and thorough lymphadenectomy of upper and left side mediastinum.

Indication; Ninety-five percent of all of thoracic esophageal cancer including cases of post chemo radiation were indicated in this operation. Exclusive criteria are severe pleural adhesion and cases of not performing hemi-ventilation anesthesia. Device; We originated a tracheal retractor that is constructed of two frames inserted from a 11.5 mm size port and united in the thorax resulting omission of small thoracotomy. Thoracoscope is 45 degrees rigid type, which allows better view of upper and left side mediastinum than conventional open surgery. Procedure; When the upper mediastinal lymphadenectomy along the right recurrent laryngeal nerve is performed, taping and retracting the right subclavian artery allows good view and avoids injury of the nerve. At the middle mediastinum, taping and retracting the esophagus allows good view of left side of mediastinum. We frequently use ultrasonic coagulating system for keeping the right plain and performing thorough lymphadenectomy. When left side pleura, Aorta, pericardium are made up for



landmarks, lymph node dissection of left side of Aorta, both hilum, infrabifurcation of trachea is more easily performed in laparoscopically than conventional open surgery. The peripheral of the right bronchial artery, the first branch of left bronchial artery, and pulmonary branches of both vagal nerves are preserved as much as possible. Careful points; Ultrasonic coagulating system and diathermy are not used around the both recurrent laryngeal nerves. This makes incidence of palsy of the nerves lower. Bleeding from the root of left bronchial artery derived from the Aorta is difficult to complete hemostasis, so we especially take care of dissection around the artery. Conclusion; Once you get used to procedure of thoracoscopic esophagectomy, it takes up to 5 hours for completion. This procedure does not take considerable long time at all comparing to conventional open surgery and rather likely to do more curative lymph node dissection under magnification of the thoracoscopic view. We concluded that this operation would become an option of standard operation for esophageal cancer.

V060

THORACOSCOPIC THYMECTOMY FOR NON-THYMOMATOUS MYASTHENIA GRAVIS, Arvind Kumar MD, Dileep K Pawar MD, All India Institute of Medical Sciences, New Delhi, India

Thymectomy is the standard surgical procedure offered to patients with myasthenia gravis and provides relief to a significant number of patients. Sternotomy has been the traditional approach to perform this procedure. Though it provides excellent exposure, the sternotomy has its own morbidity. Thoracoscopy has become a popular approach for thymectomy due to avoidance of sternotomy. It provides an opportunity for complete removal of thymus without the morbidity of sternotomy. It can be performed from the right chest, left chest or bilaterally. The use of a sternal lift device is also popular as it increases the retrosternal space, making the upper pole dissection easier. The benefits of bilateral approach include complete removal of pericardial fat bilaterally as well as clearance of aorto-caval groove and A-P window under vision. These are known sites for ectopic thymic tissue.

The steps of bilateral thoracoscopic thymectomy are same on both the sides. These consist of: complete removal of pericardial fat, division of the mediastinal pleura, dissection of the entire thymic tissue contained in the pleural envelope anterior to the phrenic nerve starting from the lower pole of the thymus on the pericardium, careful dissection of the thymus from the left innominate vein including clipping of the thymic veins and finally dissection of both upper poles upto the thyro-thymic ligament to remove the thymus completely. The mobilized gland is then put in a plastic bag and retrieved through the lowermost port on the right side. Between October 2000 and September 2006, we have performed this procedure on 102 patients with conversion required in three- two because of excessive mediastinal fat and one due to accidental injury to the phrenic nerve during dissection, which required thoracotomy for performing nerve repair under operating microscope. All the patients were extubated on the table and none required post-operative ventilation or ICU stay.

The main advantage of bilateral approach is complete clearance achieved under vision in all the critical areas. Use of sternal lift helps in the dissection in the area of innominate veins.

The video demonstrates the critical steps of the procedure.

V061

LAPAROSCOPIC TOTAL EXTRAPERITONEAL REPAIR OF RECURRENT BILATERAL INGUINAL HERNIAS, Brian P Jacob MD, Brian Katz MD, Anthony Vine MD, Mark Reiner MD, Mount Sinai Medical Center, New York City

The optimal surgical option for repairing recurrent inguinal hernias by using either a traditional open or a laparoscopic technique remains a controversial topic. Despite randomized trials showing that the laparoscopic techniques result in a less painful postoperative period and provide a quicker return to normal daily activities, few surgical groups have adopted the laparoscopic inguinal hernia repair as the standard operation for recurrences. Between January 2000 and July 2006, our group performed 125 consecutive laparoscopic recurrent inguinal hernia repairs with mesh (105 cases using the total extraperitoneal approach and 20 cases using the transabdominal preperitoneal approach).

In this video, we describe the details of our standard technique for a bilateral laparoscopic recurrent inguinal hernia repair. This case is based on a 30 year old male who had early bilateral recurrences following a laparoscopic transabdominal preperitoneal repair at an outside institution. By standardizing the operative technique, laparoscopic recurrent inguinal hernia repairs can continue to result in a rapid recovery period, few post-operative morbidities, and long term durability.

V062

LAPAROSCOPIC KASAI PORTOENTEROSTOMY WITH EXTRACORPOREAL ROUX LIMB CONSTRUCTION, Deepika Nehra BS, Samuel Rice-Townsend BA, Sanjeev Dutta MD, Lucile Packard Children's Hospital, Stanford University Medical Center

Biliary atresia can result in liver failure, and is potentially curable with Roux-en-Y portoenterostomy (Kasai procedure). We present a 10-week old infant with persistent jaundice and preliminary workup concerning for biliary atresia. In the operating room, the patient is positioned supine at the foot of the bed. A port is placed in the umbilicus for the camera and in the far left upper quadrant for the liver retractor. Two additional working ports are placed. The diagnosis of biliary atresia is first confirmed. This is done by passing a transabdominal spinal needle through the abdominal wall and into the lumen of the gallbladder. Aspiration of white bile or absence of lumen confirms the diagnosis of biliary atresia. In the case of bilious aspirate, an intraoperative cholangiogram is performed to assess biliary anatomy. The first phase of the procedure involves mobilization and removal of the atretic gallbladder. The cystic duct is then dissected proximally to expose the atretic common bile and common hepatic duct. The hepatic artery and portal vein are carefully exposed and preserved. The atretic duct is followed proximally toward the portal plate, which is then dissected away from the portal bifurcation. Small branches of the portal vein extending into the portal plate are transected. The portal plate is clearly identified and delineated left to right and anterior to posterior. The portal plate is excised leaving a thin white membrane on the liver that contains the biliary ductules. Once adequate exposure of the portal plate is achieved, attention is turned to creation of the Roux-limb. A region of bowel 10 cm distal to the ligament of Treitz is identified and 2 orienting sutures are placed. The bowel is exteriorized through a slightly enlarged umbilicus and a 40 cm Roux-limb is constructed. The bowel is then returned to the abdomen, and laparoscopy resumed. The Roux-limb is brought antecolic to the area of portal dissection and it is tacked to the liver to reduce tension on the anastomosis. A small enterotomy is made at its tip and a portoenterostomy is sutured intracorporeally using interrupted stitches, starting with the back wall and finishing with the front wall. All ports are removed, pneumoperitoneum reduced and all incisions are closed.

V063

THORACOSCOPIC REPAIR OF A TYPE D TRACHEOESOPHAGEAL FISTULA, [Samuel E Rice-Townsend](#)

BA, Deepika Nehra BS, Sanjeev Dutta MD, Lucile Packard Children's Hospital, Stanford University Medical Center

Type D esophageal atresia (EA) is the rarest form of this anomaly, comprising 1% of all cases, and is indicated by the presence of both proximal and distal tracheoesophageal fistulas (TEF). This video depicts what we believe is the first description of thoracoscopic repair of a Type D lesion. A full-term newborn with complex congenital heart disease is diagnosed with EA. She is taken to the operating room for thoracoscopic repair of her EA and ligation of the suspected TEF. The patient is positioned semi-prone at a 40-degree angle with the right side up. The right arm is elevated and secured above the head. Three trocars are placed: mid chest in the posterior axillary line, high up in the axilla at the mid-axillary line and lower in the chest at the mid-axillary line. The first step is identification and division of the azygous vein which aids visualization and manipulation of the esophageal limbs and trachea. Blunt dissection in the region of the distal esophageal pouch identifies the fistula connect-

ing the distal pouch to the trachea. This fistula is suture ligated intracorporeally and divided. The proximal esophageal pouch is then dissected. In this unusual case, a second tracheoesophageal fistula appears to originate at the distal end of the proximal esophageal pouch. This fistula is divided and the tracheal defect closed. Excellent mobilization of the proximal esophageal pouch is achieved with the "spaghetti" maneuver. Pressure on a naso-esophageal tube brings the proximal pouch near the distal pouch. The two ends are attached with a single interrupted stitch placed medially. The distal end of the proximal pouch is then opened after which interrupted sutures tied intracorporeally are placed to complete the back wall of the anastomosis. A feeding tube is inserted through the nares and directed from the proximal pouch into the distal pouch. The front wall of the anastomosis is completed. A pleural flap is created to protect the anastomosis. The lung is reinsufflated and all incisions are closed. Total operative time is typically 2.5 hours. Post-operatively, continuous feeds are instituted immediately and a swallow study is performed on post-operative day 5 to evaluate the integrity of the anastomosis. The feeding tube is removed and the patient fed orally.



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VIDEO-ASSISTED THORACIC SURGERY (VATS) FOR THE RESECTION OF METASTATIC ADENOCARCINOMA AS AN ACCEPTABLE ALTERNATIVE, Karl B Bauer BS, Mary S Maish MD, Dawn E Jaroszewski MD, Amy Yetasook BS, Robert Cameron MD, E. Carmack Holmes MD, University of California, Los Angeles Division of Thoracic Surgery, David Geffen School of Medicine

Adenocarcinomas commonly metastasize to the lungs and can be resected using open thoracotomy or Video-Assisted Thoracic Surgery (VATS). VATS remains controversial, but is a minimally invasive alternative to major open thoracotomy. This study reviews our metastatic resections in primary adenocarcinoma patients, using both thoracotomy and VATS. We aim to compare long-term prognoses to test the efficacy and viability of VATS.

Methods: A retrospective review of primary adenocarcinoma patients who underwent resection of pulmonary metastases from 1991-2006.

Results: A total of 41 (15 M, 26 F; median age 53) primary adenocarcinoma patients underwent pulmonary metastatic resection. VATS was performed in 20 patients (49%, 6 M, 14 F; median age 52) and open resection in 21 (51%, 9 M, 12 F; median age 54). Primaries included: 24 colorectal (59%), 11 breast (27%), 2 salivary (5%), and 1 liver, ovary, pancreas, and cervix (2% each). Six VATS (30%) and 9 open patients (43%) showed metastasis in non-thoracic locations. Two VATS (10%) and 5 open patients (24%) had local recurrences of their original cancer. VATS post-op follow was 427 days (median; range: 14-2436), and 1150 days (3-5835) after open resection. Primary diagnosis to first thoracic occurrence of VATS patients was 679 days (31-5057), and 1192 days (27-7002) for open patients. Total disease interval from original diagnosis to latest follow-up of VATS was 1562 days (87-6040), and 2948 days (30-10493) for open. Second thoracic recurrences were noted in 5 VATS patients (median Dfi: 173 days): 3 had VATS initially, then treated non-surgically (median Dfi: 84 days), and 2 had VATS initially, then thoracotomy (median Dfi: 576 days). Of initial open resection, a second recurrence was noted in 7 patients (median Dfi: 681 days): 6 had open resections (median Dfi: 695 days) and 1 was treated with chemotherapy (Dfi: 655 days). A third recurrence was noted in 1 VATS patient (Dfi: 569 days), who underwent an open procedure for the second recurrence, and then another VATS, and in 2 open patients (median Dfi: 1502 days), both of who had another open. No further recurrences were seen.

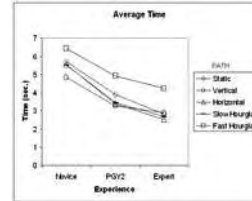
Ergo, VATS has become a viable alternative to thoracotomy regarding excision of pulmonary metastases. In the cases of primary adenocarcinoma, VATS shows no increase in the number of thoracic recurrences. VATS patients, however, have not been followed as long as open resection, as noted in the post-op follow-up and total disease intervals.

Posters of Distinction – P002

DYNAMITE SKILL ASSESSMENT SYSTEM: INITIAL EVALUATION, Audrey K Bell BS, Jacqueline T Johanas BS, Caroline G Cao PhD, Steven D Schwaitzberg MD, Tufts University Department of Mechanical Engineering and Cambridge Health Alliance

Skill assessment in the training of surgical residents has not been perfected. Most virtual trainers in minimally invasive surgery lack dynamic task elements rendering them unrealistic simulations for pure skill assessment. Previous studies have indicated that some novices are able to achieve excellent scores on pure motor skill tasks despite no previous experience. In addition, the scoring methodology on many skill and assessment systems is labor-intensive. There is a need to develop a psychomotor skill assessment system that is able to discriminate between levels of experience and can automate the scoring. A dynamic skill assessment system was developed to accomplish these goals. The unique feature of this platform is the multidimensional movement of the task fixture. The fixture can be moved at a variety of directions and speeds and requires the subject to make accurate contact with a specified target in a physical training

box environment. 15 subjects (5 novice, 5 PG 2, 5 expert) were evaluated using five conditions at varying speeds and paths of the target fixture (static, horizontal, vertical, slow hourglass, fast hourglass). Time to complete the task, errors, path length, smoothness, and target misses were measured. Analysis of variance was used to analyze the performance. Results: Time to complete the task was significantly different across all conditions and experience levels. Target misses were statistically significant across experience levels in all conditions except horizontal target trajectory. Smoothness and path length were significantly different for static and horizontal task conditions as a function of experience. These pilot results indicate that a self scoring dynamic skill assessment system has the potential to differentiate pure skill acquisition and groups of varying experience.



Posters of Distinction – P003

SHORT ESOPHAGUS: HOW MUCH LENGTH CAN WE GET?, Victor Bochkarev MD, Yong Kwon Lee MD, Atif Iqbal MD, Michel Vitamvas RN, Dmitry Oleynikov MD, University of Nebraska Medical Center

Background: Laparoscopic antireflux surgery requires an adequate length of intra abdominal esophagus. Short esophagus can cause wrap slippage and affect clinical outcomes. The aim of the study is to measure maximum length of esophageal elongation with transhiatal mediastinal dissection.

Methods: This is a prospective study performed in the tertiary referral center between 2002-2006. One hundred and six patients with gastroesophageal reflux disease and suspected short esophagus on barium swallow were studied. Patients underwent antireflux surgery with extended transhiatal mediastinal dissection to elongate short esophagus. Routine measurement of intra abdominal esophageal segment length with intraoperative esophagogastrosocopy and laparoscopy was utilized to define the GE junction in order to quantify total intra-abdominal esophageal length. Postoperative 24 hours pH-manometry, UGI series and symptom scores were recorded to document the clinical outcomes.

Results: Total esophageal elongation was achieved by a mean of 2.65 (range 3-18) cm. Resultant intra-abdominal esophageal length was measured at a mean of 3.15 (range of 3 to 5) cm. None of the preoperative "short esophagus" required Collis' gastroplasty post extended mediastinal dissection. All preoperative symptom scores showed significant improvements with mean follow up of 18 (9-36) months. Mean distal esophageal acid exposure normalized in all patients studied postoperatively.

Conclusions: Short esophagus can be safely elongated with extended mediastinal esophageal dissection. This technique can negate the need for Collis' gastroplasty and improve overall outcome after antireflux surgery. We recommended that extended transhiatal mediastinal dissection be performed to establish 3 cm. of intra abdominal esophagus at the time

Posters of Distinction – P004

LAPAROSCOPIC VENTRAL HERNIA REPAIR: IS IT FEASIBLE FOR OBESE PATIENTS?, Siok S Ching MD, Abeeaz I Sarela MS, Michael J McMahon PhD, Department of Surgery, Leeds General Infirmary, Leeds, United Kingdom.

Introduction: Treatment of ventral hernias can be particularly problematic in obese individuals. This study compared the feasibility and safety of laparoscopic ventral hernia repair in obese and non-obese patients.

Methods: Case notes were reviewed for 82 patients who

underwent laparoscopic ventral hernia repair during April 2003 to July 2006. Data on age, body mass index, size of mesh, operating time, in-patient stay and complications were analysed using Mann-Whitney U Test and Fisher's Exact Test.

Results: There were 39 men and 43 women, median age 55 years (range 24-92). Hernias were incisional in 63 patients (77%), of whom, 19 had recurrent incisional hernias following previous open repairs. In the remainder 19 patients, the hernias were mostly paraumbilical. Forty-seven patients (57%) were obese (BMI >30 kg/sq m) and 11 of these were morbidly obese (BMI >40 kg/sq m). The two heaviest patients (BMI 55 and 58 kg/sq m) had Roux-en-Y gastric bypass procedure concomitantly with the hernia repair. The hernia repair was converted to open in 2 non-obese patients (due to difficult adhesiolysis or a very wide fascial defect). There was no significant difference between non-obese and obese patients in defect size (median 4 vs. 5 cm, $p = 0.80$), size of mesh (median 280 vs. 225 sq cm, $p = 0.80$) or operating time (median 90 vs. 87 min, $p = 0.97$). An obese patient sustained colonic injury during adhesiolysis and this was laparoscopically repaired. The median in-patient stay was 2 days in both groups. Postoperatively, there was no missed enteric injury or early postoperative mesh infection. Seven patients had seromas (3 non-obese vs. 4 obese, $p = 1.00$), 8 patients had chronic postoperative pain (5 non-obese vs. 3 obese, $p = 0.28$) and 7 patients had recurrence (2 non-obese vs. 5 obese, $p = 0.69$). Two non-obese patients developed skin ulceration over a polypropylene + ePTFE composite mesh, 18 and 28 months after operation, and needed subsequent removal of mesh.

Conclusion: In obese individuals, laparoscopic repair of ventral hernia is associated with similar intraoperative and early postoperative features as compared with non-obese individuals. Ventral hernias in obese patients may be safely repaired by the laparoscopic technique with acceptable outcome.

Posters of Distinction – P005

HORMONAL EVALUATION OF PATIENTS WITH BMI BELOW 35 SUBMITTED TO THE LAPAROSCOPIC TREATMENT OF TYPE 2 DIABETES MELLITUS, Aureo L De Paula

PhD, Antonio L Macedo MD, Nelson Rassi MD, Alfredo Halpern MD, Cesar A Machado MD, Vladimir Schraibman MD, Hospital de Especialidades, Goiania, Brazil

Introduction: The objective of this study is to evaluate the pre and postoperative hormonal assays of patients with BMI below 35 kg/m² submitted to the laparoscopic transposition of a segment of ileum to the jejunum in order to treat Type 2 Diabetes Mellitus (T2DM).

Methods: The hormonal assays evaluation was done in 18 patients operated between April 2005 and Jan 2006. 8 were female and 10 male. Mean age was 52.1 years (40-66). Mean BMI was 29.3 (24.2-34.8). All patients had the diagnosis of T2DM for at least 3 years and evidence of stable treatment with oral hypoglycemic agents and or insulin for at least 12 months. Mean duration of T2DM was 7.3 years (3-15). Three techniques were performed, consisting in different combinations of Ileal interposition (II) in the proximal jejunum and a sleeve gastrectomy. The following hormones were assayed in the pre and postoperative period at the baseline and following specific food stimulation (30-60-120min): GLP-1, GIP, Insulin, CCK, PPP, Somatostatin, PYY, Ghrelin, Adiponectin, Resistin, Leptin and IL-6.

Results: 6 patients had the II, 6 had the association of an II to a sleeve gastrectomy (II-SG) and 6 had an II with a diverted sleeve gastrectomy (II-DSG). Ghrelin had an important rise following the 3 operations, especially after the II ($p < 0.001$). GLP-1 did the same, especially after the II-SG ($p < 0.001$). GIP also had an important rise, with the II-SG and II-DSG been equally effective ($p < 0.001$). CCK measurements were not affected by the II-DSG. The PPP was also slightly altered by the II-DSG. PYY had an important increase with all three operations ($p < 0.001$). Somatostatin and IL-6 were not affected by all three operations ($p = 0.632$). Both Leptin and Resistin blood levels decreased following the 3 operations, especially after the II-SG and II-DSG. Adiponectin was

not altered by the II and had a slight increase after the II-SG and II-DSG. Mean post-operative follow-up was 10.4 months. Both the II-SG and the II-DSG were effective in achieving an adequate glycemic control (91.7%). Following the II, 50% had an adequate glycemic control.

Conclusions: The incretin hormones (GLP-1, GIP) blood levels were substantially increased following the laparoscopic ileal interposition and may explain the promising good results associated to these operations for the treatment of T2DM.

Posters of Distinction – P006

PREOPERATIVE WEIGHT LOSS DOES NOT PREDICT SUCCESSFUL OUTCOME AFTER LAPAROSCOPIC ROUX-Y GASTRIC BYPASS, Dan Eisenberg MD, Alain Ramirez BS, Andrew J Duffy MD, Kurt E Roberts MD, Joshua I Hrabosky PhD, Robert L Bell MD, Yale University School of Medicine

PhD, Robert L Bell MD, Yale University School of Medicine

Objectives: Successful weight loss after laparoscopic Roux-Y gastric bypass (LRYGB) is dependent on the patient's continued compliance with dietary and exercise regimens. As a test of patient compliance, some institutions require preoperative weight loss as a prerequisite to surgery. Conversely, at our institution, we make no such preoperative demands. The goal of this study is to determine the relationship between preoperative weight loss and successful postoperative weight loss in patients undergoing LRYGB.

Methods and Procedures: Between August 2002 and September 2005, 354 LRYGB were performed. Patient demographics were entered into a longitudinal, prospective database. Patient weight was first measured six to eight weeks prior to surgery and a repeat weight was obtained immediately before surgery. Linear multiple regression analyses and one-way ANOVA were performed comparing body mass index (BMI) loss before surgery to percent BMI loss at 12 months after surgery.

Results: 256 patients were available one year after surgery and included in the study. Ages ranged from 17 to 64 years and preoperative BMI ranged from 36.1 to 90.5 kg/m² (mean 51.4 kg/m²). For all patients, mean percentage excess weight loss and percentage BMI loss was 62% and 34.5%, at one year, respectively. Patients were grouped according to pre-operative weight change: 125 patients lost weight ($M = -1.7$ kg/m², $SD = 2.8$) prior to surgery, while 131 did not lose weight or gained weight ($M = +1.2$ kg/m², $SD = 1.2$) prior to surgery. At one year's follow-up, the percentage of body mass index loss of patient's who lost weight prior to surgery ($M = -34.6$, $SD = 8.0$) was statistically indistinguishable from those who did not lose weight prior to surgery ($M = -34.5$, $SD = 7.6$), $F(1, 254) = .03$, n.s. A multiple regression analysis also revealed that percent change in BMI from initial visit to surgery did not predict percent change in postoperative BMI at one year's follow-up, $F(1, 254) = .09$, n.s.

Conclusions: In this series, there was no correlation between preoperative and postoperative weight loss. In addition, preoperative weight gain does not portend less weight loss after surgery. Thus, preoperative weight loss is neither an adequate indicator of patient compliance nor a predictor of a patient's ability to lose weight in the first post-operative year.

Posters of Distinction – P007

PERCUTANEOUS ENDOSCOPIC GASTROSTOMY: A SAFE TECHNIQUE IN PATIENTS RECEIVING CORTICOSTEROIDS, Elizabeth Franco MD, Habeeba Park BS, Stephen M Kavic MD, Patricia Turner MD, Bruce Greenwald MD, Adrian E Park MD, J. Scott Roth MD, University of Maryland School of Medicine

University of Maryland School of Medicine

Percutaneous endoscopic gastrostomy (PEG) is a well-established technique of enteral access. However, there is a concern that PEG placement may lead to an unacceptable rate of complications in certain patient populations, such as those patients receiving corticosteroids. We examined data on PEG placement from a single institution to determine whether patients receiving steroid therapy are at increased risk of procedural complications. We conducted a retrospective review on 483 consecutive successful PEG placements



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performed between January 2002 and June 2005. Of these, 32 patients (6.6%) were receiving corticosteroids; 17 were on acute steroids, and 15 were on chronic steroid treatment. For all patients, the mean age was 62 years (range 18-97 years), and 62% were male. Complications were defined as hemorrhage, wound infection, tube dislodgement, abdominal complaint, inability to tolerate gastric feeding, hypoxia and hypovolemia, and death. The overall rate of complications was 8.3%: hemorrhage (1.7%), wound infection (2.3%), tube dislodgement (0.8%), abdominal complaint (2.5%), inability to tolerate gastric feeding (0.4%), hypoxia and hypovolemia (0.2%). There was one death, in a patient who was not receiving steroids. The complication rate among patients taking steroids was 12.5%, and the complication rate was 8% for the steroid-free group. Chi-square analysis failed to demonstrate a statistically significant difference between these two rates of complications ($p=0.48$). There was no difference in rates of complications between acute or chronic steroid therapy patients. In this large series of PEG placements, we were not able to show a difference in patients receiving acute or chronic steroid therapy versus those not on steroids. Thus, PEG may be considered as a safe technique in patients regardless of steroid status.

Posters of Distinction – P008

FOREGUT SURGERY IN LUNG TRANSPLANT PATIENTS, Matthew P Sweet MD, Rasa Zarnegar MD, Ian Nipomnick BS, Charles Hoopes MD, Jeffrey A Golden MD, Steven R Hays MD, Lorriana E Leard MD, Marco G Patti MD, University of California San Francisco Departments of Surgery and Medicine, San Francisco, California, USA

Background: Gastroesophageal reflux disease (GERD) is prevalent among patients with end-stage lung disease (ESLD). GERD can lead to microaspiration and may be a risk factor for lung damage before and after lung transplantation. A fundoplication is the best way to stop reflux, but little is known about the safety of elective foregut surgery in patients with ESLD. The aims of this study were to report the safety of a laparoscopic fundoplication and/or pyloroplasty in patients with ESLD and GERD before or after lung transplantation.

Methods: Between January 1997 and July 2006, 286 patients were listed for lung transplantation. One hundred and seventy three patients went on to lung transplantation. A total of 27 laparoscopic funduplications were performed (22 total and 5 partial funduplications). Of these operations, 11 were done before and 16 after the transplant. In 3 patients a pyloroplasty was also performed. Two other patients had a pyloroplasty without fundoplication.

Results: All patients underwent a laparoscopic fundoplication and/or pyloroplasty. There were no conversions to an open operation. All patients were admitted to the ICU for observation and were followed by a multidisciplinary transplant team. Twenty-six patients recovered uneventfully (90%). Median hospitalization was 2 days (range 1-34) for patients who were admitted for elective operations. Hospitalization was not delayed in the 3 patients who had funduplications immediately following transplantation. Eleven of 13 post-transplant patients (85%) and 2 of 3 pre-transplant patients (67%) had delayed gastric emptying.

Conclusions: The results of our study show that: 1) laparoscopic foregut surgery can be performed safely in selected patients with ESLD before or after lung transplantation by an experienced, multidisciplinary team; and 2) gastric emptying should be objectively measured in all patients as it is frequently abnormal and may play an important role in the etiology of reflux.

Posters of Distinction – P009

INCIDENTAL GALLBLADDER CANCER AFTER LAPAROSCOPIC CHOLECYSTECTOMY AND THE PROBLEM OF A PRACTICAL CLASSIFICATION, Thorsten Goetze PhD, Vittorio Paolucci PhD, Clinic for general-, abdominal- and minimally invasive surgery of the Ketteler-Krankenhaus

Introduction: Since the first description of port site metastases and tumor cell seeding it is supposed that the laparoscopic technique could deteriorate the prognosis of gallbladder cancer. In the literature there is a variety of different 5 year survival curves for the different T- stages and operation methods, so it seems to be very difficult for the surgeons to compare the different results. These assumptions are going to be verified by DGCH- Register.

Material and method: To obtain data we are using the DGCH- Register of incidental gallbladder carcinoma, which is an institution of the German Society of Surgery. We have calculated the data for the T- stages, UICC/AJCC- stages and the modified Nevin- classification, which seems to be a very practical kind of classification. Results: 441 cases of incidental gallbladder cancer have been recorded so far.

There are 239 patients treated by the laparoscopic procedure, 131 by the open one, 69 with an intraoperative conversion from the laparoscopic to the open technique. The Kaplan- Meier survival shows a significant advantage for the laparoscopic procedure compared with the open surgery for the entire patients ($n=441$) ($p<0,05$). According to the T- stages calculated with the Kaplan Meier method the laparoscopy seems not to worsen the prognosis. In the stadium T2 (200 patients) there is a significant better survival for the laparoscopic group ($p<0,05$). After analyzing with the complex UICC/ AJCC- stages there seems also to be no disadvantage for the laparoscopic group.

The mod. Nevin I stadium shows a significant better survival for the laparoscopic treated patients. The advanced tumor stages with metastases (mod. Nevin IV/V) show no difference between the different procedures.

Discussion: The access technique open or laparoscopic does not seem to influence the prognosis of incidental gallbladder carcinoma. The problem in the literature is, that often many authors only classify the tumors according to the T- stages without regarding the "n" and "m" status, so a variety of different 5 year survival curves exists. A possible explanation could be that nodal status is not known, or that the UICC/ AJCC- system is very complex and difficult, so according to the authors the mod. Nevin classification is in such cases a very good additional system to divide local, local advanced and metastatic tumors, as a system added to T- system so that every reader can see and compare the different data.

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Posters of Distinction – P010

RECURRENCE AFTER LAPAROSCOPIC VENTRAL HERNIA REPAIR: A PROSPECTIVE COMPARISON OF SUTURES VERSUS TACKS, Alexander Greenstein MD, Scott Q Nguyen MD, Kerri E Buch FNP RN, Jessica Schnur BS, L. Brian Katz MD, Mark A Reiner MD, Robert A Aldoroty MD, Daniel M Herron MD, Edward Chin MD, Kaare J Weber MD, Celia M Divino MD, Mount Sinai School of Medicine, New York, NY

Background: Mesh fixation in laparoscopic ventral hernia repair typically involves the use of tacks and/or transabdominal permanent sutures. Sutures pass through all layers of the fascia and muscle of the anterior abdominal wall while tacks secure the mesh to the innermost millimeters of the peritoneal cavity. Controversy exists regarding the optimal method to fix the prosthetic mesh to the anterior abdominal wall, and it is commonly reported that use of sutures as the primary fixation method is imperative to avoid recurrence. We compare postoperative recurrence rate between the two techniques. Methods: Patients undergoing laparoscopic ventral hernia repair at the Mount Sinai Medical Center were prospectively enrolled in the study. They were sorted into two groups 1) Hernia repairs consisting primarily of transabdominal suture fixation and 2) Hernia repairs consisting primarily of tack fixation. The patients were not randomized. The technique of surgical repair and mesh material was based on surgeon preference. Office documentation, CT reports and a telephone questionnaire were used to determine recurrence events. Results: During 2004-2005, 50 pts were enrolled in the study. 28 had hernia repair primarily with transabdominal sutures and 22 had repair primarily with tacks. The two groups had similar average age, surgical history, operative time, postoperative length of stay, and follow up duration, but the tack group had a larger average

defect size (105cm² vs 87 cm²). At an average follow-up of 18 (range 6-22) months, the overall recurrence rate was 14% with events ranging from one month to 20 months post-op. While operative time (162 min vs. 122 min) and hernia defect areas (161cm² vs. 85cm²) appeared to be greater in those patients who recurred, no significant factors were detected. There were three recurrences in the suture group and four recurrences in the tack group, yielding no significant difference in recurrence between the two groups.

Conclusion: Patients undergoing laparoscopic ventral hernia repair with primarily transabdominal sutures or tacks experience similar recurrence rates. Even in the presence of large defects, tacks may be used as the primary method for mesh fixation without concern for increased incidence of recurrence.

Posters of Distinction – P011

A NEW TECHNIQUE FOR COLONOSCOPY, Yukihoro Hamahata MD, Yasunobu Tsujinaka MD, Hiroshi Azuma MD, Tokatsu Tsujinaka Hospital

OBJECTIVE: Recent progress of endoscope has allowed us to perform colonoscopy easier, still it is difficult to acquire the skill. To facilitate colonoscopy, we have employed a disposal distal attachment putting at the tip of endoscope. In this study, we discuss the method and results of the technique.

METHODS: A disposal distal attachment, or transparent soft plastic cap is attached at the tip of endoscope. Preoperatively, patients were given one ampoule of Opystan, 0.2 ampoule of Silece, and one ampoule of Buscopan. When inserting endoscope, irrigation is mainly used to obtain better visualization in place of insufflation. Because small amount of water and the attachment secure good intraluminal view and prevent colon from being overextended. Without stretching mucosal folds, endoscope can go through the folds like screwing. This technique can be applied to reduce pain and incidence of intestinal perforation as well.

RESULTS: We employed this technique in 1999. Since 2003, almost all colonoscopy cases have been performed with this technique. During June and September 2001, a randomized study between this technique and conventional technique was done by a single surgeon and demonstrated no significant difference both in time for reaching at cecum and in patients' satisfaction rate. However, three cases, which were failed to reach at cecum, were succeeded in total colonoscopy by attaching the cap. Furthermore, overextension of sigmoid colon was observed 83.0% in conventional technique and 20.6% in new technique. Overall, reaching rate to cecum has improved from 96.7% in 2000 to 99.1% in 2006; the patients' satisfaction rate has also been increased from 84.1 points in 2000 to 90.0 points in 2006. Incidentally occurred perforation was observed in 3 cases out of 42,684 cases before the new technique was employed in 2000; no perforation has been observed 42,359 cases after that. Polyp detection rate has also increased from 35.2% in 2000 to 42.1% in 2006.

DISCUSSION: This new technique is very simple; just putting a cap at the tip of endoscope. Nevertheless, it alleviates patients' pain, increases the safety of the colonoscopy, and increases reaching rate to cecum and polyp detection rate. So, we believe this technique is efficient and feasible. This attachment also secures a good intraluminal view so that operator can perform colonoscopy comfortably without overextending colon.

Posters of Distinction – P012

STUDY OF INTRA-GASTRIC AND INTRA-BLADDER PRESSURE CHANGES DURING REST, COUGHING, WEIGHT LIFTING, RETCHING AND VOMITING, Atif Iqbal MD, Mumnoon Haider MD, Vanessa Salinas MD, Sue Corkell RN, Kiran Turaga MD, Charles J Filipi MD, University of Missouri Columbia, Columbia MO. Creighton University School of Medicine, Omaha NE.

Objective: We aimed to quantify and compare the intra-gastric and intra-bladder pressures during rest, coughing, bench pressing using specified weights, induced retching and vomiting.

Methods: Intra-gastric and bladder pressures were measured in 10 healthy volunteers after insertion of manometry and Foley catheters. Baseline pressures were recorded. Each subject was then asked to cough 10 times and bench press weights (26, 44, 70, 88 and 114 lbs) 5 times each. Vomiting and retching was induced by Ipecac administration. Gastric and bladder pressures were continuously recorded during these activities and analyzed thereafter using SPSS (v.11). The t test and ANOVA were used for analysis. Significance was established at p<0.05.

Results: Ten volunteers with a mean age of 26 yrs and a mean BMI of 25 were studied. Maximum pressure generated in the stomach during vomiting was 288 mm Hg (mean 82) and for retching 280 mm Hg (mean 68), coughing 232 mm Hg (mean 35) and weight lifting 55 mmHg (mean 3.8). There was a significant difference between pressures generated during coughing and vomiting (p<0.0001) and coughing and retching (p<0.0001) with vomiting and retching being higher than coughing. All pressure changes were significantly different from baseline (p<0.004). There was no significant difference between gastric and bladder pressures during any activity and a strong correlation was seen between the two (r=0.97).

Conclusion: Gastric and bladder pressure does not significantly differ at rest or during activities. There is significantly higher intragastric pressure with vomiting and retching as compared to coughing which causes significantly higher pressures than weight lifting. Intra-abdominal pressures as high as 290 mmHg are seen with vomiting which is equivalent to 1/50th of the suture pull out force (20.3 N/m) in porcine models. Maximal tensile strength of the cadaveric abdomen (1600 N/m) is 4600 times the maximal pressure generated during vomiting. Further studies are required to delineate the effects of weight lifting and to determine the authenticity of postoperative weight lifting restrictions. Vomiting and retching can render significant forces on any tissue apposition device within the stomach or anywhere within the peritoneal cavity. This applies to procedures such as hernia repair, fundoplication, gastroplasty and future gastric port closures after trans-gastric surgery.

Posters of Distinction – P013

LAPAROSCOPIC SIGMOID COLECTOMY FOR DIVERTICULITIS AFTER PERCUTANEOUS DRAINAGE, Sanjay Jobanputra MD, Amit Khanna MD, Bashar Safar MD, Jill Genua MD, Susan Cera MD, Dana R Sands MD, Eric G Weiss MD, Anthony M Vernava III MD, Juan J Noguera MD, Steven D Wexner MD, Cleveland Clinic Florida, Weston, Florida

Background: Percutaneous drainage followed by colonic resection is an acceptable method to treat diverticular abscess. However the effect on subsequent surgical outcomes is unknown. The aim of this study was to evaluate whether preoperative percutaneous drainage (PPD) influences conversion rate, operative time, complication rate, or length of stay (LOS).

Methods: Retrospective review of all patients entered into our prospective database who underwent laparoscopic or laparoscopic attempted diverticular resection between 2001 and 2006. 150 patients underwent laparoscopic or laparoscopic assisted surgery for diverticular disease, 14 of whom had preoperative percutaneous drainage. These patients were compared to 136 patients who had no preoperative percutaneous drainage (NPD). Age, gender, ASA, BMI, prior abdominal surgery, conversion rate, operative time, complication rate, and LOS were evaluated. Mean time between drainage and surgery was 62.9 days.

Results: The laparoscopic conversion rate was 28.5% for PPD and 35.3% for NPD (p=0.71) and the mean operative time was 184 minutes for PPD and 201 minutes for NPD



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(p=0.30). The complication rate was 14.3% for PPD and 20.6% for NPD (p=0.62) while the mean LOS was 5.5 days for PPD and 5.84 days for NPD (p=0.66).

Conclusion: Percutaneous drainage of diverticular abscess prior to laparoscopic diverticular resection does not influence conversion rate, operative time, complication rate, or LOS. Laparoscopic resection should be offered to patients who have had PPD as the outcome of emergent resection while the abscess is present is unknown.

Posters of Distinction – P014

LAPAROSCOPIC DISTAL PANCREATECTOMY FOR PANCREATIC NEOPLASIA, Michael L Kendrick MD, Geoffrey B Thompson MD, David R Farley MD, Mayo Clinic College of Medicine

Background: Laparoscopic distal pancreatectomy (LDP) is increasingly performed. Outcomes of laparoscopic approaches for pancreatic resection of neoplasia are not well defined. Our aim was to define the feasibility and outcome of laparoscopic distal pancreatectomy for benign and malignant pancreatic neoplasms.

Methods: Retrospective review of all patients undergoing laparoscopic distal pancreatectomy at a single institution. Data are presented as mean ± standard deviation or as a range.

Results: 28 patients with a mean age of 63 (range: 44-83) years underwent attempted LDP; 3 patients required conversion to laparotomy for failure to progress (n=2) or bleeding (n=1). Spleen preserving and extended LDP was performed in 3 and 4 patients respectively. Operative time was 235±40 minutes, and blood loss was 211±156 ml. Diagnosis was non-functioning islet-cell tumor (n=10), serous or mucinous cystadenoma (n=10), pancreatic adenocarcinoma (n=4) insulinoma (n=3) and metastatic cancer (n=1). A concomitant procedure was performed in 7 patients (cholecystectomy, Nissen fundoplication, or herniorrhaphy). One patient underwent en-bloc wedge resection of adherent stomach. Mean tumor size was 2.6 cm (range: 1-5.1). Days to oral intake and length of hospital stay were 3±1 days and 6±3 days, respectively. Among patients undergoing LDP, there was no perioperative mortality. Perioperative morbidity occurred in 30% with pancreatic leak (n=4), DVT/PE (n=3), abdominal infection (n=2), lymphocele (n=1) and anemia requiring transfusion (n=1). At mean follow-up of 14 months (range: 1-54), all patients are alive without disease with exception of one patient with recurrent adenocarcinoma.

Conclusion: Laparoscopic distal pancreatectomy appears safe and effective in patients with pancreatic neoplasia. Further controlled trials are necessary to evaluate oncologic outcomes with laparoscopy versus open approaches.

Posters of Distinction – P015

IS THERE A DIFFERENCE IN ANASTOMOTIC COMPLICATIONS BETWEEN DIFFERENT GASTROJEJUNAL TECHNIQUES FOR GASTRIC BYPASS?, J Lau, T LaMasters, J Hagedorn MS, M Curet MD, B Safadi, J Morton MD, Stanford Department of Surgery

Background: Many surgical techniques have been successfully applied to the laparoscopic Roux-en-Y gastric bypass (RYGBP). The method of gastrojejunostomy (GJ) particularly the circular stapled approach has been linked to complications of the anastomotic site such as ulcer/stricture (U/S) and leak. Our study aim was to compare the incidence of these complications between the circular stapled (CS) and the hand-sewn (HS) techniques.

Methods: Single institution retrospective review was conducted for all patients undergoing laparoscopic RYGBP over a three year period with average follow up of 1.7 years. All surgeries were conducted by three fellowship trained surgeons. Patients were divided into two cohorts: gastrojejunostomy technique via transabdominal 25 mm EEA stapled (Ethicon Endosurgery) or two-layered hand-sewn. The incidence of ulcer, stricture and anastomotic leak were determined by retrospective chart review, upper GI series report, and endoscopic findings.

Results: 484 patients underwent laparoscopic RYGBP with-

out conversion (83% female, mean age 43, and mean BMI 49). There were 304 patients in the CS group and 180 patients in the HS group. The two patient groups were similar in age, gender and preoperative BMI. U/S developed in 10 (3.3 %) of the 304 patients in the CS group and in 7 (3.9%) of the 180 patients in the HS group (p<0.7343). Anastomotic leak developed in 4 (1.32%) of the patients in the CS group and in 2 (1.11%) of the patients in the HS group (p<0.18).

Conclusion: This large volume single institution experience indicates that the incidence of gastrojejunal ulcer, stricture or anastomotic leak is low overall without a difference between a circular stapled or hand-sewn gastrojejunostomy technique for laparoscopic RYGBP.

Posters of Distinction – P016

LYMPHATIC SPARING SURGERY FOR VARICOCELE IN ADOLESCENTS IS EFFECTIVE IN CONTROLLING HYDROCOELE DEVELOPMENT, Anies Mahomed MD, Simon Blackburn, Royal Alexandra Children's Hospital, Brighton, United Kingdom.

Background The standard laparoscopic Palomo technique for varicocele ligation has been associated with a post operative hydrocele rate of up to 31% in children. However, current laparoscopic technology allows for the exclusive ligation of spermatic veins preserving accompanying lymphatic channels. The impact of this modification on recurrence/persistence of varicocele and the development of post operative hydrocele are as yet not completely defined.

Aim To determine the incidence of persistent/recurrent varicocele and complicating hydrocele, following a lymphatic/spermatic artery sparing, modified laparoscopic Palomo procedure in children.

Method A prospective series conducted over 3 years on consecutive cases having laparoscopic varicocele surgery by a single surgeon. Patient demographic and outcome data were collected on a Microsoft Excel database and analysed. Technique: A transperitoneal approach using three 5mm ports were utilised -umbilical/camera with suprapubic and right iliac fossa working ports. The camera utilised was an integrated parfocal zoom lens f = 14-28mm (2x). Following peritoneal division the spermatic vein, exclusively, was isolated above the pelvic brim and controlled between Liga clips before division. The accompanying spermatic artery and lymphatics were preserved.

Results A total of 10 cases with mean age of 14.9 years underwent unilateral surgery over a 3 year period. There were no intraoperative complications and 7 were well enough for discharge on the day of surgery with the rest discharged the next morning. At a mean follow up of one year (SD 211 days) no patients experienced complicating hydroceles although a single patient had a persistent albeit reduced varicocele.

Conclusion Preliminary results of this study demonstrate that the incidence of hydroceles following a modified Palomo procedure (spermatic artery and lymphatic sparing) is markedly lower than that reported for other approaches. However the incidence of recurrent/persistent varicocele does not appear to be any different to that already reported for other approaches. The findings of this study would therefore support this subtle modification to the technique of varicocele surgery.

Posters of Distinction – P017

LAPAROSCOPIC CANNULATION: USE OF THE SAGES LEARNING CENTER TO VALIDATE A POTENTIALLY NEW FLS TASK, A L McCluney MD, M C Vassiliou MD, J Cao, P A Kaneva, D D Stanbridge RN, L S Feldman MD, G M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal, QC, Canada

SAGES Fundamentals of Laparoscopic Surgery (FLS) tasks are valid measures of technical skill. However post-test questionnaires of FLS subjects and interviews with experts identify laparoscopic cannulation as a clinically relevant skill not currently assessed by FLS. In this study, the validity of an FLS-compatible laparoscopic cannulation task (LCT) was



evaluated.

A 2x90 mm plastic tube, fixed at 45 degrees were used to approximate the common bile duct. The LCT requires subjects to insert a cholangiocatheter into the "duct" and remove it. Subjects viewed a LCT instructional video. A pilot study was conducted at our institution to determine scoring metrics and feasibility. During the 2006 SAGES Conference, additional subjects were tested at the Learning Center. In total, 140 subjects were tested: 44 novice (student/PGY 1-2), 25 intermediate (PGY 3-4) and 71 expert (PGY 5/fellow/attending) laparoscopic surgeons. A subset of 30 subjects also underwent FLS skill testing. ANOVA with posthoc analysis compared mean LCT scores across experience levels. Student t-test compared subjects from our institution (n=65) to those from the Learning Center (n=75). Correlations between LCT and FLS scores were analyzed with Pearson's coefficient. Receiver operator curves were used to determine the optimal pass-fail score for the LCT. Data are reported as mean±SD. Significance was defined as p<0.05.

Mean LCT scores increased with experience (p<0.01). Scores for novices (49±36) were significantly lower than those for intermediates (79±25) and experts (87±25). Intermediates and experts did not differ significantly. Novice and intermediate scores from the Learning Center were significantly higher than at our institution (novice: 73±36 vs. 41±32; intermediate: 93±12 vs. 68±27). Expert scores did not differ significantly at the two testing sites. Individual LCT scores correlate well (0.79) with FLS scores. A LCT pass-fail score of 86 maximizes sensitivity and specificity.

LCT distinguishes novices from other experience levels. Novice and intermediate subjects attending the 2006 SAGES Conference are likely interested in laparoscopy and thus outperform their more broadly selected colleagues from our institution. Individual LCT scores are predictive of FLS scores, and a LCT pass-fail score of 86 optimizes sensitivity and specificity. Overall, the LCT satisfies multiple criteria for validity as a test of laparoscopic skill, and as such, warrants consideration as a new FLS task.

Posters of Distinction – P018

FEASIBILITY OF TRANSRECTAL NATURAL ORIFICE TRANSLUMENAL ENDOSCOPIC SURGERY (NOTES) IN THE PORCINE MODEL, Michael F McGee MD, Jeffrey M Marks MD, Amitabh Chak MD, Raymond P Onders MD, Steve J Schomisch BS, Jaime M Andrews BS, Conor P Delaney MD, Case Medical Center, Case Western Reserve University, Department of Surgery, Department of Gastroenterology, Cleveland, Ohio, USA

BACKGROUND: NOTES access via a transrectal approach may be a beneficial alternative to transgastric approaches by providing superior visualization and eliminating need for endoscopic retroflexion. Transrectal NOTES may also introduce a second point for tissue retraction and triangulation when used in conjunction with transgastric NOTES. The optimal means of performing transrectal NOTES has not been described.

METHODS: Transrectal NOTES was performed in 6 pigs using various techniques to evaluate means of peritoneal access and closure. Using a rigid operating anoscope, 2 animals had a 1.5 cm transmural proctotomy made by conventional hand-held electrocautery which enabled peritoneal passage of a flexible endoscope. Transrectal NOTES access was achieved in 2 other animals by endoscopic balloon dilation over a transmural access wire. Finally, in 2 animals, an endoscopic needle-knife papillotome made a transmural incision enabling passage of the endoscope without dilation. Once feasibility of access was demonstrated, closure of the rectal defect was attempted. 2 animals had direct sutured closure under anoscopic visualization with a continuous absorbable suture. A third animal underwent closure with

the NDO Plicator, an endoscopic tissue plicating device.

RESULTS: In all animals, transrectal access was achieved quickly and easily without injury to adjacent organs. In the first 2 animals, a laparoscope was used to provide guidance until the learning curve was completed. In 2 subsequent animals, guidance was obtained with a transgastric NOTES endoscope and combined transgastric and transrectal NOTES cholecystectomy was performed. In the last 2 animals, the transrectal endoscope was passed directly into the peritoneal cavity without additional video guidance. Direct suture closure of the proctotomy was easily performed under anoscopic visualization and demonstrated negative leak tests in vivo. Endolumenal closure with the NDO Plicator was easily performed; however one small leak was present on ex vivo tissue examination.

CONCLUSIONS: Transrectal NOTES, either as a stand-alone procedure or combined with transgastric NOTES, is feasible and provides safe access to the peritoneal cavity. Closure of the proximal rectal NOTES access point can be done by hand with suture. Despite one small leak, Plicator closure of rectal defects is intuitive and promising. Additional survival studies are required to determine the long-term effects of transrectal NOTES.

Posters of Distinction – P019

INTRAOPERATIVE CHOLANGIOGRAPHY IN PERFORMANCE OF LAPAROSCOPIC CHOLECYSTECTOMY. SELECTIVE OR ROUTINE? OUR EXPERIENCES., Shahram Nazari MD, Semira Mousavi Khosroshahi MD, Abolfazl Jamalabasi MD, Milad Hospital

Background: 10% to 18% of patients undergoing cholecystectomy for gallstones have common bile duct (CBD) stones. In the performance of laparoscopic cholecystectomy (LC) diagnosis of such stones intra-operatively is a matter of debates. Treatment options for these stones include pre- or post-operative endoscopic retrograde cholangiopancreatography (ERCP) or open or laparoscopic surgery.

Selection Criteria: The inclusion criteria was cholelithiasis with normal liver function tests, no history of gallstone pancreatitis, common bile duct (CBD) diameter less than 10 mm in pre-operation ultrasonography and no previous history of jaundice.

Hypothesis and Aims: The aim of the present study was to show if intraoperative cholangiography (IOC) during LC can be safely omitted for all patients who fit standard criteria, namely normal liver function tests, no history of gallstone pancreatitis, common bile duct (CBD) diameter less than 10 mm or no previous history of jaundice (1-4-5-8).

Some investigators believe that routine IOC in the performance of Laparoscopic Cholecystectomy must be done and they state that with this tool they reduced intra and post operative complications (6-11-12). In this prospective study we evaluate the role of IOC for patients undergoing LC to determine whether it could be safely omitted for all patients who fit our standard criteria (4-5-7-24-26).

Patients, Data Collection and Analysis: Data were collected prospectively from 277 consecutive patients who had LC for symptomatic gall bladder disease. The patients who were fit with our standard criteria grouped in 2 different groups. In every 2 groups, the patients have normal liver function tests, no history of gallstone pancreatitis, and common bile duct (CBD) diameter less than 10 mm or no previous history of jaundice. Then randomly in one group (Group A) intraoperative cholangiography was done and in the second group (Group B) intraoperative cholangiography was not done.

Main Results: This study confirms one CBD retained stone (0.36%) and no CBD injury among patients who fit our criteria.

Authors' Conclusions: Our experience demonstrates that LC performed without routine IOC does not result in an increased incidence of retained stones in selected patients.



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Posters of Distinction – P020

SAFE COMBINED PLACEMENT OF THE LAPAROSCOPIC DIAPHRAGM PACING STIMULATION SYSTEMS(DPS) AND PERCUTANEOUS ENDOSCOPIC GASTROTOMY(PEG) TUBES: RESULTS OF A PHASE ONE STUDY IN AMYOTROPHIC LATERAL SCLEROSIS(ALS), Raymond P Onders MD, MaryJo Elmo RN, Bashar Katirji MD, Robert Schiltz DO, Anthony R Ignangi MS, Case Medical Center of University Hospitals of Cleveland

Background: ALS (Lou Gehrig's Disease) is a progressive neurodegenerative disease affected 6,000 patients annually and respiratory failure is the usual cause of death. The laparoscopic DPS system has been shown to be 96% effective in replacing mechanical ventilation in spinal cord injured patients. The DPS system is being evaluated in ALS patients to decrease the decline in forced vital capacity (FVC) and delay the need for ventilators. ALS patients become malnourished because of progressive bulbar symptoms leading to a need for enteral access. The goal of this study is to assess the surgical outcomes of patients undergoing combined laparoscopic DPS placement and PEG tubes.

Methods: Patients who met FDA and IRB approved criteria for the DPS system and also required a feeding tube were evaluated. Patients underwent laparoscopic mapping of their diaphragm to locate the phrenic nerve motor points with two electrodes implanted in each hemidiaphragm. The electrodes are a teflon coated double helix of fourteen stainless steel strands that allow tissue ingrowth. The electrodes leave the abdominal cavity in the epigastric area and are tunneled to a percutaneous exit site on their right chest. Patients then underwent PEG tube placement.

Results: Eleven ALS patients underwent DPS placement with an average FVC of 57% predicted at time of surgery. One patient had a PEG prior to DPS and this was excluded from the field for DPS placement. One patient had a PEG placed after the DPS with no compromise of the abdominal wires. 5 patients underwent combined DPS and PEG placement. There were no operative adverse events with the combined placement and with an average follow-up of 8.5 months no patients developed any wire infections. In post-implant data after conditioning the diaphragm with the DPS, patients show an average rate of decline in FVC of 1% per month from the pre-implantation decline of 3.1% a month, which extrapolates to an additional 20 months of ventilator free survival for these patients.

Conclusion: ALS patients are at a surgical risk because of their declining respiratory function with reported morbidity from PEG alone. This study confirms that these patients can undergo combined placement of the DPS system during a clean-contaminated PEG decreasing the possible need for two surgical procedures. The lack of infection also opens the possibility that the DPS system could be implanted with NOTES techniques at the same time as a PEG.

Posters of Distinction – P021

PROPHYLACTIC PLACEMENT OF REMOVABLE INFERIOR VENA CAVA FILTERS IN PATIENTS UNDERGOING GASTRIC BYPASS FOR MORBID OBESITY., David W Overby MD, Timothy M Farrell MD, University of North Carolina, Chapel Hill, Department of Surgery, Chapel Hill, NC, USA

INTRODUCTION Postoperative Venous Thromboembolism (VTE), including Deep Vein Thrombosis (DVT) and subsequent Pulmonary Embolism (PE), continues to be a leading cause of death in patients treated surgically for morbid obesity. Still, there remains little evidence regarding the risks, benefits, and cost-effectiveness of VTE prophylaxis strategies to guide bariatric surgeons. Given the recent availability of new technology in the form of removable Inferior Vena Cava Filters (IVCF), we developed protocols that included selective prophylactic placement in 110 of our Gastric Bypass (GB) patients since September 2003.

METHODS We performed a retrospective chart review of 288 morbidly obese patients undergoing GB between 1/2001 and 9/2006 to determine patient characteristics, as well as outcomes including mortality, VTE, DVT, and PE rates.

Beginning 9/15/2003, we implemented selective prophylactic IVCF (P-IVCF) placement, along with screening lower extremity CT angiogram prior to filter removal, in patients deemed to have an increased risk of VTE. We determined rates of P-IVCF placement, removal and complications, and compared patients who had P-IVCF to those who had not using the 2-tailed Fisher's exact test.

RESULTS 288 morbidly obese patients (mean BMI 50.4 kg/m², range 35.4-86.4) underwent GB with 87% being laparoscopic, 8% open-redo, and 5% open primary. 7 deaths occurred from all causes within one year of GB (2.4%). 1 death (0.35%) was definitely attributed to PE. Of 288 patients, 110 (38.2%) had P-IVCF, but all of these were implanted in the 183 patients since 9/15/03 giving a rate of 60.1% for our P-IVCF experience to date. 1 complication (0.9%) resulted from P-IVCF placement. 5 of 178 patients (2.8%) without P-IVCF had VTE events, compared with 7 of 110 (6.4%) with P-IVCF (p=0.22). 2 of 178 (1.1%) patients without P-IVCF had DVT vs. 7 of 110 (6.4%) with P-IVCF (p=0.03). 4 of 178 (2.24%) without P-IVCF had PE vs. 0 of 110 with P-IVCF (p=0.30). The overall PE rate was 1.4%.

CONCLUSIONS IVC filters are safe and effective means for prophylaxis against PE after GB for morbid obesity. Complications are rare. Most filters can be removed when surgery-associated VTE risks are past. In this series of high-risk patients, placement of prophylactic IVC filters was associated with a trend toward fewer PE's, despite the higher number of DVT's seen by routine CT scan prior to filter retrieval.

Posters of Distinction – P022

FUNDAMENTALS OF LAPAROSCOPIC SURGERY (FLS) SKILLS TRAINING IS APPROPRIATE FOR SENIOR MEDICAL STUDENTS ENTERING SURGICAL RESIDENCY, Richard A Pierce MD, Debra Tiemann RN, Brent D Matthews MD, L. Michael Brunt MD, WASHINGTON UNIVERSITY SCHOOL OF MEDICINE, ST. LOUIS, MO

Introduction: Laparoscopic skills training is often reserved for residents with substantial exposure to open surgical techniques. We examined the ability of senior medical students (MS) matched in a surgical specialty to perform the skills tasks of the Fundamentals of Laparoscopic Surgery (FLS) program developed by SAGES.

Methods: Seven 4th year MS matched in a surgical residency were instructed in the FLS drills as a part of a skills preparation course for surgical internship. The FLS skills exam was administered within 7 days (pre-test) of a 2.5 hour instructional session and again 5 weeks later (post-test) after independent practice and one additional 45 min instruction session. Tests were administered by an FLS approved proctor and were scored by standard FLS criteria (passing score 54). Test results were compared using Wilcoxon matched-pairs analyses (p <0.05 significant).

Results: Mean pre- and post-test times (seconds) and scores for each FLS task are shown in the table (suture 1 = extracorporeal, suture 2 = intracorporeal). Improvement for each task was seen but the degree of improvement was significant for the PEG transfer times only. Average total time to complete the 5 tasks was 1036 ± 364 sec pre vs 769 ± 269 sec post and mean composite test scores were 50.8 ± 19 pre vs 67.2 ± 18 post (both p<0.05). All but one student showed improvement in composite post-test scores (p=NS). Two students achieved passing scores on all 5 tasks and 2 other students passed 4 of 5 tasks. Practice time ranged from 45-315 minutes (mean 139 min). The two lowest scoring students also logged the least amount of individual practice time (45 and 60 min).

Task	Peg	Cutting	Endoloop	Suture 1	Suture 2
Time Pre	121 ± 38	203 ± 68	125 ± 16	298 ± 158	291 ± 133
Time Post	100 ± 50*	160 ± 48	100 ± 38	199 ± 63	211 ± 134
Score Pre	74 ± 16	35 ± 20	38 ± 12	48 ± 39	58 ± 27
Score Post	84 ± 24	49 ± 18	56 ± 27	73 ± 23	75 ± 26

* p<0.05

Conclusion: Training in FLS skills, including laparoscopic suturing, is feasible for 4th year medical students entering



surgical residency. FLS skills training should be integrated into skills training curricula earlier than is practiced in most residency programs, including at the senior medical student level.

Posters of Distinction – P023

EFFECT OF CARBON DIOXIDE PNEUMOPERITONEUM ON HEPATIC TISSUE PERFUSION, Gerry N Polytronopoulos MD, Liane S Feldman MD, Sebastian V Demyttenaere MD, Anthony McCluney MD, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal, Quebec, Canada.

INTRODUCTION: While pneumoperitoneum (PP) consistently decreases renal perfusion, previous studies examining the relationship between PP and hepatic tissue perfusion (HTP) have yielded conflicting results. The aim of this study was to assess the effect of carbon dioxide (CO₂) PP on HTP in a porcine model.

METHODS: Eight female pigs were anesthetized and ventilated. Catheters were inserted in the external jugular vein and carotid artery to monitor central venous pressure (CVP) and blood pressure; cardiac output (CO) and stroke volume (SV) were measured using esophageal Doppler. HTP was measured with a laser Doppler probe laparoscopically placed on the left medial lobe of the liver. In each pig, 20-minute intervals without PP preceded 30-minute periods of CO₂ PP to 8, 12 and 16 mmHg. Paired t-test was used to compare HTP at the end of each control period to that at the end of each corresponding period of PP. The primary measure of interest was HTP. Secondary measures of interest included CO, SV, CVP, and end-tidal CO₂ (ETCO₂). A p-value of <0.05 was considered statistically significant.

RESULTS: There was no significant difference between the baseline HTP and the HTP measured following an increase in PP to 8 (37.8 to 36.3 tissue perfusion units (tpu), p=0.48), 12 (36.7 to 38.2 tpu, p=0.64) or 16 mmHg (34.6 to 35.9 tpu, p=0.82). There was also no significant change in CO or SV when the PP was increased from baseline to 8, 12, or 16 mmHg. There was a significant increase in CVP between each baseline and corresponding level of increased PP to 8 (10 to 13 mmHg, p<0.001), 12 (10 to 14 mmHg, p<0.001), or 16 mmHg (10 to 16 mmHg, p<0.001). There was also a significant increase in ETCO₂ between each baseline and corresponding level of increased PP to 8 (30 to 36 mmHg, p=0.017), 12 (31 to 37 mmHg, p=0.001), or 16 mmHg (31 to 41 mmHg, p=0.01).

CONCLUSIONS: Our study findings suggest that in a porcine model, CO₂ pneumoperitoneum to 16 mmHg does not significantly impair hepatic tissue perfusion.

Posters of Distinction – P024

TRANSAXILLARY ENDOSCOPIC THYROIDECTOMY FOR MULTINODULAR GOITER: A NEW APPROACH TO AN OLD DISEASE, Qammar Rashid MD, Titus Duncan MD, Ijeoma Ejeh MD, Fredne Speights MD, Department of Surgery, Morehouse School of Medicine Atlanta, Georgia

Introduction: Multinodular goiters are most often managed medically. Indications for surgical intervention are compressive symptoms, malignancy, and cosmesis. The typical incision of an open approach is large and obvious in a highly visible area of the neck. Endoscopic procedures of the neck to approach the thyroid and parathyroid gland have been previously described by others. We describe our experience using a transaxillary endoscopic approach to perform a near total thyroidectomy for multinodular goiter.

Methods and Procedures: Between December 2004-February 2006 we performed transaxillary endoscopic thyroidectomies in 6 patients requiring surgical intervention for the treatment of multinodular goiter. Three 5-mm trocars were placed in the right anterior axillary line in a supine patient. Sharp dissection was accomplished above the pectoralis major muscle toward the ipsilateral thyroid gland. The ipsilateral gland was excised, and then the contralateral gland was approached and excised taking care to identify and protect all vital structures. A drain was left in the area of dissection for 48 hours.

Results: The mean age of patients was 43 years (range 20 - 61). The average size of the resected gland was 78 gm (range 37 - 130 gm). Three patients had follicular hyperplasia on final pathologic exam. Two patients had nodular hyperplasia, and one patient had nodular hyperplasia with follicular thyroiditis and microinvasive papillary carcinoma. A near total thyroidectomy was completed in all patients. The recurrent laryngeal nerve (RLN) and parathyroid glands were visualized in all patients. There were no injuries to the RLN, and no patient suffered from postoperative hypocalcemia.

Conclusion: The benefits of endoscopic surgery of the neck (ie improved visualization, cosmesis, and recovery) have been well documented. Because the transaxillary approach is typically reserved for patients harboring unilateral thyroid disease, surgical excision for multinodular goiter has not been previously described using this technique. This study shows that adequate visualization of both ipsilateral and contralateral structures can be adequately visualized and preserved using this approach. We conclude that transaxillary near total thyroidectomy for patients with indication to undergo surgery for multinodular goiter is a safe and feasible alternative to the open cervical approach.

Posters of Distinction – P025

CONVERSION RATES IN LAPAROSCOPIC COLECTOMY AFTER PREOPERATIVE ENDOSCOPIC TATTOOING., Christina Seo MD, Sanjay Jobanputra MD, Jill Genua MD, Susan Cera MD, Dana R Sands MD, Eric G Weiss MD, Juan J Noguerras MD, Steven D Wexner MD, Cleveland Clinic Florida, Weston, Florida

Background: Preoperative tattooing is a common practice for nonpalpable endoscopically irretrievable colonic pathology. While useful in intraoperative localization of these lesions, the correlation of preoperative endoscopic inking among laparoscopic findings and surgical conversion rate has not been defined. Methods: 32 consecutive patients were identified retrospectively from the prospective departmental operative database between September 2002 and July 2006 with lesions that had been preoperatively endoscopically tattooed to facilitate laparoscopic colectomy.

Results: In 17 cases, the endoscopist and the surgeon were the same (ESS), whereas in the other 15 cases the endoscopist and colorectal surgeon were different (ESD). The tattoo was laparoscopically found in 69% (n=22) of the total. 76% (n=13) of patients in the ESS group had positive laparoscopic ink findings versus 60% (n=9) in the ESD group. Only one of the patients in whom the ink was intraoperatively identified required conversion secondary to failure to progress. 5 of 10 patients in whom the tattoo was not clearly identified required conversion to laparotomy (p= 0.0014).

Conclusions: The ability to intraoperatively identify the operatively applied tattoo was a significant predictor of the success of laparoscopy. There was no correlation between the endoscopist who performed the tattoo and the need for conversion.

Posters of Distinction – P026

PREVALENCE OF INTERNAL HERNIAS AFTER LAPAROSCOPIC COLORECTAL RESECTION, Stefano Sereno MD, Mehran Anvari PhD, Joel Leroy MD, Jacques Marescaux MD, IRCAD-EITS, University Louis Pasteur, Strasbourg, France

INTRODUCTION Laparoscopic approach for colorectal resections is gaining popularity. Internal small bowel herniation (SBH) through a mesenteric defect has been described and although rare is a severe complication. The aim of this study was to evaluate the incidence and outcome of internal hernias after laparoscopic colorectal resection.

PATIENTS AND METHODS During a 5 years period, all patients who underwent laparoscopic left colon resection were included in the study. A retrospective data base query was performed searching for all patients in whom SBH required surgical reintervention.

RESULTS A total of 436 laparoscopic left colorectal resections were performed from January 2000 to July 2006. Five



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male patients presenting a symptomatic internal hernias required re-operation. Four had a resection for cancer (2 rectal resections, 1 sigmoidectomy and 1 extended left colectomy), and one for sigmoiditis. The mesenteric defect was not initially closed in three cases, closed with staples in one and sealed with Ligasure[®] device in one. The initial presentation was intestinal obstruction in four cases and shock in one. Time from first surgery to re-operation varied from 2 to 13 days.

In all cases we found small bowel hernias through the mesocolon defect. One patient had also a perforation of the small bowel and the colon. The treatment always consisted in reduction of the hernia. A terminal ileostomy was performed in 2 patients. Mean hospital stay was 19 days (range 8-30 days). One patient was re-operated on po day 2 for mesenteric ischemia and died after 24 hours.

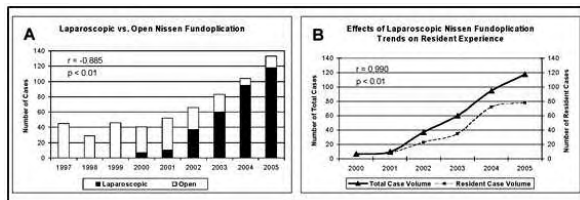
DISCUSSION Internal hernia is a rare but fatal complication after laparoscopic colonic resection. Suspicion of this diagnosis requires emergency re-operation because symptoms are non specific. All mesenteric defects created during colorectal laparoscopy surgery should be meticulously closed.

Posters of Distinction – P027

EVALUATING THE IMPACT OF A MINIMALLY INVASIVE PEDIATRIC SURGEON ON HOSPITAL PRACTICE AND RESIDENT TRAINING, Sohail Shah MD, Alexander Feliz MD, Rahul Anand MD, Katherine Bartsness MD, Douglas Potoka MD, Barbara Gaines MD, George Gittes MD, Timothy Kane MD, University of Pittsburgh Medical Center, Children's Hospital of Pittsburgh

We hypothesized that a pediatric surgeon committed to minimally invasive surgery (MIS) could effectively change hospital practice by creating an emphasis on MIS that would increase hospital volume and enhance resident training. Annual case volume from 1997-2005 at a tertiary pediatric hospital, with a minimally invasive pediatric surgeon as of 2001, was evaluated for trends in MIS for 10 different operations. The hospital MIS volume was then compared to the resident MIS case logs for each procedure from 2000-2005. Statistics were generated using Pearson correlation. The total hospital volume showed a statistically significant negative correlation between MIS and open surgery for all 10 case-types, indicating a strong trend toward increasing MIS (Figure A shows Nissen fundoplication as an example: $r = -0.885$, $p < 0.01$). As the number of MIS cases increased within the hospital there was a positive correlation in the resident MIS experience (Figure B shows Nissen fundoplication as an example: $r = 0.990$, $p < 0.01$).

The study demonstrates that upon arrival of a dedicated minimally invasive pediatric surgeon there was a significant change in hospital practice, with an overall trend of increasing MIS. This trend also translated into greater resident experience in minimally invasive pediatric surgery.



Posters of Distinction – P028

LAPAROSCOPIC VERSUS OPEN EMERGENCY APPENDICECTOMY- LENGTH OF HOSPITAL STAY IN ENGLAND 2000-2004, S.L Singer, A A Al-Sarira, G G David, M Deakin, S N Selvachandran MD, D Cade, Department of General Surgery, Leighton Hospital, Crewe, U.K. ; Department of General Surgery, University Hospital of North Staffordshire, Stoke on Trent, U.K.

Introduction: Emergency appendicectomy is a common surgical procedure. It can be performed as open or laparoscopic procedure. Many studies have been published comparing the advantages of one over the other based on findings

from a single site. These studies have shown post-operative hospital stay is reduced for laparoscopic appendicectomy. However, little data has been published from the UK on this subject. We set out to investigate whether length of postoperative hospital stay is reduced for laparoscopic as compared to open appendicectomy.

Methods: Hospital Episode Statistics (HES) data for the financial years 2000-2001, 2001-2002, 2002-2003 and 2003-2004 were obtained from the Department of Health and were analysed using Microsoft Access. Data from all patients undergoing emergency appendicectomy as primary operative procedure, as identified by OPCS-4 code H01 were included. Laparoscopic and laparoscopic converted to open procedures were identified by secondary operative codes Y508 and Y718 respectively.

Results: In the 4-year period 135848 emergency appendicectomies were identified. The proportion of patients who had attempted laparoscopic appendicectomy was 8588 (6.3%), this proportion increased significantly from 4.2% in 2000/01 to 9.1% in 2003/04 ($P < 0.001$). Laparoscopic appendicectomy was more frequent in female as opposed male patients 9.1% to 3.9% respectively ($P < 0.001$). The median age of the study population was 23 years (Inter quartile range (IQR) 14 - 37 years) and there was a significant difference between the median age of open and laparoscopic groups 23 years (IQR 14 - 37 years) vs 25 years (IQR 18 - 38 years) ($P < 0.001$). The median post-operative hospital stay was reduced by one day when appendicectomy was done laparoscopically - 2 days (IQR 2 - 4 days) compared to open appendicectomy - 3 days (IQR 2 - 4 days) ($P < 0.001$).

Conclusions: Over the four-year period studied, use of laparoscopic appendicectomy has increased. It is more likely to be performed in women as compared to men. Length of hospital stay post-operatively is reduced following laparoscopic appendicectomy.

Posters of Distinction – P029

THE USE OF EPIDURAL ANALGESIA IN LAPAROSCOPIC COLORECTAL SURGERY, Angela J Skull MD, Henry M Dowson MD, Sarah Burton MD, Timothy A Rockall MS, Minimal Access Therapy Training Unit, Royal Surrey County Hospital, Guildford, UK

Introduction and Objective: Enhanced recovery programmes are increasingly being utilised in colorectal surgery. Epidural analgesia is one of the key features of these programmes. However the continued use of epidurals in laparoscopic surgery is open to question. The aim of this study was to evaluate the role of epidural analgesia in laparoscopic surgery.

Methods: A prospective database was established for all laparoscopic colorectal resections. Data were collected between January 2004 and July 2006 on anaesthetic and perioperative factors, in-hospital stay, and complications. Use of epidural analgesia in our unit was determined by the preference of individual anaesthetists. Outcomes of patients with epidural analgesia were compared with those who had alternative forms of analgesia.

Results: 222 patients underwent laparoscopic colorectal resections, of whom 46 had an epidural. There was no significant difference between the groups in terms of age, sex, and operation type. There was a significant difference between the epidural and no epidural groups with regards to the length of anaesthetic time (38 v 25 minutes, $p = 0.001$) and length of post-operative stay (7.13 days v 4.8, $p = 0.007$). There was no significant difference in the complication rates between the groups.

Conclusion: Our data suggests that epidural usage delayed patient discharge and therefore should not play a key role in enhanced recovery programmes in laparoscopic surgery.



Posters of Distinction – P030

EFFECT OF PREVIOUS ABDOMINAL SURGERY ON LAPAROSCOPIC COLORECTAL SURGERY, H Tomioka MD,S

Yamaguchi PhD,H Morita MD,M Ishii MD,S Saitou PhD,Y Kinugasa MD,S Akamoto MD,K Morimoto MD,T Okumoto MD,H Hazama MD, Department of Colorectal Surgery, Shizuoka Cancer Center Hospital, Japan

INTRODUCTION. This study aimed to investigate the effect of previous surgery on laparoscopic colorectal surgery.

METHODS. In this study, we examined 271 patients who underwent laparoscopic colorectal surgery between September 2002 and December 2005. All 271 patients were classified into 7 groups according to laparoscopic procedure (ileocecal resection, 30 cases; right colectomy, 41 cases; transverse colectomy, 20 cases; left colectomy, 22 cases; sigmoid colectomy, 43 cases; high anterior resection, 71 cases; low anterior resection, 44 cases). In each of 7 groups, patients were classified into 3 subgroups according to previous surgical procedures (appendectomy or other operations), previous surgical locations (upper abdomen or lower abdomen), and previous surgical frequency (0-2 times), and surgical outcomes in each of 3 subgroups were compared regarding to duration of surgery, blood loss, length of the hospital stay, diet start, and complications (ileus, leakage and wound infection). The chi-squared test or Fisher's exact test were used to compare proportions, and the Mann-Whitney U test or the Kruskal-Wallis test were used to compare continuous variables. $P < 0.05$ was considered significant.

RESULTS. There was no statistical difference in overall patient with or without previous abdominal surgery. Only in the subgroup of previous surgical locations in the high anterior resection group, there were statistical differences in blood loss (the group without previous surgery, 13 g; the group with previous upper abdominal surgery, 44.5 g; the group with previous lower abdominal surgery, 24 g) and ileus (the group without previous surgery, 0%; the group with previous upper abdominal surgery, 0%; the group with previous lower abdominal surgery, 12.5%).

CONCLUSION. Previous abdominal surgery is not a contraindication for laparoscopic colorectal surgery. However it was suggested that high anterior resection was high risk of bleeding and ileus.

Posters of Distinction – P031

EFFECT OF VIRTUAL REALITY TRAINING BY NOVICES ON LAPAROSCOPIC CHOLECYSTECTOMY IN A PORCINE MODEL, Nancy J Hogle MS, Akuezunkpa O Ude MD,Dennis L Fowler MD, College of Physicians and Surgeons, Columbia University, New York, NY

Intro: The purpose of this study is to determine whether training on a surgical simulator results in improved operative performance during laparoscopic cholecystectomy (LC) in an animal model.

Methods: 21 surgery interns completed LC in a pig on the first day of internship. To create a baseline score against which improvement could be measured, an experienced laparoscopic surgeon evaluated and quantified each intern's performance. A validated global assessment tool was used to grade each subject's performance on a scale of one (poor) to five (excellent) in five domains: depth perception, bimanual dexterity, efficiency, tissue handling and autonomy. The interns were then randomized to Group A (train to criteria on a laparoscopic simulator [LapSim® Surgical Science Ltd., Göteborg, Sweden]) and Group B (no training). After completing the trial period of 6 weeks, each intern completed another LC in a pig and was again evaluated. Within each group, the mean pre-training scores for each domain were compared with the mean post-training scores for each domain using a non-paired t-test.

Results: Pre-/Post-Training Scores for each Domain for each Group

	Depth Perception	Bimanual Dexterity	Efficiency	Tissue Handling	Autonomy
Group A	2.30/2.00	1.90/2.45	2.00/2.70	2.40/2.80	2.30/2.90
p	0.04	0.13	0.09	0.30	0.13
Group B	2.09/2.45	1.82/2.27	2.36/2.36	2.36/2.55	2.36/2.55
p	0.29	0.27	0.91	0.36	0.59

Conclusions: The interns who trained scored higher and showed greater improvement in all domains than those who did not train, but the only statistically significant improvement was in the domain of Depth Perception. These results suggest that training on the simulator has predictive validity for improving intraoperative performance.

Posters of Distinction – P032

HOW MANY ESOPHAGEAL CANCERS NEED TO BE PREVENTED TO MAKE ABLATION OF BARRETT'S ESOPHAGUS COST-EFFECTIVE?, Vic Velanovich MD, Henry Ford Hospital

Background: Barrett's esophagus increases the risk of developing esophageal adenocarcinoma. Because of this increased risk, strategies for management have generally centered on close surveillance to identified malignancies at an early stage. An alternative strategy would be to ablate the Barrett's mucosa in order to prevent cancers occurring to begin with. However, there is concern that many patients would be treated in order to prevent a few cancers. The purpose of this study was to determine how many cancers need to be prevented to make ablation cost-effective.

Methods: Assumptions: Incidence of the development of esophageal adenocarcinoma in patients with Barrett's esophagus is 0.5%/yr. The cost of ablation using the Barrx system (Barrx Medical Inc., Sunnyvale, CA) is \$3,642. The hospital cost of an esophagectomy is \$45,600. The median income of the USA is \$46,242. The life expectancy of a 40 year old is 38.5 years (working life 25 years), a 50 year old is 29.5 years (working life 15 years), and a 60 year old 21.3 years (working life 5 years).

Results: For every 1,000 patients with Barrett's esophagus ablated using the Barrx device, from the standpoint of prevention of esophagectomies, 80 cancers need to be prevented to make Barrett's ablation cost effective. If ablation completely eliminates the risk, this will be obtained within 17 years after ablation. From the standpoint of patient earning power: for every 1,000 40 year olds, 3 cancers need to be prevented (achieved after 1 year); for every 1,000 50 year olds, 5 cancers need to be prevented (achieved after 1 year); for every 1,000 60 year olds, 16 cancers need to be prevented (achieved after 3 years).

Conclusions: Using real cost incurred due to esophagectomy, 80 cancers prevented in 1,000 initially treated patients would make ablation cost-effective. This is achieved within 17 years of the ablation, which is within the average life expectancy of the United States population up to the age of 60 years. When assessing lifetime income loss, many fewer cancers need to be prevented in order to make ablation worthwhile.

Posters of Distinction – P033

PATIENT PERCEPTIONS OF NATURAL ORIFICE TRANSLUMINAL SURGERY (NOTES), Eric T Volckmann MD, Eric S

Hungness MD,Nathaniel J Soper MD, Lee L Swanson MD, Northwestern University Feinberg School of Medicine and Legacy Health System Departments of Surgery

Introduction: Natural Orifice Transluminal Endoscopic Surgery (NOTES) has captured the imagination of surgeons and interventional gastroenterologists. Its possible advantages are theoretical and there are many developmental and perceptual hurdles to overcome. As public attitude toward NOTES will influence its adoption, our aim was to assess patients' opinions regarding NOTES.

Methods: A 58 item survey was administered to 192 sequential patients at 2 busy surgery clinics. The basic concepts of NOTES and laparoscopic surgery (LS) were described along with an example case. Patients were then asked to rate the importance of various aspects of surgical procedures and to decide whether they would prefer cholecystectomy (chole) by NOTES or LS, and why.



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Results: Forty-nine percent of patients were male, the mean age range was 50-59 yo, 64% were employed, 79% had some college education, 60% had prior flexible endoscopy (FE), 52% had prior LS and 48% had previous open surgery (OS). Subjects considered the risk of having a complication, recovery time, and amount of postoperative pain to be more important than cosmesis, cost, length of hospital stay (LOS), or anesthesia type (all $p < 0.001$). Patients perceived NOTES to be associated with less pain, cost, risk of complications, and recovery time while also requiring more surgical skill than either OS or LS (all $p < 0.04$). In the hypothetical chole, 56% of respondents preferred NOTES and 44% chose LS. For patients who did not choose NOTES, reasons were that NOTES was too risky (35%), too new (35%), had no advantages over LS (22%) or simply that the concept was not appealing (36%). Patients who attended college were more likely to choose NOTES, and patients ≥ 70 years old or who had undergone FE were less likely to select NOTES (all $p < 0.04$). Although 80% of patients would still prefer NOTES if it was 1% riskier than LS, only 18% would choose NOTES if it had a 10% complication risk. NOTES preference also decreased as hospital distance and cost increased and as surgeon experience decreased (all $p < 0.001$).

Conclusion: When offered a choice, the majority of patients prefer cholecystectomy by NOTES. This is particularly true when patients are younger, have more education, and have not had prior FE. When comparing operations, procedure-related risks, pain, and recovery time are more important than cosmesis, cost, LOS, or anesthesia type. Patients are willing to accept some increased risk for NOTES, but are less willing to accept NOTES as the risks and cost increase and as surgeon experience and procedure availability decrease.

Posters of Distinction – P034

DYNAMIC DECISION MAKING RESEARCH IN LAPAROSCOPIC CHOLECYSTECTOMY, Dawit Worku MD, Bijendra Patel, S Sarker, St. Bartholomew's and The London School of Medicine and Dentistry

Over the last two decades, laparoscopic cholecystectomy (LC) has gained worldwide acceptance and considered as "gold standard" in the surgical management of symptomatic cholelithiasis. Despite the expertise gained in performing the procedure, complications such as bile duct injuries continue to occur at unacceptable rates. Understanding the decision process involved in LC is believed to ameliorate some of the errors associated with the procedure. Using methodologies of Naturalistic Decision Making (NDM) (Hierarchical Task Analysis (HTA), Cognitive Task Analysis, Direct Observation, Interface Survey), 12 laparoscopic cholecystectomy procedures were analyzed while being carried out by 4 consultant surgeons and 4 Registrars (equivalent of senior resident). The aims of the study were to analyse the dynamic decision making process involved in LC, identify mental models utilized by surgeons performing the procedures and suggest decision support techniques and technologies. HTA of LC was carried out. Performances of the Consultant surgeons and Registrars were compared using a valid global scoring system for generic and specific technical skills. Situation Awareness (SA) and Recognition-Primed Decision (RPD) have been identified as plausible mental models used by surgeons performing LC. Five types of skills involved in performing LC have been identified and relevant training strategies suggested. Five principal stages of skill acquisition have been discussed. The need for additional decision support technique and technologies to the already existing one, for use in difficult cases and by inexperienced surgeons, have been highlighted and potential decision aids suggested. In conclusion, Dynamic Decision Making (DDM) research applying the techniques of NDM studies can produce useful information helpful in tailoring surgical training to needs and suggesting decision support techniques and technologies.

Posters of Distinction – P035

LAPARO-ENDOSCOPIC BOWEL RESECTION: A HYBRID PROCEDURE FOR FUTURE TRANSGASTRIC SURGERIES, Yassar K Youssef MD, Alfonso Torquati MD, Erik Hansen MD, William O Richards, Vanderbilt University Medical Center

Background: Endoluminal and transgastric interventions are newly evolving techniques, and the transgastric approach to the peritoneal cavity for diagnostic and therapeutic purposes including liver biopsies, manipulation of intra-abdominal organs, gastro-jejunostomy, ligation of fallopian tubes and transgastric cholecystectomy have been previously demonstrated. The aim of this study is to develop the technique of transgastric removal of abdominal organs as a hybrid procedure of laparoscopic and transgastric surgery.

Methods: Laparoscopic colectomy or enterectomy was performed in 7 dogs. The animals were fasted for 24 hours before the procedure except for water access. All procedures were performed under general anesthesia. A segment of colon (~15 cm) or small bowel (~25 cm) was resected laparoscopically. The bowel segment was secured in and Endo-catch bag. Transoral gastroscopy was then performed with subsequent laparoscopic gastrotomy and passage of the endoscope into the peritoneal cavity. The Endo-catch bag was tied to an endoscopically placed endo-loop and the specimen was removed with the endoscope via the mouth. No incision larger than 12 mm was required. The gastrotomy was closed laparoscopically followed by repeat endoscopy to rule out any immediate complication.

Results: Seven dogs were included in the study. Laparoscopic colectomy was performed in 3 and enterectomy in 4 animals. The first animal was done laparoscopically and converted to open for education and quality control. The average time of the procedure was about 2 hours. All specimens were successfully removed thru the mouth with no evidence of any immediate complications noted on upper endoscopy following the procedure. All specimens were examined and there was no gross pathological distortion.

Conclusions: Laparo-Endoscopic bowel resection is a hybrid procedure that allows the removing of some abdominal organs and specimens without the need for an open incision for retrieval. This study demonstrated that transgastric removal of bowel is technically feasible.

Bariatric Surgery – P036

ROUX LIMB OBSTRUCTION SECONDARY TO CONSTRICTION AT TRANSVERSE MESOCOLON AFTER LAPAROSCOPIC RETROCOLIC ROUX-EN-Y GASTRIC BYPASS (LRYGB), Ahmed R Ahmed MD, Gretchen Rickards, Syed Husain MD, Joseph Johnson MD, Thad Boss MD, William O'Malley MD, University of Rochester Medical Center

INTRODUCTION: Partial small bowel obstruction can occur as a result of thickened cicatrix formation causing circumferential extrinsic compression of the retrocolic Roux limb as it traverses the transverse mesocolon. This study examines the incidence of this complication with particular attention to the timing of presentation and associated weight loss. Small bowel obstruction is a recognized complication of laparoscopic gastric bypass occurring in up to 4% of patients undergoing surgery. Causes include internal herniation, postoperative adhesive bands, anastomotic strictures and incarcerated incisional hernias. A series of 20 patients who underwent surgery for small bowel obstruction at the transverse mesocolon rent after retrogastric, retrocolic laparoscopic gastric bypass is presented. 18/20 cases underwent Upper GI contrast study which confirmed the diagnosis. In all cases, laparoscopic intervention succeeded in releasing the constricted Roux limb.

METHODS: A retrospective chart review was performed of all patients undergoing LRYGB who developed symptomatic small bowel obstruction requiring operative intervention between Jan 1 2000 and September 15 2006.

RESULTS: see Table below.

CONCLUSION: Narrowing at the transverse mesocolon rent is an uncommon cause of small bowel obstruction after laparoscopic retrocolic Roux-en-Y gastric bypass. Unlike



internal hernias which tend to occur later in the clinical course and are associated with significant weight loss, roux limb obstruction caused by transverse mesocolon stricture occurs earlier after gastric bypass and is not associated with significant weight loss.

Roux limb constriction

Incidence	20/2215 (0.9%)
Days post LRYGB	49+/-6 (35-61)*
Wt loss (kgs)	19+/-2 (15-23)*
%EBWL	29+/-2 (24-33)*

() * = 95% conf intervals, p<0.01

Bariatric Surgery – P037

CHOLECYSTECTOMY DURING LAPAROSCOPIC GASTRIC BYPASS HAS NO EFFECT ON DURATION OF HOSPITAL STAY

Ahmed R Ahmed MD, Gretchen Rickards, O'Malley William MD, Johnson Joseph MD, Boss Thad MD, University of Rochester Medical Center, Rochester, New York

INTRODUCTION: Laparoscopic cholecystectomy can be safely performed at the time of laparoscopic Roux-en-Y gastric bypass. This study was primarily conducted to examine whether there is any difference in the length of hospital stay and duration of operation in patients who undergo concomitant cholecystectomy with their gastric bypass. In addition, the frequency and nature of complications in the two groups was compared.

METHODS: Retrospective chart analysis and comparison of 200 patients who underwent laparoscopic gastric bypass alone with 200 patients who underwent laparoscopic gastric bypass with simultaneous cholecystectomy.

RESULTS: Concomitant cholecystectomy does not increase length of hospital stay (2.04 ±0.20 days vs 2.06 ±0.29 days in the gastric bypass alone group; p=0.85). Furthermore the addition of cholecystectomy only adds an extra 29 minutes to the operation (p<0.01). In both groups, there was no difference in the rate of postoperative complications (8.5% in both groups, p= 0.21), the nature of which was more or less equally distributed amongst the two groups.

CONCLUSION: Laparoscopic cholecystectomy performed at the time of laparoscopic gastric bypass does not alter length of hospital stay or frequency of postoperative complications and only adds an extra half hour to total operation time. Therefore there may be a role for routine prophylactic cholecystectomy in patients who are undergoing uncomplicated gastric bypass surgery.

Bariatric Surgery – P038

TRENDS IN INTERNAL HERNIA INCIDENCE AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS (LRYGB)

Ahmed R Ahmed MD, Gretchen Rickards, Syed Husain MD, Johnson MD, Thad Boss MD, William O'Malley MD, University of Rochester Medical Center

INTRODUCTION: This study investigates the relationship between extent of patient weight loss and time course after gastric bypass and internal hernia incidence. It examines whether switching to running closure of the Peterson's mesenteric defect has an impact on incidence of this particular type of internal hernia. Lastly, it compares the incidence of internal hernia occurrence in patients with retrocolic versus antecolic Roux limb placement.

The incidence of internal hernia after LRYGB is greater in the laparoscopic approach than in the open technique and has been estimated to be 3-4.5% in previous studies. It has been observed that the vast majority of internal hernias present months and not days after surgery. It has been postulated that the weight loss seen in these patients, typically occurring some months after surgery, results in reduced intraperitoneal fat which in turn leads to larger mesenteric defects. Most surgeons close these defects at the index operation using an interrupted technique or continuous suture.

METHODS: A retrospective chart review was performed of all patients undergoing LRYGB who developed symptomatic internal hernia requiring operative intervention between Jan 1 2000 and September 15 2006.

RESULTS: 54 internal hernias occurred in 2572 patients, an incidence of 2.1%. The site of internal hernias varied: 25 (1%) - transverse mesocolon; 22 (0.8%) - enteroenterostomy; 7 (0.3%) - Peterson's space. The mean time to intervention for an internal hernia repair was 413 ±46 days (95% c.i. 319-596, p<0.01), whereas average % excess body weight loss (%EBWL) in this period was 59 ±3.3 (95% c.i. 52-65, p<0.01) (Student's t test). Subgroup analysis demonstrates internal hernia incidence to be 2/357 (0.6%) in antecolic Roux versus 52/2215 (2.4%) in retrocolic Roux limb (Odds ratio= 4, P<0.05) (Chi Square analysis). Of the 7 patients presenting with a Peterson's type internal hernia, 3 had undergone interrupted closure and 4 had undergone continuous closure of this defect.

CONCLUSION: This study demonstrates an association between presentation of internal hernia after LRYGB and time after surgery as well as weight lost. Furthermore the antecolic approach is associated with a reduced incidence of internal hernia. Continuous closure versus interrupted stitching of Peterson's space does not seem to alter the incidence of internal hernia at this location.

Bariatric Surgery – P039

THE EFFECT OF STAPLE LINE REINFORCEMENT SLEEVES (SEAMGUARD) ON INTERNAL HERNIA INCIDENCE AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS (LRYGB)

Ahmed R Ahmed MD, Gretchen Rickards, Syed Husain MD, Johnson MD, William O'Malley MD, Thad Boss MD, University of Rochester Medical Center

INTRODUCTION: This study has been designed to observe the impact of using glycolide copolymer staple-line reinforcement sleeves (Seamguard - W L Gore & Associates, Inc) applied onto linear staplers when dividing small bowel mesentery during LRYGB on the incidence of internal hernia. Typically, mesenteric defects created during LRYGB are closed using interrupted or continuous suture. In our unit we started using Seamguard reinforcement sleeves. The main benefits of this are (i) reduced bleeding and (ii) increased staple line strength. It has also been suggested that these strips can be adhesiogenic. Our own observations concur with this. We have found from reoperating on patients who have had previous staple line reinforcement strips used that there is significant adhesion formation between the strip and neighboring native tissue. Therefore, one surgeon (WB) at our unit switched from suturing all the mesenteric defects closed to using Seamguard.

METHODS: A retrospective chart review was performed of all patients undergoing LRYGB with and without the use of Seamguard™ and who developed symptomatic internal hernia requiring operative intervention between Jan 1 2000 and September 15 2006. Seamguard was used in the process of small bowel and mesenteric division during creation of an antecolic Roux limb.

RESULTS: see Table

CONCLUSION: This comparative investigation suggests that the use of glycolide copolymer staple-line reinforcement (Seamguard) decreases the incidence of internal hernia formation, though this effect was not statistically significant. Additionally it obviates the need for suture closure of all mesenteric defects thereby reducing operative time.

	No Seamguard	Seamguard
LRYGB N	2215	330
Int hernia N(%)	28 (1.3%) *	1 (0.3%) *
Hernia locus:	21 - enteroent 7 - Peterson's	1- enteroent

* odds ratio 4.2 (p=0.06)



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Bariatric Surgery – P040

REDUCTION OF CIRCULAR STAPLER RELATED WOUND INFECTION IN PATIENTS UNDERGOING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Fahad S Alasfar

MD, Adheesh A Sabnis MD, Rockson C Liu MD, Bipan Chand MD, Cleveland Clinic Foundation

Background: Circular-stapled anastomosis with trans-oral anvil insertion for the creation of the gastrojejunostomy in laparoscopic Roux-en-Y gastric bypass (LRYGB) is associated with frequent infections at the abdominal wall site where the circular stapler is inserted.

Methods: Patients who underwent routine LRYGB over a 1.5 year period at The Cleveland Clinic Foundation without any concomitant procedures were included. After our initial experience with circular-stapled anastomosis related wound infections, we implemented measures to reduce the infection rate. Prevention measures included chlorhexidine "swish and swallow," a plastic barrier device over the stapler, wound irrigation, loose skin approximation, and placement of loose packing. We compared wound infection rates in patients before (?no prevention?) and after (?prevention?) implementing these measures.

Results: Ninety-one patients with a mean age of 42 years and average body mass index of 48 kg/m² underwent laparoscopic Roux-en-Y gastric bypass. The infection rate was 30% among the "no prevention" (n=10) group and 1% in the "prevention" (n=81) group (p<0.05).

Conclusion: Trocar site infection related to the circular-stapled anastomosis technique can be significantly reduced with simple prevention measures.

Bariatric Surgery – P041

IMPACT OF SOCIOECONOMIC FACTORS ON PATIENT PREPARATION FOR BARIATRIC SURGERY, Lisa M Balduf

MD, Joseph A Galanko PhD, Timothy M Farrell MD, University of North Carolina

The prevalence of severe obesity and the incidence of bariatric surgery (BS) have increased. Socioeconomic factors (SEF) are linked to the prevalence of obesity, affect access to and outcome of BS and may affect patient pre-operative preparation. The purpose of this study was to examine the effects of income, formal education, race, health insurance and employment status on patient self-educational and behavioral activities prior to BS. Over an 11-month period, a 20-minute cross-sectional telephone survey was administered to 127 individuals who contacted our office regarding BS. Study participants were asked to report their income, formal education, health insurance and employment status, height, weight and standard demographic data. The type and number of self-educational resources (SR) utilized were elicited. Current eating and exercise behaviors were recorded and a 19-item objective assessment (OA) of knowledge of the risks of both obesity and BP was completed. Univariate analysis of the effect of each SEF on type and number of educational resources, engagement in healthy behaviors and OA scores were performed using Student's t-test, Chi square or ANOVA. A backwards stepwise multivariate analysis was then performed for those SEFs found to be significant on univariate analysis (p<=0.05). Participants had a mean age of 41.2±10.8 years, 85% were women and mean BMI was 51.8±10.6 kg/m². The most valuable SR cited by respondents was the internet (41.2%), which was unaffected by SEF. On univariate analysis, those with employment (2.89±1.0 vs 2.53±1.0, p=0.05), private insurance (2.84±1.0 vs 2.47±1.0, p=0.05), white race (2.86±1.0 vs 2.49±1.0, p=0.05) and income>\$20,000/yr (2.93±1.0 vs 2.34±0.1.0, p<0.001) used a greater mean number of SR than their peers. Subjects with private insurance (15.3±2.5 vs 14.0±3.3, p=0.02), higher formal educational levels (15.9±2.4 vs 13.9±3.1) and income >\$20,000/yr (15.9±2.20 vs 13.2±3.14, p<0.0001) demonstrated greater proficiency on the OA instrument. Engagement in healthy eating and exercise behaviors was unaffected by any SEF. On multivariate analysis, higher income was the sole factor directly related to the number of SR utilized and score on the OA. We conclude that obese patients from lower income households

may benefit from additional preoperative education, while all obese individuals, regardless of SEF, must be encouraged to implement healthy eating and exercise behaviors preoperatively.

Bariatric Surgery – P042

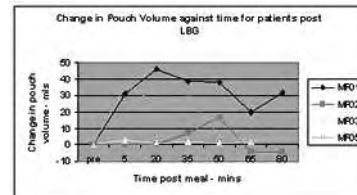
MRI ASSESSMENT OF GASTRIC FUNCTION AFTER LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING - A PILOT STUDY., John M Bennett BA, Paul Malcolm, Alex P

Boddy BA, Martin Wickham BS, Stuart Williams, Andoni Toms, Ian T Johnson PhD, Michael Rhodes MD, Norfolk and Norwich University Hospital NHS Trust and Institute of Food Research

Background: LAGB is a restrictive bariatric surgical procedure. Patients post LAGB state they remain satiated for several hours after a small meal despite on going weight loss. We utilised MRI to investigate post LAGB gastric function.

Method: MRI scanning post an eight-hour fast with two test meals (water and 3% Locust Bean Gum) of post-LAGB patients and age/sex matched controls. MRIs are repeated every 15 minutes out to 80 minutes post test meal. Axial MRI slices are examined to calculate gastric volumes. Visual analogue scores for hunger are recorded prior to each scan.

Results: 5 post-LAGB patients (47yrs, 32-53) with good weight loss (%EWL mean 84.8±12.0) and good subjective assessment of post meal satiety and 4 non-obese controls (38 yrs 29-50) have been recruited. MRIs with LBG have been completed on 4 patients and 3 controls and with water on 3 patients. Gastric pouch filling varies greatly between patients (see figure), as does initial pouch volume (6,0,50,0ml). Three of the four (MP01, 02, 05) demonstrated significant dilatation (delayed transit or reflux) which impacts on gastric and pouch volumes. Comparison with control volunteers will be presented.



Discussion: The study demonstrates that gastric filling varies post LAGB. The occurrence of significant oesophageal dilatation post meal in 3 out of 4 patients imaged with LBG is undergoing further investigation.

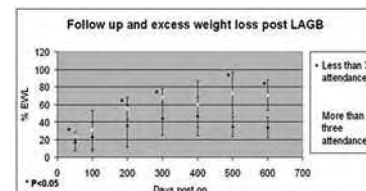
Bariatric Surgery – P043

THE EFFECT OF FOLLOW UP ON THE OUTCOME OF LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING IN THE TREATMENT OF MORBID OBESITY., John M Bennett

BS, Michael Rhodes MD, Norfolk and Norwich University Hospital NHS Trust and BUPA Hospital, Norwich

Introduction: The National Institute of Clinical Excellence (NICE) estimate that there are 1.2 million people in the UK clinically eligible for morbid obesity surgery. The commonest type of surgery worldwide is laparoscopic gastric banding and increased intensity of follow up may improve the outcome.

Methods: Patients' weight loss results were recorded on a prospective database also documenting their attendance at a monthly follow up "club" run by specialist nurses. Percentage excess weight loss (EWL) was recorded in patients attending 2 or less follow-up sessions as compared to 3 or more sessions





Results: 63 patients have had surgery to date (M-6, F-57; Median age 43 yrs (range 24-62); Mean preop BMI 44.6 Kgm-2 (35-60)). Median operating time was 35 minutes (range 25-75), median hospital stay 1 day (1-5) and return to normal activities at a mean of 12.7 days (sd 2.97). There were no deaths. 30 day morbidity was 1.8%. Total complications to date are 11.3% with delayed complications of 9.4% (3 port rotations, one band infection and one band slip-page). Conclusion: The more intensive the follow up the better the result after LAGB. This follow up can be completed routinely by nurse led patient “clubs” with surgical input only when necessary.

Bariatric Surgery – P044

PAIN MANAGEMENT IN LAPAROSCOPIC GASTRIC BYPASS SURGERY, VENKATA BODAVULA MD, SAGAR MEHTA BS, SURYA NALAMATI MD, LEONARD MAFFUCCI MD, MADHU RANGRAJ MD, SOUND MEDICAL CENTER OF WESTCHESTER, NEW ROCHELLE, NY

SAGES - POSTER PRESENTATION

Introduction: Post-operative pain management can be handled with multiple modalities in patients who undergo Laparoscopic Roux-en-Y Gastric Bypass Surgery (LRYGBP). Due to the less invasive nature of laparoscopic technique, a reduced amount of pain medication is usually required when compared to open procedures. Pain control can be attained with the use of intermittent non-opioid drugs in conjunction with opioids resulting in decreased amount of total pain medication use as well as a decrease in associated nausea and respiratory depression. The pain control is comparable to PCA and Epidural Analgesia.

Methods: We reviewed the charts of patients who underwent LRYGBP, focusing on length of hospital stay, pain medications administered during the length of hospital stay, nausea, vomiting and respiratory complications. Goal of pain management to keep the VAS score <2-3.

Results: 200 patients from June 2005 to September 2006 were reviewed. Average operative time was 165 minutes. Average length of hospital stay was 2.5 days. Morphine 24 mg(n=100), Demerol 150mg(n=60), Ketorolac 90 mg (n=40) was used POD#1. The requirement for pain medication decreased by one third, on the second postoperative day. All patients were discharged home on oral pain medications. Complications - nausea in 40% of the patients, respiratory depression was in 7(14%) patients. Hemorrhage was in 7(3.5%) patients.

Conclusion: Postoperative pain management has been simplified with combinations of intermittent Morphine and Ketorolac. A Morphine sparing effect can be seen with increasing use of Ketorolac and an associated decrease in nausea and respiratory complications associated with opioids. Ketorolac is not associated with increased bleeding as feared.

Bariatric Surgery – P045

INTRAGASTRIC MIGRATION OF A GASTRIC BANDING: ABOUT 13 CASES, Bernard BOKOBZA MD, Evelyne BISSON, Hospital Group of Le Havre

Background: Gastric erosion is a potentially severe complication of adjustable gastric banding.

Methods: From June 1998 to December 2005, 13 patients have been operated for intra-gastric migration of an adjustable band. In the same period of time 338 patients had an adjustable band, i.e. a 3,85% erosion rate. 11 F (mean BMI 45,6), and 2 M (mean BMI 49,6) were operated on. The mean interval between the placement of the band and its removal has been 44 months (8 - 68). Symptoms were epigastric pain (5), abscess of the access-port (4), and band slippage with GERD (4). Weight-loss had stopped in all cases.

Results: The laparoscopic approach has been used in all cases but one (open procedure for a 6 months pregnant woman who had the band partially inserted into the spleen). Post-op gastric baryum swallow has been routinely performed. No complication occurred. 5 Bypass have been performed, including 2 intra-operative-

ly. Mean BMI at this time was 44,3, and dropped to 30,7 after an 8 months follow-up.

Conclusions: Intra-gastric erosion of a band is a rare and serious complication after lap-banding that entails a careful monitoring of the patients including upper GI endoscopy in case of suspicion. A secondary bypass may obtain good results in these cases, which question the results of lap-banding.

Bariatric Surgery – P046

LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS: AN INSTITUTION'S REVIEW OF WEIGHT LOSS IN BOTH EXTENDED AND SHORT ROUX LIMBS, James A Bonheur MD, Lisa Rynn BS, Ibrahim Azer MD, Laura Choi MD, Keith Zuccala MD, Danbury Hospital

Objective: The purpose of this study was to examine weight loss in patients with a BMI => 50 who underwent laparoscopic Roux-en-Y gastric bypass surgery with an extended roux limb length of 150 cm (eRYGP) and weight loss in patients with a BMI <= 49 who underwent laparoscopic gastric bypass with a shorter roux limb (sRYGP) of 100 cm at six months and one year intervals post surgery.

Methods: This study was a retrospective chart review. A total of 458 patients who underwent Laparoscopic Roux-en-Y gastric bypass surgery over a four-year period were reviewed. All procedures were performed at Danbury Hospital in Danbury CT by two laparoscopic/bariatric surgeons. The standard procedure was a Roux-en-Y gastric bypass with a 100 cm Roux limb for the morbidly obese patient (BMI <=49) and, an extended 150 cm Roux limb for the super obese patient (BMI =>50).

Results: Both groups demonstrated weight loss as early as 3 months post procedure. Patients who underwent the eRYGP (BMI => 50) demonstrated an average weight loss of 104lbs at six months with an additional 23.8 lb weight loss at one year. Patients who underwent sRYGP (BMI <= 49) demonstrated an average weight loss of 83lbs at six months with an additional 13lb weight loss at one year. In addition, patients classified as super-super obese (BMI => 60) demonstrated an even greater weight loss, with an average of 106.7lbs and an additional 46.8lbs at six months and one year respectively.

Conclusion: Surgical therapy has proven to be the sole treatment in achieving significant long-term weight loss, improving obesity-related co-morbidities, reducing the risk of premature death, and improving the quality of life in morbidly obese patients. The Roux-en-Y gastric bypass is the most widely performed surgical procedure for morbid obesity in the United States. Although there are considerable risks associated with this procedure, published data suggest that the risks are offset by the extensive health benefits. Our review coincides with previously published data and confirms weight loss surgery, more specifically laparoscopic Roux-en-Y gastric bypass, as a safe and effective treatment for morbid obesity.

Bariatric Surgery – P047

LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS VERSUS LAPAROSCOPIC GASTRIC BANDING: AN INSTITUTION'S COMPARISON OF WEIGHT LOSS, James A Bonheur MD, Lisa Rynn BS, Ibrahim Azer MD, Laura Choi MD, Keith Zuccala MD, Danbury Hospital

Objective: The aim of this study was to compare weight loss in morbidly obese patients (BMI =>40) who underwent laparoscopic gastric banding (LB) versus Roux-en-Y Gastric Bypass surgery (RYGB). This study focuses on the total weight loss within the first six months and one year following surgery.

Methods: This study was a retrospective chart review. A total of 112 patients were reviewed during a 1-year period. Seventy-three patients underwent RYGB versus thirty-nine patients who underwent LB. All procedures were performed at Danbury Hospital in Danbury CT by two laparoscopic/bariatric surgeons. The standard procedures were the laparoscopic RYGB with a 100 - 150 cm roux limb and the LB using either Van Guard bands or Inamed Lap Bands in



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patients with BMI => 40.

Results: There was no significant difference demonstrated in preoperative weight, BMI, operative time, estimated blood loss, or length of stay within both procedure groups.

Average body weight was found to decrease over the one year period in both groups. Patients who underwent RYGB surgery experienced an average weight loss of 104lbs and 127.8lbs at six months and one year respectively. Patients who underwent LB experienced an average weight loss of 40.9lbs and 64.2 lbs at six months and one year respectively. A significant difference in weight loss is demonstrated between the two groups; with a greater weight loss seen in the patients who underwent laparoscopic RYGB one year post surgery. In addition, a small subset of patients noted to have a BMI => 60 who underwent LB, demonstrated an even greater average weight loss of 65.8 lbs and 89.4lbs at six months and one year respectively. This finding was also noted in the subset of patients with a BMI => 60 who underwent laparoscopic RYGB surgery with an average weight loss of 106.7lbs and 153.5lbs at six months and one year respectively.

Conclusion: Previous studies have demonstrated that both gastric bypass and gastric banding procedures result in significant weight loss in obese patients. This effect is seen as early as 6 months postoperatively and often times sooner. Both procedures have been demonstrated to be safe and effective in the management of morbid obesity. This study demonstrates that RYGB results in greater weight loss as compared to LB within the first 6-12 months following surgery. In particular, our study found RYGB to be more effective in the treatment of a cohort of patients with a BMI =>60.

Bariatric Surgery – P048

LAPAROSCOPIC TRUNCAL VAGOTOMY FOR WEIGHT-LOSS: INITIAL EXPERIENCE IN 15 PATIENTS FROM A PROSPECTIVE, MULTI-CENTER STUDY, Thad Boss MD, Jeffrey Peters MD, Marco Patti MD, R Lustig MD, J Kral, Department of Surgery, Highland Hospital; Department of Surgery, University of Rochester; Division of General Surgery, UCSF; Division of Endocrinology, UCSF; Department of Surgery, SUNY Downstate

INTRODUCTION: The objective of this study was to test the hypothesis that laparoscopic truncal vagotomy among severely obese men and women would promote weight loss and improvements in medical comorbidities.

METHODS: Laparoscopic truncal vagotomy via 5mm access ports was performed under general anesthesia on 15 severely obese patients. Thirteen of the 15 were women. Mean age was 37±9.5 years, ranging from 25-54 years. The posterior and anterior vagus nerves were identified, clipped and a segment removed for pathologic review. Esophageal dissection was carried out to assure division of additional vagal fibers. The adequacy of vagotomy was assessed by inspection and intraoperative/endoscopic congo red test under IV baclofen stimulation. Outcome measures included total weight loss and BMI changes, percent excess body weight lost, operative morbidity, and adverse events. Follow-up was at least 3 months in all patients.

RESULTS: Seventy three percent of the 15 patients lost weight. Mean preoperative weight was 112±20.4 kg (range: 85-159) and BMI 41±3.0 kg/m² (range: 35-48). There were no operative complications. One patient required re-admission for transient severe diarrhea of bacterial origin. On symptom assessment at 3 months, 2 patients complained of post-operative abdominal pain. BMI change and % excess weight loss (%EWL) for all 15 patients and for the 11/15 (73%) responders is shown in the table.

CONCLUSION: Although early, these data using an objective and otherwise difficult to achieve end point such as weight loss, suggest that truncal vagotomy may be a viable treatment for obesity.

Time	No	Change BMI	%EWL
3 mo/Total	15	2.1	12.2
3 mo/Responders	11	3.0	18.1

Bariatric Surgery – P049

SPECTRUM AND PREDICTORS OF COMPLICATIONS AFTER GASTRIC BYPASS, Guilherme M Campos MD, Ruxandra Ciovisa MD, Stanley Rogers MD, Mark Takata MD, Andrew Posselt MD, Eric Vittinghoff PhD, John Cello MD, Bariatric Surgery Program, University of California San Francisco.

Background: Complications after gastric bypass (GBP) occurs in 10 to 25% of patients. Objectives: To determine the spectrum and predictors of complications after open and laparoscopic GBP. Setting: University tertiary referral center. Patients: Three-hundred and seventy-nine morbidly obese patients that underwent open (n=65) or laparoscopic (n=314) GBP. Outcomes: Complications, stratified by Grade as: Grade I-requiring only bedside procedure, Grade II-requiring therapeutic intervention but without lasting disability, Grade III-resulting in organ resection or irreversible deficits, and Grade IV-death.

Methods: Occurrence of complications compared using Fisher's exact test. Patients with more than one complication, the highest grade was used for analysis. Logistic regression was used to identify independent predictors of complications. Predictors considered were age, gender, insurance and marital status, BMI, comorbidities, surgical technique, and surgeon experience (<51 cases).

Results: One-hundred and fourteen complications occurred in 72 patients (19%). Mortality was 0.3%. Grade I complications were more frequent after open GBP (Table), 87% were wound related. Grades II to IV complications occurred in 41 patients (10.8%), and frequency was similar (Table). Two factors were predictive of complications after open GBP: BMI>70 (odds ratio=8.7; 95% CI=1.3-58, p=0.02) and surgeon experience (odds ratio=4.1; 95% CI=1.1-15, p=0.03). Only surgeon experience (odds ratio=2.2; 95% CI =1.1-4, p=0.02) was predictive of complications after laparoscopic GBP.

	Open GBP n=65	Lap. GBP n=314	p value
Complications	28 (43%)	44 (14%)	<0.01
Grade I	16 (25%)	15 (5%)	<0.01
Grade II	10 (15%)	26 (8%)	ns
Grade III	1 (1.5%)	3 (1%)	ns
Grade IV	1 (1.5%)	0 (0%)	ns

Conclusion: Grades II to IV complications occurred at low and similar rates in both groups. Surgeon early experience strongly predict complications after open and laparoscopic GBP. BMI>70 is an additional predictor after open GBP.

Bariatric Surgery – P050

BARIATRIC SURGERY - ASIAN PERSPECTIVE, Pradeep Chowbey MS, CHAIRMAN, MINIMAL ACCESS AND BARIATRIC SURGERY CENTRE, SIR GANGA RAM HOSPITAL, NEW DELHI, INDIA

The incidence of obesity in India is reported at 7-9%. Although comprising only a small percentage, the actual number of obese persons is significant due to the sheer size of the Indian population. The most important factor behind this escalating problem of obesity in India is a changing lifestyle. It is the affluent urban middle class with the highest prevalence of obesity. Lifestyle changes observed in this strata of society include a change in eating habits and an increasingly sedentary life. Refined food with low dietary fiber, an increasing ratio of sugars and fats in the diet contributes to obesity. This unbalanced diet results in vitamin and mineral deficiencies.

Surgery for obesity is relatively unknown in India. It is not surprising since understanding of obesity as a disease is also a recent phenomenon. Bariatric surgery assumes a significant status when it comes to management of patients suffering from clinically severe obesity. Bariatric surgery in fact is the only treatment option which has reported effective, consistent and sustained prophylaxis and improvement of obesity related complications.

The data on obesity from the Asia Pacific region brings to light certain differences in behavior patterns of obese individuals here as compared to that observed in the west. This difference in behaviour may warrant a modification of guidelines for bariatric surgery in the Asian population.



Bariatric surgeons in India are in evolution and to day surgery is performed by only a few surgeons. Procedure of choice at most laparoscopic centre is LAGB, with increasing experience and expertise the Roux-en-Y gastric bypass is also becoming popular.

Bariatric Surgery – P051

LAPAROSCOPIC SPLEEN PRESERVING DISTAL PANCREATICTOMY AFTER GASTRIC BYPASS FOR NESIDIOBLASTOSIS, Benjamin L Clapp MD, Sherman Yu MD, Terry Scarborough MD, Erik B Wilson MD, The University of Texas Health Science Center at Houston and the Minimally Invasive Surgeons of Texas

Introduction: As the laparoscopic Roux-en-Y gastric bypass (RNYGB) operation becomes more common, rare post operative complications are being seen more often. One of these rare complications is postprandial hyperinsulinemic hypoglycemia and nesidioblastosis. Once the diagnosis is made, a distal pancreatectomy can be curative.

Case Report: We report a case of a 40 year old female who underwent an open RNYGB 15 years ago who presented with postprandial hypoglycemia. The patient had weight loss in excess of expected and was experiencing fatigue, dizziness and weakness after eating. An extensive workup revealed a postprandial hyperinsulinemic hypoglycemia. A pancreatic protocol CT of the abdomen ruled out an islet cell tumor and further investigation, including a selective arterial calcium stimulation test, revealed findings consistent with nesidioblastosis. A laparoscopic spleen preserving distal pancreatectomy was performed with complete resolution of her symptoms.

Discussion: Postprandial hyperinsulinemic hypoglycemia after RNYGB is being reported now in the literature. To our knowledge, this is the fourth such report. Although there is no evidence to suggest that the RNYGB can cause nesidioblastosis, there may be an association, and additional work up of postprandial hypoglycemia is necessary in the post gastric bypass patient.

Conclusion: Postprandial hyperinsulinemic hypoglycemia after a RNYGB can be a sign of nesidioblastosis. Distal pancreatectomy can be curative. Laparoscopic spleen preserving distal pancreatectomy is effective and feasible.

Bariatric Surgery – P052

IS IT TIME TO ABANDON THE 21MM STAPLER FOR GASTROJEJUNOSTOMY IN LAPAROSCOPIC RNY GASTRIC BYPASS?, Daniel R Cottam MD, Barry Fisher MD, Jim Atkinson MD, Sugical Weight Control Center

The construction of the gastrojejunal anastomosis (GJ) is perhaps the most important step in the laparoscopic Roux en Y gastric bypass (LRYGBP). We have previously reported the higher rates of stenosis associated with the 21mm stapler. However, we were willing to accept higher stenosis rates if it resulted in improved weight loss. This study seeks to address this question by looking at the short term wt loss results when comparing a 21 v 25 circular stapled anastomosis.

Methods 200 patients were randomized to 21mm or 25mm stapler use upon induction of anesthesia. Patients, surgeons and staff taking measurements were blinded to stapler size for the duration of the study. Patients were then followed for one year.

Results Preoperatively there were no differences in age (41.4 v 41.5) or wt (310 v 297) or BMI. At three, six and 12 months postoperatively there was no statistically significant difference in BMI or EWL.

Conclusion The 25mm stapler for Ethicon has similar weight loss profile to the 21mm stapler from Ethicon. Published weight loss curves show that weight loss achieved during the first year is a good predictor of long term wt loss. Due to high stenosis rates and similar weight loss the 21mm EEA stapler should be replaced by the 25 mm stapler.

Bariatric Surgery – P053

PATIENTS CAN BE SAFELY DISCHARGED AFTER 24 HOURS FOR A LAPAROSCOPIC GASTRIC BYPASS, Nestor de la Cruz-Munoz MD, Luz Velez MD, Cristina Torres MD, Surgical Weight Loss Institute

Introduction: Roux-en-Y gastric bypass (RYGB) is an effective treatment of severe obesity and one of the fastest growing surgical procedures in the United States. A decreased length of stay (LOS) is one of the many advantages of laparoscopic over open Roux-en-Y gastric bypass for the treatment of morbid obesity. There has been no consensus as to what constitutes an optimal length of stay in this procedure.

Materials and Methods: We retrospectively reviewed all patients undergoing laparoscopic Roux-en-Y gastric bypass from August 2005 to August 2006 for one surgeon in private practice. Data obtained was length of stay and readmissions. All patients were offered the chance of discharge on post operative day 1, and those that wished to go, were allowed to go home.

Results: A total 317 patients underwent LGB. Of these 230 patients (72.5 %) were discharged on postoperative day 1 (Group A). 87 patients stayed 2 or more days (Group B). There were 5 readmissions (2.2%) in the Group A and 2 readmissions (2.3%) in Group B. There were no mortalities in either group.

Discussion: Our findings suggest that gastric bypass patients can safely be discharged after one day, without increased risk of readmission or complication.

Bariatric Surgery – P054

GASTRIC BYPASS IN PATIENTS >60 YEARS OLD, Nestor F de la Cruz-Munoz MD, Luz Velez MD, Juan C Cabrera MD, Cristina Torres MD, Surgical Weight Loss Institute

Background: Surgical weight loss has been utilized as a means for weight reduction and treatment of obesity related comorbidities in morbidly obese patients. NIH criteria for bariatric surgery had a maximum age limit of 60yo. Recent studies have shown a higher than expected morbidity and mortality rate for older patients. This has raised the question as to the safety of gastric bypass in the elderly.

Study Design: The charts from 40 patients who underwent GBP by one surgeon from 2002 to 2006 ranging between the ages of 60 to 73 where studied retrospectively. During this time, the surgeon performed over 1200 GBP. Weight and BMI during the first postoperative year, preoperative comorbidities, and postoperative complications were evaluated and compared to national norms for all age patients.

Results: The average weights decreased from an initial of 273 pounds to 187 pounds at one year. The average BMI was 49 initially. The average BMI at one year was 33 for an excess weight loss percentage of 57%. The mean hospital stay was less than 2 days. Common preoperative comorbidities were obstructive sleep apnea, diabetes, hypertension, GERD, hypercholesterolemia, arthritis and peripheral edema. The patients experienced significant improvement and or resolution of most of their comorbidities. There were 9 postoperative complications in 8 patients. Of these only one was major, requiring reoperation. The complications included (1) clostridium difficile infection, (1) pulmonary edema, (2) anastomotic strictures, (2) wound infections, (1) hemorrhage, (1) pneumonia, and (1) case of anastomotic stenosis. 7 occurred during the first postoperative month while 2 occurred during the first postoperative year. There was no mortality within the group.

Conclusion: Patients over 60yo can undergo gastric bypass surgery with acceptable complication rates that can approach those of younger patients. Weight loss surgery in patients over the age of 60 is beneficial and should be considered.



Bariatric Surgery – P055

CT SCANNING IS NOT SENSITIVE FOR FINDING INTERNAL HERNIAS AFTER GASTRIC BYPASS, Nestor de la Cruz-Munoz MD, Luz Velez MD, Cristina Torres MD, Constantino Pena MD, Surgical Weight Loss Institute

Introduction: Internal hernias after gastric bypass may present acutely with bowel obstruction, or in the office setting as intermittent post prandial pains and vomiting. Computed tomographic (CT) evaluation of internal hernia has been reported as 80% sensitive in the literature, but these studies have only discussed acutely presenting patients. There is nothing in the literature that discusses the use of CT scan in diagnosing chronic internal herniations.

Materials and Methods: We retrospectively reviewed the CT scans of 26 patients who had undergone laparoscopic GBP and subsequent internal hernia repair for chronic abdominal pains. All had obtained CT scans prior to the hernia repair.

Results: Of the 26 patients, the Radiologist interpretation of the scans was normal in each case. The scans were reviewed by a radiologist retrospectively with the knowledge that the patients had internal hernias clinically and he felt that there were very subtle findings in the CT scans at best.

Discussion: Diagnosis of internal hernia with CT remains difficult. Post prandial abdominal pain with associated vomiting should alert the clinician to the possibility of an internal hernia. CT scanning cannot be counted on to accurately evaluate a patient for a chronic internal hernia without an acute small bowel obstruction.

Bariatric Surgery – P056

GASTRIC BYPASS IS SAFE IN PATIENTS WITH BMI>50, Nestor F de la Cruz-Munoz MD, Luz Velez MD, Juan C Cabrera MD, Cristina Torres MD, Surgical Weight Loss Institute

Background: The super obese are at an extremely high risk for major comorbidities that greatly reduce life span and quality of life. Surgical weight loss provides an effective treatment for morbidly obese patients. There have been concerns that super obese patients should not undergo gastric bypass due to the potential for high rates of complications. This study will evaluate the perioperative complication rate, in a private practice bariatric center, of gastric bypass surgery on patients with a BMI >50 and compare it to published norms in the literature for all morbidly obese patients.

Study Design: Outcomes from 277 roux-en-y gastric bypass procedures (with one converted to an open procedure for loss of abdominal domain with a very large ventral hernia) on super obese patients with an initial mean BMI of 56 where studied retrospectively. Postoperative complications and changes in BMI were evaluated.

Results: The data was obtained from the patients initial, 1month, 3 month, 6 month, and 12 month follow up visit. The average BMI decreased from 56 to 37. There were a total of 14 perioperative complications. Of those, there were only four major complications requiring reoperation. There was one death. This occurred in the patient that had to be converted to open. The skin and subcutaneous tissue over the hernia sac necrosed and the patient passed away from the ensuing sepsis.

Conclusion: In our high volume bariatric surgical center, the perioperative complication rates were comparable to published studies for all bariatric patients. We conclude that laparoscopic gastric bypass surgery can be safely performed on the super obese patient without significant increased risk.

Bariatric Surgery – P057

DOES MENTAL HEALTH ILLNESS AFFECT THE ASSESSMENT AND OUTCOME OF BARIATRIC SURGERY?, B H Dickie MD, C Johnsson-Stoklosia, P D Davey MD, D W Birch MD, Department of Surgery, University of Alberta, Centre for Advanced Minimally Invasive Surgery, Royal Alexandra Hospital, Edmonton, Alberta, Canada

OBJECTIVES: With bariatric surgery, a profound stress, both personal and emotional, is caused by both the operation as

well as the dramatic life changes that follow. Recent literature quotes rates of up to 50% of patients seeking bariatric surgery have a diagnosis of a psychiatric illness. There is minimal data to support whether these patients should undergo surgery or if they do any different than patients without mental health issues. Our clinical experience suggests careful selection of these patients can lead to successful outcomes. We have reviewed the female patients assessed and treated in our bariatric clinic who have had bariatric surgery and a psychiatric illness.

METHODS: A retrospective review of the female patients from our bariatric clinic patient database was completed from patients assessed and treated from October 2002-July 2006.

RESULTS: 386 new female patient consults were evaluated in our multidisciplinary clinic. 157 (40.7%) patients had reported a mental health (MH) issue (self reported (20), treated by a mental health professional (114) or on psychiatric medications (61)). The breakdown of diagnoses are as follows: 134 depression, 3 postpartum depression, 24 anxiety disorder, 3 ADHD, 14 eating disorders, 8 bipolar, 5 obsessive compulsive, 9 borderline personality, 1 schizophrenic and 31 had other diagnoses. Of these patients, 77 patients have undergone bariatric surgery (49% - same as non-MH patients) and 4 patients are undergoing medical screening for possible OR. Only one patient did not qualify for surgery because of her MH illness. Mean BMI pre-operatively was 53.52 (49.86 in non-MH patients). Following surgery, 9 MH patients were lost to follow-up (11.6%) (versus 4 (3.5%) in non MH patients) even with intense intervention to locate these patients. Overall, both MH and non-MH patients have comparable outcomes in weight loss.

CONCLUSIONS: Patients with mental health disease are more difficult to assess and follow. But if screened appropriately and with intense follow-up arranged can have successful outcomes with bariatric surgery.

Bariatric Surgery – P058

LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING WITH TRUNCAL VAGOTOMY: DOES THIS AUGMENT WEIGHT LOSS?, Kristen R Earle-Hardcastle MD, Matt B Martin MD, David H Newman MD, Ben T Hoxworth MD, Central Carolina Surgery, PA; Moses Cone Health Systems, Greensboro, NC

OBJECTIVE: Since the vagus nerve provides important motor, sensory and hormonal signals regulating satiety and hunger, vagotomy may augment weight loss in patients receiving adjustable gastric bands. This is the first study to examine the effect of laparoscopic truncal vagotomy in combination with laparoscopic adjustable gastric banding (LAGB) and it's effect on weight loss and reduction of comorbidities.

METHODS: Since May 2006, 11 of the 25 IRB approved patients have undergone laparoscopic gastric banding with truncal vagotomy. The adequacy of vagotomy was assessed by intraoperative and pathologic inspection and endoscopic Congo Red test under IV baclofen stimulation. Outcome measures include total weight loss, BMI changes, percent excess body weight lost, operative morbidity and adverse events.

RESULTS: All patients report anorexia. There were no adverse events and all patient were discharged in < 23 hours. No patients reported diarrhea, bloating, or other historical side effects from vagotomy. Average pre-op BMI was 43.25 (+/- 3.27). Average age was 46 years. 9/11 patients were female. At 3 months we observed a reduction in BMI of 4.34. We have seen over 2 pound per week weight loss in these patients with no issue of hunger. Most patients do not request an adjustment at five weeks like standard LAGB patients. We have observed and will later report a significant reduction in comorbidities.

CONCLUSION: Although further study is needed, LAGB efficacy for weight loss and reduction of comorbidities may be augmented when combined with a truncal vagotomy.



Bariatric Surgery – P059

CHANGES IN BODY TISSUE COMPOSITION IN MORBIDLY OBESE PATIENTS FOLLOWING BARIATRIC SURGERY.,

Ayesha Hossain BS, Aaron Eckhauser MD, Pamela Marks MS, James Isbell MD, Phillip Williams BS, Kong Chen PhD, Alfonso Torquati MD, William Richards MD, Naji Abumrad MD, Vanderbilt University Medical Center

Purpose: To document the time dependent changes in body weight and tissue composition following laparoscopic Roux-en-Y gastric bypass (LRYGB).

Methods: We used dual energy x-ray absorptiometry (DEXA) to measure changes in regional (trunk, arms and legs) in fat mass (FM) and lean body mass (LBM) in 9 morbidly obese subjects prior to and 6 and 12 months following LRYGB.

Results: As expected body mass index (BMI) dropped after surgery (from 48.1 to 34.9 at 6 months and 31.1 at 12 months, $p < .005$). Weight loss was significantly greater (77%) during the first 6 months versus the second 6 months (23%). Waist-to-hip ratio (WHR) dropped from .92 (preoperatively) to .86 and .84 at 6 and 12 months, respectively. The changes in body weight were associated with equal losses in FM and LBM in the first 6 months, but the losses were predominantly in FM during the subsequent 6 months. The changes in LBM during the first 6 months were predominantly from the trunk (Table 1).

		Arms (kg)	Trunk (kg)	Legs (kg)	Total
0-6M	Loss FM	2.5	7.9	7.8	18.2
	Loss LBM	1.0	14.4	4.0	19.4
7-12M	Loss FM	1.3	5.6	2.5	9.4
	Loss LBM	.2	.4	1.4	2

Conclusion: The losses in lean body mass during the first 6 postoperative months following LRYGB are significant and equal to the losses in fat mass. The majority of losses in LBM during this period are derived from trunk muscles. These changes require reassessment of our strategies to prevent lean body mass loss postoperatively and require readjustment of our exercise strategies to curb trunk muscle weight loss.

Bariatric Surgery – P060

ROLE OF COLOR DOPPLER SONOGRAPHY IN THE DIAGNOSIS OF DEEP VEIN THROMBOSIS IN MORBIDLY OBESE PATIENTS UNDERGOING LAPAROSCOPIC GASTRIC BYPASS, Tomas Escalante-Tattersfield MD, Olga Tucker MD, Patricio Fajnwaks MD, Samuel Szomstein MD, Raul J Rosenthal MD, The Bariatric Institute, Cleveland Clinic Florida

Background. Deep venous thrombosis (DVT) is a significant cause of morbidity after surgery. Obesity is a known risk factor for DVT. In patients undergoing surgery for morbid obesity reported incidence is up to 3.8%. Early detection and treatment is essential to prevent fatality from a pulmonary embolus and local long-term effects of the postphlebotic limb. Color Doppler sonography (CDUS) is currently the most accurate technique for evaluating DVT. The objective of this study was to define the incidence of DVT in our population of morbidly obese patients after laparoscopic Roux-en-Y gastric bypass (LRYGB). **Materials & Methods.** A retrospective review of prospectively collected data was performed on 500 consecutive morbidly obese patients who underwent LRYGB. Each patient received 5000 units of subcutaneous unfractionated heparin preoperatively, and every 8-hr after surgery for the first 24-hr. Subcutaneous enoxaparin was then administered every 12-hr until patient discharge. Sequential compression devices (SCD) were applied to both legs intraoperatively and continued until the patient was fully ambulatory. 24-hr postoperatively, all patients underwent a lower extremity CDUS. Patients were subsequently followed at 2, 8, 12, 24 and 52 weeks after surgery. **Results.** Of the 500 patients, 74% were female, with a mean age of 43 years (range 18-78). The mean preoperative BMI was 49 kg/m² (range 35-90) Mean operative time was 96 min (range 50-196). CDUS was positive for a right common femoral DVT in only one patient (0.2%). This patient had no

clinical features suggestive of DVT. The remaining 499 patients had no clinical or sonographic evidence of DVT.

During the follow up period, no further DVTs were detected. **Conclusions.** Although the DVT in this study was low at 0.2%, clinically asymptomatic DVT may lead to morbidity and even mortality; we recommend CDUS in all morbidly obese patients undergoing LRYGB. A perioperative protocol for DVT thromboprophylaxis is essential in all bariatric surgical programs.

Bariatric Surgery – P061

RISK FACTORS FOR MORBIDITY FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Alex Escalona MD, Rodrigo Munoz MD, Camilo Boza MD, Gustavo Perez MD, Fernando Pimentel MD, Sergio Guzman MD, Luis Ibanez MD, Departamento de Cirugia Digestiva. Pontificia Universidad Catolica de Chile

Introduction: Laparoscopic Roux-en-Y gastric bypass (RYGBP) is one of the alternatives of choice in the surgical treatment of the morbid obesity. Preoperative risk assessment is important to establish an adequate risk-benefit ratio. The aim of this study was to identify risk factors of morbidity after laparoscopic RYGBP. **Methods and procedure:** Information was obtained from the prospective database of all patients who underwent laparoscopic RYGBP at our institution from August of 2001 to May of 2006. Univariate and multivariate logistic regression were performed to identify risk factors for postoperative morbidity. Factors examined included demographic characteristics of patients, comorbidities and learning curve. **Results:** During this period, 1052 patients underwent laparoscopic RYGBP, 796 (76 %) women. Mean age and preoperative body mass index (BMI) were 37 ± 11 years and 41 ± 5 Kg/m² respectively. The mean operative time was 114 ± 39 minutes. The mean hospital stay was 4,0 ± 2,5 days. In 12 patients (1,1 %) conversion to open surgery was needed. There were no deaths. Postoperative complications were observed in 78 patients (7,4 %). In 24 of them (2,1 %) reoperation was needed. Postoperative complications were observed in 49 (9,3 %) and 29 (5,5 %) patients of the first and second consecutive half of patients respectively ($p=0,019$). Mean preoperative BMI in patients with and without postoperative morbidity was 42,3 ± 5,8 and 40,9 ± 5,1 Kg/m² respectively ($p=0,046$). Multivariate logistic regression showed that BMI was an independent risk factor for postoperative morbidity (odds ratio = 1,05; 95% confidence interval, 1,01-1,09). **Conclusion:** Postoperative morbidity was lower in the second half of patients. Mean BMI was higher in patients who developed postoperative complications. Preoperative BMI was the only independent risk factor for postoperative morbidity after laparoscopic RYGBP.

Introduction: Laparoscopic Roux-en-Y gastric bypass (RYGBP) is one of the alternatives of choice in the surgical treatment of the morbid obesity. Preoperative risk assessment is important to establish an adequate risk-benefit ratio. The aim of this study was to identify risk factors of morbidity after laparoscopic RYGBP. **Methods and procedure:** Information was obtained from the prospective database of all patients who underwent laparoscopic RYGBP at our institution from August of 2001 to May of 2006. Univariate and multivariate logistic regression were performed to identify risk factors for postoperative morbidity. Factors examined included demographic characteristics of patients, comorbidities and learning curve. **Results:** During this period, 1052 patients underwent laparoscopic RYGBP, 796 (76 %) women. Mean age and preoperative body mass index (BMI) were 37 ± 11 years and 41 ± 5 Kg/m² respectively. The mean operative time was 114 ± 39 minutes. The mean hospital stay was 4,0 ± 2,5 days. In 12 patients (1,1 %) conversion to open surgery was needed. There were no deaths. Postoperative complications were observed in 78 patients (7,4 %). In 24 of them (2,1 %) reoperation was needed. Postoperative complications were observed in 49 (9,3 %) and 29 (5,5 %) patients of the first and second consecutive half of patients respectively ($p=0,019$). Mean preoperative BMI in patients with and without postoperative morbidity was 42,3 ± 5,8 and 40,9 ± 5,1 Kg/m² respectively ($p=0,046$). Multivariate logistic regression showed that BMI was an independent risk factor for postoperative morbidity (odds ratio = 1,05; 95% confidence interval, 1,01-1,09). **Conclusion:** Postoperative morbidity was lower in the second half of patients. Mean BMI was higher in patients who developed postoperative complications. Preoperative BMI was the only independent risk factor for postoperative morbidity after laparoscopic RYGBP.

Bariatric Surgery – P062

EFFECT OF ADVANCED AGE ON OUTCOMES AFTER LAPAROSCOPIC GASTRIC BYPASS, Rafael Fazylov MD, Eliana Soto MD, Stephen Merola MD, New York Hospital at Queens

As laparoscopic gastric bypass is being performed more frequently on older patients, we ask the question whether advanced age has an effect on the rate of perioperative complications and degree of postoperative weight loss. A retrospective cohort study was performed of 30 patients > or = 55 years old and 230 patients < 55 years old who underwent laparoscopic gastric bypass surgery during August 2002 and August 2006 at our institution. We compared complication rates, degree of weight loss and improvement of comorbidities between the two groups.

Bariatric Surgery – P063

ENDOSCOPIC TREATMENT OF JEJUNOJEJUNAL OBSTRUCTION AFTER ROUX-EN-Y GASTRIC BYPASS SURGERY, Derek G Fong MD, Edward C Mun MD, Christopher C Thompson MD, Brigham and Women's Hospital

Narrowing at the jejunojejunal (JJ) anastomosis may occur as a complication after Roux-en-y gastric bypass (RYGB) surgery and present as small bowel obstruction. Although a



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surgical approach has been advocated as definitive therapy, here we report the first successful endoscopic treatment of a JJ obstruction with balloon dilation.

Case Report: A 50-year-old female presented six weeks after laparoscopic RYGB bypass surgery with four days of obstructive symptoms including nausea, vomiting, and abdominal pain. The patient's surgical anatomy consisted of a 75 cm Roux limb and a side-to-side jejunostomy constructed with a blue load EndoGIA stapler. At the time of presentation, a CT scan of the abdomen and pelvis revealed dilation of the defunctionalized stomach, duodenum, and multiple jejunal loops down to the level of the JJ anastomosis consistent with a small bowel obstruction.

Upper endoscopy was performed using a pediatric colonoscope (PCF-160, Olympus, Tokyo, Japan). At the level of the JJ anastomosis, a stenotic aperture prevented passage of the endoscope into the afferent (pancreaticobiliary) limb. Under fluoroscopic guidance, a guidewire was advanced into the afferent limb and CRE balloon (Boston Scientific, Natick, MA) was used to sequentially dilate the afferent portion of the anastomosis to a diameter of 12 mm with the resultant decompression of the afferent limb. There were no procedural complications and the patient has remained clinically well without further obstructive symptoms at ten months post procedure.

Discussion: Obstructive complications may develop after RYGB bypass surgery at the level of the gastrojejunal (GJ) anastomosis and JJ anastomosis. Narrowing at the JJ anastomosis is most often caused by adhesions. Bowel obstruction due to JJ narrowing occurs in less than 5% of patients after laparoscopic RYGB surgery.

Surgical treatments for JJ obstruction include laparoscopic bypass of the obstruction site and lysis of adhesion. Although endoscopic dilation of GJ strictures has been effectively performed with good long term results, this case represents the first report of endoscopic therapy for a JJ obstruction. Endoscopic dilation should be considered as a viable alternative to surgical treatment of JJ obstructions after RYGB surgery.

Bariatric Surgery – P064

RESTRICTIVE SLEEVE GASTRECTOMY, Eldo E Frezza MD, Texas Tech University Health Sciences Center

Objectives Sleeve gastrectomy (SG) has acquired more publicity in the United States. Some physicians have now been using it as a single stage procedure.

It was suggested at the last SAGES meeting that the stomach should be approximately a 32 French bougie to get good results.

Some papers have described injury secondary to bougie. In this paper, we describe a sleeve gastrectomy done under direct vision with a 29 French endoscope. This allows us to continually monitor our staple line and our stomach while performing the operation.

Methods From June 2005 to June 2006, we considered the experience of 10 patients in which we performed a SG with endoscopic guidance. The body mass index (BMI) ranged between 52 and 72 with a mean of 65. Age range was between 48 to 65 with an average of 57. Six patients were male and four were female. All of the patients had multiple comorbidities including diabetes, high blood pressure, high cholesterol, high triglycerides, sleep apnea, joint pain, dysmenorrhea, difficulty urinating and others. All of the patients underwent a SG with endoscopic guidance.

Results None of the patients had complications with the staple line after the operation. Only two patients had skin infection. Excess weight loss at 6 months was about 30% for all patients with a decrease on average BMI of 50 to 68.

Conclusion SG appears to be safe and effective for weight loss. The advantage of endoscopic guidance is decreased potential bougie injury.

Bariatric Surgery – P065

THE IMPACT OF MORBID OBESITY ON THE REGIONAL ECONOMY, Eldo E Frezza MD, Mitchell S Wachtel MD, Bradley T Ewing PhD, Texas Tech University Health Sciences Center; Texas Tech University

Objectives Obesity's impact on a region's economy has not been fully analyzed. An economic model was derived to evaluate the cost of obesity in terms of lost business output, employment, and income.

Methods We analyzed the charts of all of our patients who underwent laparoscopic gastric bypass and laparoscopic banding over two years. Input-output analysis estimate margins, the purchase prices for goods and services, and regional purchase coefficients, the percent of spending by local suppliers, were used to model the regional economy. Collected patient data, used in conjunction with IMPLAN model data, were used to estimate, on a regional basis, an industry-by-industry formulation of input-output accounts to calculate multipliers, the impact of the economic costs of the obese to the general economy.

Results For our region, the impacts total over \$1.3 billion, about 2.5 % of total gross state product. Total labor income impacts are nearly \$200 million, \$1,660 of output income per household and \$245 of labor income per household. Obesity cost over 7,300 jobs and cut state and local tax revenues by over \$48 million.

Conclusion Governmental measures to combat this menace are warranted.

Bariatric Surgery – P066

LAPAROSCOPIC GASTRIC BANDING AND STOMACH REDUCTION (GBSR), Eldo E Frezza MD, Mitchell S Wachtel MD, Texas Tech University Health Sciences Center

Objectives Laparoscopic gastric banding (LGB) and sleeve gastrectomy (SG) are established bariatric surgical procedures.

Methods A single-procedure, combined laparoscopic gastric banding/sleeve gastrectomy (GBSR), was devised.

Technique and results in the first ten patients is reported.

Results Ten patients, one man and nine women, with a median BMI of 66.5 kg/m² (range 64-79 kg/m²) and multiple serious co-morbidities, underwent GBSR without complications. At six months, BMI decreased by a median 28% (range 19%-34%). The percent excess weight loss (EWL) was 24.4 + 1.6. All patients were discharged within one day. No complications or deaths occurred. Only two patients required outpatient band adjustments, both at five months after GBSR.

Conclusion GBSR appears to be a safe bariatric surgical procedure with faster weight loss in the first 6 months than LGB alone and less need of band adjustments.

Bariatric Surgery – P067

REOPERATIVE LAPAROSCOPIC ADJUSTABLE GASTRIC BAND (LAP-BAND®) SURGERY CAN BE SAFELY PERFORMED AT A FREE STANDING AMBULATORY SURGERY CENTER., Mark A Fusco MD, LifeShape Advanced Bariatrics Center of Florida and Melbourne Same Day Surgery Center.

Introduction: Several authors have documented the appropriateness of performing LAP-BAND® surgery in the outpatient setting. Our outpatient based bariatric program previously reported short term safety data of the author's first 100 LAP-BAND® procedures demonstrating the ability to safely perform outpatient LAP-BAND® without inpatient LAP-BAND® experience. Our hypothesis was that reoperative surgery could be performed in an ambulatory surgery center with similar short term safety.

Methods and Procedures: Our prospectively collected patient database was retrospectively reviewed to assess 30 day mortality, morbidity, and hospital admission rates for nine patients undergoing reoperative LAP-BAND® surgery.

Results: Since May 2005 nine patients underwent reoperative surgery. These included three patients who had bands replaced after previously being removed, two band removals, two band replacements (one stage) for prolapse, and two patients who were converted from other previous



bariatric surgeries (1 vertical band gastroplasty, 1 Molina fixed band). All nine surgeries were completed as planned. All patients were discharged the day of surgery. Follow up at 90 days was 100 percent. There were no mortalities. There were no major morbidities. There was one port site infection requiring antibiotics. The 30 day readmission rate was 0%.

Conclusion: Reoperative LAP-BAND® surgery can safely be performed in the outpatient setting. The acceptance of LAP-BAND® as an outpatient procedure has several potential advantages including decreased cost, improved patient ambulation, and a better microbial environment.

Bariatric Surgery – P068

EFFECT OF THE LAP BAND SYSTEM ON COMORBID CONDITIONS IN SEVERELY OBESE ADOLESCENTS: EARLY

RESULTS., Alberto S Gallo MD, Carlos A Galvani MD, Racquel Smith-Bueno MD, Maria V Gorodner MD, Mark Holterman, Allen Browne MD, Ai-Xuan Le Holterman MD, Nancy Browne MD, Santiago Horgan MD, Department of General Surgery, University of Illinois at Chicago.

Background: Obesity in adolescent patients increases the likelihood of adult obesity, and also the prevalence of weight-related comorbidities. Laparoscopic adjustable gastric banding (LAGB) is a safe procedure that offers a good option for attaining weight loss. However, there is scarce data in the literature regarding the influence of weight loss on adolescents' comorbidities.

To determine if LAGB related weight loss is associated with improvement of comorbidities.

Methods and Procedures: Between December 2001 and March 2006, 27 patients underwent LAGB. The following data were analyzed: Perioperative data, postoperative complications, body Mass Index (BMI), % excess body weight loss (%EBWL). Patients were given a questionnaire after surgery to evaluate resolution/improvement of Asthma, Depression, Dyslipidemia, Gastroesophageal Reflux Disease (GERD), Hypertension (HTN), Menstrual Irregularities, Osteoarthritis (OA), Sleep Apnea and Type 2 Diabetes Mellitus. Values are expressed as mean ± standard deviation.

Results: Twenty one (78 %) patients were female and 6 (12%) were male. Of these, 23 patients were Caucasian and 4 African American. Mean age was 18±1.7 years (14-20), and preoperative BMI was 49±9.7 kg/m² (38-81). Operative time was 45±15 min, blood loss 7±4 ml (5-20), and length of hospital stay 15.6±8 hrs (5-26). There was no mortality. The most common long term complication was pouch enlargement occurring in 7 (26%) patients. Five of these patients (72%) were managed conservatively and 2 (28%) required surgery. A total of 92% of patients were in active follow up at 17±12 months. The mean %EBWL at 3, 6, 9, 12, 24, 36 and 48 months was 22±14, 34±23, 28±18, 41±24, 42±13, 42±26 and 41.5 respectively. The overall number of comorbidities before surgery was 41 (1.5 /patient); decreasing to 10 (0.4 /patient) postoperatively (p = 0.000). Resolution/improvement was observed in: Asthma 75%, Depression 100%, Dyslipidemia 50%, GERD 50%, HTN 71%, Menstrual irreg. 100% (one patient taking birth control pills), OA 80%, Sleep apnea 63%, Type 2 DM 33%.

Conclusion: With very low perioperative morbidity and no mortality, LAGB is a safe and effective tool for attaining weight loss in adolescents, potentially leading to an early control of obesity-related comorbidities. Nevertheless, band-related complications seem to be more frequent in this cohort. Longer follow up is needed to support these preliminary findings

Bariatric Surgery – P069

UNREVELING THE MYTH: SIZE DOES MATTER. THE VG BAND DECREASES THE INCIDENCE OF COMPLICATIONS AFTER LAP BAND SURGERY. Carlos A Galvani MD, Maria V Gorodner MD, Racquel Bueno MD, Alberto S Gallo MD, Federico Moser MD, Celia Chretien RN, Allen Mikhail MD, Santiago Horgan MD, University of Illinois at Chicago

BACKGROUND: The laparoscopic placement of the adjustable gastric banding (LAGB) has evolved overtime.

Since March 2004 two types of bands have been used in our practice: the 10 cm and the 11 cm band (VG). It has been said that the liberal use of the VG band reduces the incidence of postoperative obstruction. However the impact on long term complications such as pouch enlargement (PE) and band slippage (BS) remains unknown.

OBJECTIVES: To report our initial results after the introduction of the larger band in our practice.

METHODS: Between 3/04 and 6/06, 435 patients underwent LAGB. Patients were divided into 2 groups. Group A: 10 cm band, and Group B: VG band. Patients with less than 3 months follow up were excluded. Selection of the type of band was done intraoperatively, according to the amount of fat pad present.

RESULTS:

	Group A	Group B	p
Patients	121	313	
BMI preop. (kg/m ²)	42±6	47±9	
PE	22 (18%)	22 (7%)	
BS	3 (2%)	0 (0%)	
%EWL (%)			
• 3 months	25±12	21±11	N S
• 6 months	40±18	29±16	< 0.05
• 9 months	46±20	35±20	< 0.05
• 12 months	47±19	42±23	N S
• 18 months	43±19	45±27	N S

(**) %excess weight loss

CONCLUSIONS: our initial results showed that the liberal use of the VG reduces the incidence of postoperative complications. However the % EWL was slower in this group of patients.

Bariatric Surgery – P070

POST-OPERATIVE ROBOTIC TELEPRESENCE REDUCES LENGTH OF STAY IN PATIENTS UNDERGOING NON-COMPLICATED LAPAROSCOPIC GASTRIC BYPASS FOR MORBID OBESITY. Alex Gandsas MD, Christina Li MD, Stuart Shindel MD, Marvin Tan MD, Kennedy Gabregiorgish MD, Sinai Hospital of Baltimore

Background: Several studies have shown that the average length of stay (LOS) following laparoscopic gastric bypass (LGBP) ranges between 2 to 4 days. As our program matured, we tested the impact of robotic telepresence as an adjunct to standard post operative rounds in regard to LOS in patients undergoing non-complicated LGBP for morbid obesity. Robotic telepresence allows physicians to conduct patient rounds in the hospital, consult with staff and access patient's data by using a combination of two-way real time streaming video, wireless protocols and the Internet.

Methods: We retrospectively reviewed 376 patients who underwent a non-complicated LGB from January 2004 to August 2006. Patients suffering from a major post operative complication were excluded from this study. Qualifying patients were grouped into those assessed by standard bedside rounds only (Group A) and those assessed by combining remote robotic with standard bedside rounds (Group B). Groups were matched for age, gender, body mass index and number of co-morbidities. Discharge criteria included adequate urine output, ambulation, oral intake and pain control.

Results: In Group A, 76% (218 patients), 17% (48 patients) and 4% (12 patients) were discharged on post operative day 2, 3 and 4 respectively, while in Group B, 76% (68 patients), 20% (18 patients) and 3% (3 patients) were discharged on post operative day 1, 2 and 3 respectively. The average LOS was 2.36 days in Group A and 1.27 days in Group B. Readmission rate within 30days following discharge was 6% for Group A and 1% for Group B.

Conclusions: Our data indicates that post-operative robotic telerounding can safely reduce LOS in patients undergoing non-complicated LGB and may help with the overall hospital through-put

Bariatric Surgery – P071

WHAT IS THE OPTIMAL BOWEL PREP FOR PATIENTS WHO HAVE UNDERGONE GASTRIC BYPASS? Susan A Garand DO, Gary Wease MD, S Salimi MD, Dilip Desai MD, Michigan State University Department of Surgery, Flint Campus

Introduction: Patients who have undergone bariatric gastric bypass procedures could be predicted not to tolerate high-



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volume colonic bowel preparations (?bowel prep?) prior to colonoscopy. Anecdotal experience in our community appeared to support that concern. Review of the current literature yielded no established protocol regarding the optimal bowel prep after gastric bypass surgery. The aim of our study was to identify the most easily tolerated prep as well as its effectiveness in the gastric bypass patient who subsequently required colonoscopy.

Methods: We conducted a retrospective chart review of patients who underwent gastric bypass and subsequent colonoscopy. For each patient, we recorded the type, patient tolerance (as told to and recorded by the nursing staff) and adequacy of the bowel prep (as described in the procedure note). The interval between gastric bypass and colonoscopy was also recorded.

Results: We identified 21 patients who underwent both gastric bypass and subsequent colonoscopy. Bowel preps employed included Golytely (n=7), Golytely plus Dulcolax tabs (n=3), Fleets Phosphosoda alone (n=5), Fleets Phosphosoda plus enema (n=2), Fleets Phosphosoda plus Dulcolax tabs (n=1), Visicol tablets (n=1), and Half-lytely plus Dulcolax tabs (n=2). The time frame between gastric bypass and colonoscopy ranged from 1 month to 5 years. All but 2 patients tolerated their bowel prep. Both of these patients had colonoscopy within 3 months after gastric bypass and were given high-volume preps.

Conclusion: Our study suggests that high-volume bowel prep is not tolerated in the early period following gastric bypass but is well tolerated later in the post-bypass period. Because our study included a small sample size and variation in bowel preps, we plan to conduct a prospective, randomized study comparing standard 2-gallon bowel prep to smaller volume Fleets Phosphosoda bowel prep.

Bariatric Surgery – P072

FOLLOW-UP OF 121 MORBIDLY OBESE PATIENTS AFTER GASTRIC BYPASS SURGERY, Ke Gong MD, Michel Gagner MD, Alfons Pomp MD, Taghreed Almahmeed MD, Sergio Bardaro MD, Department of Surgery, Beijing Shijitan Hospital and Department of Surgery, New York Presbyterian Hospital, Weill Medical College

Objective The aim of our study is to evaluate the changes of nutrition and metabolism of the patients with morbid obesity after laparoscopic Roux-en-Y gastric bypass surgery (LRYGBP).

Methods A study of 121 patients diagnosed with morbid obesity who underwent LRYGBP in New York Presbyterian Hospital. Serum Iron(Fe), Calcium(Ca), Zinc(Zn), Selenium(Se), Vitamin A(VitA), 25-hydroxy Vitamin D3(VitD), Vitamin B12 (VitB12) and Parathormone (PTH) were measured at 6-month, 12-month and 24-month after LRYGBP.

Results It took this research approximately sixty-nine months from June 1999 to February 2005 to complete. Among the total 121 patients, 40 males and 81 females underwent LRYGBP surgery. They had a mean age of 46 years (range 22-67). The mean BMI prior to LRYGBP was 47.00 ± 7.15 kg/m² (range 30.65-76.60 kg/m²). After the surgery, the mean BMI was 33.79 ± 6.06 kg/m² (range 21.70-52.76 kg/m²). The mean BMI was decreased $P < 0.001$; after 6 month of the surgery. Within the following two years, the serum Fe, Ca, Zn, Se, VitA, VitD, VitB12 were all at the normal level. Although the serum Zn, Se, VitA of some patients were decreased, they were near the healthy level with the supplementation help for more than one year. Whilst serum PTH remained continuously at a higher than normal level.

Conclusions This research concludes that Laparoscopic Roux-en-Y Gastric Bypass surgery is reliable and safety to the patients suffering from morbid obesity. Meanwhile, the serum Calcium, Zinc, Selenium metabolisms and PTH are altered in the patients following LRYGBP. Multi-Vitamin and microminerals supplementation are strongly advised in all patients.

Bariatric Surgery – P073

NATURE VS NURTURE: IDENTICAL TWINS AND BARIATRIC SURGERY, J Hagedorn MS, J Morton MD, Stanford Department of Surgery

BACKGROUND: Genetics and environment both play a role in weight maintenance. Twin studies may help clarify the influence of nature vs. nurture in weight loss. We present the largest US experience with identical twins undergoing bariatric surgery

METHODS: We retrospectively reviewed the charts of four sets of monozygotic twins who underwent laparoscopic roux en y gastric bypass and laparoscopic adjustable gastric banding at three different institutions. BMI and comorbidities were examined pre- and post-operatively and complications were recorded.

RESULTS: All four sets of twins are female, live together, and have the same profession. Set 1 had near identical weight loss patterns after open gastric bypass surgery in 1996 (preop: 320/312 to 2 years: 180/180, and 10 years 237/235). The two patients within Set 1 also both needed cholecystectomies within the first year post operatively. In Set 2, these twins underwent laparoscopic gastric bypass surgery and also had required cholecystectomies in the first post-operative year. Set 2 also experienced near identical weight loss at 1 year (% BMI Loss, 37.7 vs. 37). Set 3 underwent Lap Band placement with two different surgeons with differing amounts of weight loss at 6 months (% BMI loss, 7.4 vs. 19.4). Finally, Set 4 underwent laparoscopic gastric bypass with 2 year % BMI loss of 39 vs. 34. The twin who lost less weight proportionally lived apart from her twin and their extended family for a year and during that time her weight loss was less than the twin living with her family.

CONCLUSION: Two sets of monozygotic twins had identical responses to bariatric surgery and complications. The other two sets of identical twins had differential weight loss results due to differences in surgical approach and social support. While genetics do exert a strong influence on weight maintenance, this case series demonstrates the effect of social support and post-operative management upon post-operative weight loss in the presence of identical genetics.

Bariatric Surgery – P074

WEIGHT LOSS OUTCOMES UTILIZING A STANDARDIZED ROUX-LIMB LENGTH: A COMPARISON BETWEEN SUPER-OBESE AND NON-SUPER OBESE PATIENTS UNDERGOING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS., Soo Hwa Han MD, Nicole Basa MD, Amir Mehran MD, Lubna Suleman MD, Darshni Vira BS, Ian Soriano MD, Carlos Gracia MD, Erik Dutson MD, University of California at Los Angeles, David Geffen School of Medicine

Background: In the laparoscopic Roux-en-Y gastric bypass (LRYGB), the ideal alimentary limb length is unknown. Controversy exists regarding whether various body mass index (BMI) ranges require different alimentary limb lengths for optimum weight loss results. At our institution, an 80 centimeter (CM) roux-limb is created for both the super-obese (BMI greater than or equal to 50) and non-super obese (BMI less than 50) patients. We hypothesized that this approach will result in comparable weight loss results.

Methods: Between January 2003 and June 2006, 835 LRYGBs were performed. One year follow-up data was available in 246 patients. The patients were divided into two groups: Group I - 167 patients with BMI < 50 kg/m² (average = 43, range 35-49); and group II - 79 patients with BMI > 50 kg/m² (average = 54, range 50-82). Their demographic, comorbidity, excess body weight loss (%EBWL) and perioperative complications were collected into a prospective database and retrospectively reviewed.

Results: The two groups were comparable in age, sex, pre-operative comorbidities and postoperative complications. The average EBWL was 76% (range 8-100%) in group I and 54% (range 16-99%) in group II (p = .0075).

Conclusion: With a standardized 80 CM roux-limb, weight loss results were inferior in the super obese group when compared to their non-super obese counterparts. These

results have prompted us to make a programmatic change by creating a longer roux-limb length in super obese patients.

Bariatric Surgery – P075

IMPORTANCE OF CLINICAL INDICATORS IN DETECTING POSTOPERATIVE COMPLICATIONS FOLLOWING LAPAROSCOPIC SLEEVE GASTRECTOMY. SM Han MD, WW Kim MD, Department of Surgery, Kangnam CHA Hospital, College of Medicine, Pochon CHA University, Seoul, South Korea.

Background: A significant and drastic complication of laparoscopic sleeve gastrectomy (LSG) in morbidly obese patients is gastric staple line leakage. The aim of our study is evaluate the efficacy clinical data for detecting postoperative complications after LSG.

Methods: The study enrolled 150 consecutive patients undergoing LSG performed from January 2003 to July 2006. When abnormal data (heart rate ≥ 110 /min, or temperature ≥ 37.5 °C) were detected on postoperative day 1, laboratory tests (blood, urine, Chest X-ray, abdominal sonogram) and water soluble gastrografen UGIS were performed to detect the postoperative complications after LSG (group 1).

Patients (group 2) who had normal postoperative clinical data were compared with group 1.

Results: From the total of 150 patients who underwent LSG, nine patients (6%) had postoperative complications. Two patients had major complications: 1 leakage (0.6%) and 1 delayed bleeding (0.6%), and 4 patients had minor complications in group 1. But, major complications had not detected in group 2 ($p < 0.01$). Heart rate and body temperature in group 1 was significantly faster and higher than group 2 ($p < 0.01$). Especially, 2 patients who had major complications had severe tachycardia over 120 beats per minute (bpm). However, when high temperature was present, it was no high grade fever in all cases (> 39 °C).

Conclusions: Evidence of tachycardia or high body temperature may be useful to detect major complications. Also, routine postoperative gastrografen upper gastrointestinal series (UGIS) following LSG may be not beneficial. We recommend laboratory test and UGIS when clinically indicated.

Bariatric Surgery – P076

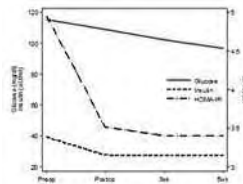
EARLY IMPROVEMENT IN GLUCOSE HOMEOSTASIS AFTER ROUX-EN-Y GASTRIC BYPASS IS WEIGHT-INDEPENDENT. Erik N Hansen MD, Ed Yoo BS, Marks Pamela MS, J K Wright MD, W O Richards MD, A Torquati MD, Naji N Abumrad, Vanderbilt University School of Medicine

Purpose: To investigate the early post-op changes in glucose, insulin and the Insulin Resistance index of the Homeostasis Model Assessment (HOMA-IR) after roux-en-Y gastric bypass (RYGB) and to determine a) the earliest time points for improvements and b) whether the improvements are purely related to weight loss.

Methods: Fasting serum samples and anthropometric data were collected from eight subjects (3M, 5F) undergoing RYGB before operation and again 3-5 days, 3 weeks, and 6 weeks postop.

Results: Body mass index (BMI) did not change at 3-5 days after operation (52 ± 6 and 51 ± 7 kg/m², pre-op and 3-5 days post-op, respectively; $p=0.2$). However, at 3 and 6 weeks post-op, BMI fell 10% ($p<0.0001$) and 13% ($p<0.0001$), respectively. Fasting blood glucose fell to 94% ($p=0.03$), 90% ($p=0.1$), and 86% ($p=0.002$) of preop levels at 3-5 days, 3 weeks, and 6 weeks postop, respectively. Fasting insulin fell to 64% ($p=0.08$), 71% ($p=0.08$), and 52% ($p=0.001$) of the preop level at 3-5 days, 3 weeks, and 6 weeks, respectively. Accordingly, HOMA-IR showed improvement over the early postop period (figure 1), falling to 65% ($p=0.04$), 69% ($p=0.02$) and 52% ($p=0.001$) of preop levels at 3-5 days, 3 weeks, and 6 weeks after the operation, respectively.

Conclusion: Insulin and glucose balances improve early after RYGB. Our data support a weight-independent period of HOMA-IR improvement followed by a weight-related improvement in glucose homeostasis.



Bariatric Surgery – P077

CANCER IN THE GASTRIC REMNANT PRESENTING EARLY AFTER GASTRIC BYPASS. Jason L Harper MD, Derrick Beech MD, David S Tichansky MD, Atul K Madan MD, University of Tennessee Health Science Center, Memphis, TN and Meharry Medical College, Nashville, TN

Gastric carcinoma in the gastric remnant after roux-en-y gastric bypass (RYGB) is rare but has been reported. The time from surgery to the presentation of carcinoma has ranged from 5 to 22 years postoperatively in the literature. A significant concern with RYGB is the difficulty evaluating the gastric remnant. Due to this difficulty some surgeons recommend routine preoperative evaluation via endoscopy. Although most findings are benign, abnormalities are frequently discovered during screening endoscopy in bariatric surgery patients.

We present a 45-year-old female who had an open RYGB. Approximately one year later she presented with abdominal pain and distension. CT scan diagnosed a gastric remnant mass causing gastric outlet obstruction and subsequent exploration revealed unresectable metastatic gastric adenocarcinoma. A decompressive gastrostomy tube was placed, and she was treated with chemotherapy and radiation. She eventually expired due to metastatic disease. She did not have a preoperative endoscopic evaluation.

This case illustrates the importance of endoscopic evaluation prior to RYGB and it signifies the need for a high index of suspicion in order to recognize this problem at an early stage.

Bariatric Surgery – P078

PREOPERATIVE BARIATRIC SCREENING AND TREATMENT OF H. PYLORI. Charles W Harten MD, Daniel S Remine, Tananchai A Lucktong MD, Carilion Clinic, Roanoke, Virginia, USA

INTRODUCTION: A preoperative screening and treatment program of pre-existing H. pylori infections was hypothesized to reduce postoperative bariatric complications and associated morbidity as the role of H. pylori in gastrointestinal symptomatology and peptic ulcer disease is known.

METHODS: A single institution, single surgeon, IRB approved, retrospective chart review was done for 183 consecutive patients undergoing an initial laparoscopic gastric bypass over a 40-month period from December, 2003 to April, 2006. The patients were divided into an H. pylori untested group (125 patients) and a tested and treated if indicated group (58 patients). Patient demographics and incidences of hospital re-admissions, GI ulceration and bleeding, perforated viscous, esophagogastrroduodenoscopy, and foregut symptoms were documented at routine follow-up and emergency room visits. Results were subjected to analysis with Fisher's exact test.

RESULTS: Seven patients (12%) in the tested group were positive for H. pylori and treated. The number of GI ulcers and bleeding, EGDs, ER visits, and hospital re-admits were not statistically different; however, in the untested group, six patients (5%) presented with viscous perforation compared with none in the tested and treated group ($p=0.09$). Demographics for both groups were similar and both had a large number of non-specific foregut symptoms.

CONCLUSION: Preoperative H. pylori screening should continue, especially in geographically high prevalence areas, as data suggest that the incidence of viscous perforation may be reduced with preoperative treatment if indicated.



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Bariatric Surgery – P079

REVERSE ANGLE OF HIS DISSECTION: A NEW TECHNIQUE FOR LAP. BAND PLACEMENT, Aaron B Hoffman, Colin J Powers MD, Alan C Geiss, Melanie L Howard RPA-C, Syosset Hospital- Laparoscopy Center, North Shore- Long Island Jewish Health System, Syosset, New York

Purpose: Laparoscopic adjustable gastric banding has become an important component of bariatric surgery with ever increasing utilization. However, the placement of the laparoscopic adjustable gastric band (LAGB) can prove difficult in the morbidly obese patient secondary to multiple anatomic factors. While traditional lesser curve dissection methods include the peri-gastric and the pars flaccida techniques, a novel approach is now described with allows for placement of the LAGB using a reverse Angle of His dissection to position the LAGB.

Methods: Two separate cases are presented in which access to the hepatogastric ligament and right crus were not possible secondary to challenging anatomy. As access to the retrogastric plane was not possible through the traditional lesser curve dissection options, a custom modified 10mm laparoscopic esophageal dissector was used to open the phrenogastric ligament on the greater curvature at the Angle of His and dissect into the retrogastric plane in reverse fashion.

Results: In both of the described cases, the reverse Angle of His dissection technique allowed for placement of the LAGB in morbidly obese patients with challenging anatomy. Both patients experienced uneventful peri-operative periods and have progressed well during their post-operative follow-up. The method for step-by-step performance of this innovative technique is described and illustrated.

Conclusions: While the LAGB can be a highly effective tool for surgical treatment of the morbidly obese, this modality can pose significant technical difficulties and requires advanced laparoscopic skill. Though the lesser curve dissection techniques remain the easiest and preferred means to place the LAGB, this new approach allows for successful and safe placement of the LAGB when exposure to the right crus is limited and the lesser curve approach to the retrogastric plane cannot be established.

Bariatric Surgery – P080

UNCOMMON CAUSE OF CHRONIC NAUSEA, VOMITING AND REGURGITATION FOLLOWING LAPAROSCOPIC GASTRIC BYPASS: LONG JEJUNAL DIVERTICULUM SYNDROME, Dennis Hong MD, Jay Jan MD, Emma J Patterson MD, Laparoscopic Bariatric Surgery Program, Legacy Health System and Oregon Weight Loss Surgery LLC

Objective: To describe an unusual cause of chronic nausea, vomiting and regurgitation following laparoscopic gastric bypass procedure.

Methods: From January 2000 to September 2006, 778 patients underwent laparoscopic antecolic, antegastric gastric bypass at our institution. Using our IRB-approved, prospectively maintained database, we identified all patients who presented with chronic nausea, vomiting and regurgitation that required resection of the jejunal diverticulum at the gastrojejunal anastomosis. All values are given as median (range).

Results: 4 patients presented with chronic nausea, vomiting and regurgitation following laparoscopic gastric bypass that required resection of an elongated jejunal diverticulum. All patients underwent investigations including bloodwork, and endoscopy. The first 3 patients underwent CT scans and upper GI. Median age was 41.5 yrs (16 yrs). All patients underwent a laparoscopic antecolic, antegastric gastric bypass with a 25-mm EEA circular staple technique. Median time to symptoms after gastric bypass was 11 months (15 mo). Time to correct diagnosis was 3 months (2.5 mo). Median length of jejunal diverticulum was 5.5 cm (1 cm) All patients had complete resolution of symptoms following resection of the elongated jejunal diverticulum.

Conclusion: An elongated jejunal diverticulum is a rare cause of chronic nausea, vomiting and regurgitation. Resection of the diverticulum results in immediate relief of symptoms

Bariatric Surgery – P081

RECURRENCE OF MESENTERIC DEFECTS AFTER CLOSURE IN ROUX-EN-Y GASTRIC BYPASS, William W Hope MD, Albert Y Chen MD, Keith S Gersin MD, Timothy S Kuwada MD, B Todd Heniford MD, Carolinas Medical Center

Background: Numerous studies have documented the risk of developing small bowel obstruction after Roux-en-Y gastric bypass (RYGBP). Debate still remains concerning the importance of closing all mesenteric defects. We reviewed patients who have undergone gastric bypass with suture closure of their jejunojejunostomy mesenteric defects. In patients who required subsequent surgery, the mesenteric defect was examined intraoperatively. This study documents the status of the mesenteric closure at reoperation.

Methods: A retrospective review of patients undergoing abdominal surgery after RYGBP was performed from August 1999 to August 2006. The operative notes from subsequent surgeries were reviewed to examine the status of the mesentery at the jejunojejunostomy.

Results: Fifteen patients underwent surgery between 6-19 months after either open (8) or laparoscopic (7) gastric bypass. Patients lost between 52-137 pounds between operations. Surgeries were performed for various indications including ventral hernia (7), cholecystectomy (3), abdominal pain (3), and small bowel obstruction (2). All 15 patients were found to have open mesenteric defects at surgery despite previous closure. All of the defects were incidental findings and not causal factors in reoperation.

Conclusions: Routine suture closure of mesenteric defects after gastric bypass is not an effective means of permanent closure. This finding is probably secondary to the extensive weight loss and loss of fat within the mesentery in this patient population.

Bariatric Surgery – P082

A CANADIAN EXPERIENCE COMPARING LAPAROSCOPIC GASTRIC BYPASS TO ADJUSTABLE GASTRIC BAND, Quoc H Huynh MD, Shea Chia MD, Hagen A John MD, Starr David MD, Klein Laz MD, Urbach David MD, Humber River Regional Hospital

Authors/Institutions: Quoc H. P. Huynh, MD; Shea Chia, MD; David Starr, MD; Laz V. Klein, MD; John A. Hagen, MD; David Urbach, MD. Minimally Invasive Surgery Program, University of Toronto.

Introduction: Laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic adjustable gastric band (LAGB) procedures are common practice in the United States. In Canada, the experience is limited with few institutions doing either and fewer still doing both. It is important to compare the two in Canada because LRYGB is covered by publicly available health insurance, while LAGB is not. Patients having LAGB may have better outcomes compared to LRYGB, because having to pay for the procedure themselves might serve to make patients more motivated and invested in its success.

Methods: Retrospective chart review of consecutive LRYGB and LAGB from April 2005 to April 2006 at Humber River Regional Hospital in Toronto, Canada. We measured patient demographics, weight loss, percentage of excess weight loss, change in body mass index (BMI), early (<30d) and late (>30d) complications, reoperations, medical comorbidity, and patient satisfaction.

Results: A total of 124 patients were evaluated. 39 (31%) and 85 (69%) underwent LAGB and LRYGB, respectively. Demographic factors were similar between the two groups. Compared with LRYGB, patients who underwent LAGB experienced less percent excess weight loss (27% vs 55% EWL), but fewer complications (13% vs 21%).

Conclusion: Financial motivation does not translate into better outcome for LAGB compare to LRYGB.



Bariatric Surgery – P083

REMOVABLE IVC FILTERS IN HIGH RISK BARIATRIC PATIENTS, *Isaias Irgau MD, Gail m Wynn MD, Todd Harad MD, Christiana institute of advanced surgery and Delaware vascular Associates*

Background: Pulmonary embolism is a leading cause of early mortality following bariatric surgery. Several experienced bariatric surgeons have advocated the prophylactic use of IVC filters in a sub-group of bariatric patients with higher than average risk for Pulmonary Embolism. The enthusiasm for this approach has been tempered by the long term morbidity associated with traditional permanent IVC filters. The advent of removable IVC filters has made this prophylactic intervention more appealing. We report our experience with the prophylactic use of removable IVC filters, in high risk bariatric patients.

Methods: Retrospective analysis of medical records, of patients selected to have prophylactic removable IVC filters prior to primary bariatric procedures.

Results: From June 2003 to September 2005, 42 patients underwent preoperative removable Gunther-Tulip IVC filters placement. Mean age 47yrs, mean BMI 54.1, Female 75% Male 25%. Reason for IVC filter - history of venous thromboembolism and/or venous stasis disease. All placements by single vascular surgeon in the radiology suite or the OR on day of bariatric surgery except for 9 cases done one or more days prior to bariatric surgery. Mean length of filter stay prior to removal 16.6 days, range 9-30 days. Filters removed successfully, 38 out of 42. Failed attempt at retrieval 1 case, patient refusal 1 case. Clinical decision to leave filters in place 2 instances, development of DVT/PE 1 patient and long postoperative illness 1 patient. No other filter related complications.

Conclusion: Removable IVC filters are safe in the high risk bariatric patients and allow for a proactive prophylaxis against Pulmonary Embolism while avoiding the long term morbidity of permanent filters.

Bariatric Surgery – P084

PREDISPOSING FACTORS FOR BAND SLIPPAGE IN LAP-BAND PATIENTS, *Jay C Jan MD, Matt Muhlbauer BS, Dennis Hong MD, Emma J Patterson MD, Department of Surgery, Legacy Health System, Portland, Oregon*

Background: Band slippage or gastric prolapse is a well-known complication of gastric banding. Predisposing factors have not been characterized.

Methods: All patients who underwent laparoscopic adjustable gastric banding (LAGB) by a single surgeon at Legacy Health System over a two-year period were identified from a prospectively-maintained database. All patients received either a 10 cm or 11 cm Lap-Band System using the pars flaccida technique. Occurrence of band slippage, preoperative BMI, excess weight loss (EWL), crural repair, and gastric band size were analyzed.

Results: From November 2002 to November 2004, 223 patients underwent LAGB. Mean follow-up was 26 months. 195 patients received the 10 cm Lap-Band and 28 patients received the 11 cm Lap-Band. 13 patients (5.8%) were diagnosed with band slippage. The mean time interval between primary surgery and diagnosis of slippage was 9 months (range 9 to 43). There was no significant difference in age (45 vs. 46 years; P = 0.743) or male sex (8 vs. 20%; P = 0.471) between patients with slippage and without slippage.

	Slip (N=13)	No Slip (N=210)	P
Preop BMI	46.8	51.8	0.043
11 cm Lap-Band	0%	13.3%	0.380
Crural Repair	23.1%	11.0%	0.182
EWL at 12 mo	41.7%	33.4%	0.075
Follow-up (mo)	29	25	0.237

Conclusion: Band slippage is associated with lower preoperative BMI and possibly faster early weight loss. Increased use of the 11 cm Lap Band may reduce the incidence of band slippage.

Bariatric Surgery – P085

PREVENTION OF MORTALITY FROM PULMONARY EMBOLISM IN BARIATRIC PATIENTS THROUGH IVC FILTER PLACEMENT, *Clark M Kardys MD, Mark L Manwaring MD, Michael Stoner MD, Michael Barker MD, Kenneth MacDonald MD, John Pender MD, William Chapman MD, East Carolina University Department of Surgery*

Objective: The placement of inferior vena cava filters (IVCF) is thought to provide protection from fatal pulmonary embolism (PE) despite causing an increased incidence of deep venous thrombosis (DVT). We hypothesize that our practice of IVCF placement in bariatric patients helps prevent fatal PE and we present our analysis of that data. PE is the leading cause of death after gastric obesity procedure (GOP) approximating 0.5%. It has been our practice to offer IVCF placement to those with BMI > 60 kg/m², profound immobility, history of venous thromboembolism (VTE), hypercoagulable state, or venous stasis. **Methods:** Hospital and outpatient records of all 494 patients who underwent GOP in our practice from January 1, 2004 to May 31, 2006 were reviewed. Patients who underwent IVCF placement under fluoroscopy or intravascular ultrasound (IVUS) were selected. Co-morbidities, outcomes, and complications were recorded. **Results:** Thirty-two patients (mean BMI = 67±3.18 kg/m²) underwent GOP (9 laparoscopic, 23 open) with perioperative IVCF placement by fluoroscopy (5) or IVUS (27). Indications were history of VTE (4), hypercoagulable state (3), and profound immobility (25). Technical success rate of placement was 97.3% with one filter placed in the iliac vein using IVUS. Three patients (9.4%) were diagnosed with DVT postoperatively. Computed tomography detected PE in one of those patient (3.1%) two months postoperatively. There were two deaths with a mean follow up of 302±35.5 days. Autopsy excluded VTE as the cause of death in those patients. **Conclusions:** Our population is at greater risk for VTE than the standard GOP population due to immobility from unusually large BMI or hypercoagulable state. IVUS guided IVCF placement allows for added PE prophylaxis in high risk and super obese patients who may not be candidates for IVCF placement due to table weight limits or fluoroscopic penetration limitations. This technique make IVCF placement possible in almost any patient. This data suggests IVCF placement is effective in preventing fatal PE. A larger patient population will be required to prove statistical efficacy or to determine the risk relationship between prevention of mortality from PE and contribution to DVT related morbidity from IVCF placement.

Bariatric Surgery – P086

LAPAROSCOPIC BARIATRIC SURGERY IN JAPAN: SINGLE SURGEON'S SERIAL EXPERIENCES, *Kazunori Kasama MD, E Kanehira MD, A Umezawa MD, T Kurosaki MD, T Ohshiro MD, Yotsuya Medical Cube*

Background: Bariatric Surgery was very rare in Japan But recently obesity become a social problem. We performed the first Laparoscopic Roux en Y Gastric Bypass (LRYGB) in Japan in Feb. 2002. In this study we present our experiences.

Methods: From Feb.2002 to Sep. 2006, 102 patients underwent Lap Bariatric surgery by single surgeon. 93 cases of LRYGB, 6 cases of Lap sleeve gastrectomy (LSG) and 3 cases of LAGB in Japan. Median preoperative BMI of LRYGB was 43.7, LSG: 60.5, LAGB: 40.

Results: Our procedures of LRYGB: Antecolic antegastric method. Gastrojejunostomy methods were 1 circular stapler, 8 liner stapler, 83 Hand sewn Double-layer. Leakage occurred in 1 circular stapler case, and 3 Hand-sewn cases. Stenosis occurred in 1 linear stapler case and 6 hand-sewn cases. No mortality within 30 days postope. was observed. Average weight loss 30kg, BMI-11.5, 60% of Excess body weight loss was achieved at 6 mo. after surgery, 42kg, BMI -15.8, %EWL 79% at one year, 43kg BMI -16.4 %EWL 74% at two year after surgery and 53kg, BMI-19, %EWL 80% at four years after surgery. Almost every co-morbidity are improved after surgery. Two LRYGB with simultaneous remnant gastrectomy were done for the patients with family history of



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gastric cancers. And one case of double balloon endoscope was safely done at three years after LYRGB for examination of remnant stomach.

Six cases of LGB were done as 1st procedure for two stage operation or solo procedure as alternative of LAGB. At 3 mo., average weight loss 25 kg, BMI -9.0, %EWL 30%. At 6 mo., weight loss 29kg BMI -13 %EWL 25%.

LAGB results are at 3Mo., -14kg BMI -5.5 ,%EWL 32%, at 6Mo.-19kg BMI -7.5 ,%EWL 43% and at 9Mo.-23kg BMI -9.0 %EWL 52%.

Conclusion: LRYGB shows superior results to other operations even in Japan. Japan is high risk region of gastric cancer but simultaneous remnant gastrectomy for high gastric cancer risk case and double balloon endoscope can be done safely. Lap Band is the least perioperative complications. Sleeve gastrectomy will be the one of the option for restrictive procedures in Japan.

Bariatric Surgery – P087

SUBCLINICAL DIABETIC GASTROPARESIS MAY CONTRIBUTE TO POOR OUTCOMES AFTER LAPAROSCOPIC GASTRIC BAND, Ajay Goyal MD, Catherine A Boulay MD, Overlook Hospital Summit, New Jersey

Introduction: The subset of patients who do not tolerate the laparoscopic adjustable band remains an elusive patient population to identify before surgery. Diabetes Mellitus, a common co-morbid condition in bariatric patients, is frequently associated with gastroparesis. We propose screening for diabetic patients to identify subclinical forms of diabetic gastroparesis which may be exacerbated by placement of a band.

Methods: We retrospectively reviewed our last 175 bariatric cases performed over two years in a community hospital setting. Patients were closely followed post-operatively with interviews and questionnaires, to evaluate improvements in co-morbid conditions and to elicit post-operative problems.

Results: Of the 175 patients reviewed, 100 patients underwent laparoscopic gastric bypass (57%) and 75 patients (43%) laparoscopic adjustable band. Eleven (15%) of the 75 gastric band patients had diabetes. One diabetic patient underwent conversion of gastric band to bypass after 18 months of aggressive postoperative management for inadequate weight loss with nausea & vomiting, despite normal findings on UGI and endoscopy. A second diabetic patient is undergoing evaluation for similar complaints. This problem was not seen in any of our non-diabetic gastric band patients or any gastric bypass patients.

Conclusions: Diabetic patients without obvious signs of gastroparesis prior to surgery may be at risk for developing dysmotility problems after placement of a gastric band. A preoperative evaluation to detect subtle forms of gastric dysmotility will be discussed. Gastric bypass is an alternative for bariatric patients at risk for complications of diabetic gastroparesis.

Bariatric Surgery – P088

BARIATRIC SURGERY IN PATIENTS OVER 65 YEARS IS SAFE WITH ACCEPTABLE MORBIDITY, Ashutosh Kaul MD, Thomas Sullivan, Dominick Artuso MD, Edward Yatco MD, Thomas Cerabona MD, New York Medical College

Aim of this presentation is to communicate our results of bariatric surgery in patients over 65 years (seniors) of age at a single center.

This is a retrospective analysis of prospectively maintained data from a tertiary care center. Data was analyzed from 1999 till August 2006. All cases were done by bariatric surgeons and by fellowship trainees under their guidance. Of the 1217 cases done in that period 30 bariatric procedures were done in senior patients.

	Under 65	over 65
cases	1187	30
BMI	49.37	46.55
Lap bands	152	12
Gastric bypass	1024	18
Readmission rat	6.2%	0%

There were a higher percentage of seniors who opted for

the band in comparison to younger patients. The number of seniors undergoing bariatric surgery has increased dramatically in our series. While there were no cases in years 1999, 2001 and 2002 the percentage has increased in the later years (2000=1 case only, 2003=2.5%, 2004 = 3.1%, 2005 = 1.5% and 2006 = 5.9%). The excess weight loss in this series was 45% at one year. This partly reflects the advanced comorbidities, limited mobility and a higher percentage of these patients electing to have a lap band that continues to have weight loss over a longer period. There were 3 conversion to open surgery and 3 mortalities in patients under 65 years old only.

Our technique in creation of gastrojejunostomy is a four layered hand sutured technique and we bring the roux limb up in a retro-colic retrogastric route. We have had no leak from the GJ in over 970 cases. This series thus shows that bariatric surgery can be safely done in patients over 65 years old with acceptable morbidity

Bariatric Surgery – P089

THE USE OF RETRIEVABLE VENAL CAVAL FILTERS IN BARIATRIC PATIENTS, Colleen Kennedy MD, Daniel Devun MD, Dennis Kay MD, William Richardson MD, Ochsner Medical Center

Introduction: The risk of a venous thromboembolic event (VTE) after bariatric surgery is significant and linked to multiple factors. The risk of increased morbidity/mortality with these events is seen in patients with a BMI >60, weight >400, immobility, personal history of DVT/PE. We evaluated the use of retrievable venal caval filters in this patient population for prevention of PE in the high-risk perioperative 3 months.

Methods: A retrospective review was performed examining all patients undergoing a laparoscopic gastric bypass from December 2003 to August 2006 at one institution. All patients undergoing preoperative IVC filter placement were examined.

Results: Between December 2003 and August 2006, 17 of 250 patients undergoing bariatric surgery underwent preoperative IVC filter placement prior to surgery. 15 patients had a Bard recovery filter placed and 2 patients had the Bard G-2 filter placed. All filters were placed percutaneously by interventional radiology. Indications for placement included BMI >60, weight >400 lbs (12), history of DVT/PE (4), wheelchair dependence (1). 10 patients had removal of the filter attempted at 3-6 months post bypass. Retrieval was successful in 8 of 10 patients (80%). A single VTE was seen postoperatively (DVT). No PEs were seen in our group.

Conclusion: The development of retrievable IVC filters allows a new option in the prevention of PE in the high-risk bariatric patient. Incorporation of this option in standard preoperative protocols for bariatric patients may provide improved protection from postoperative PE while avoiding the risks/complications associated with permanent vena caval filters.

Bariatric Surgery – P090

AGE RELATED RESOLUTION OF CARDIOVASCULAR COMORBIDITIES IN BARIATRIC SURGERY PATIENTS, E Ketchum BS, Y Liu BS, J Hagedorn MS, B Encarnacion BS, DB Williams MD, J Morton MD, Stanford Department of Surgery

Introduction: Given that bariatric surgery is the only effective and enduring therapy for morbid obesity, bariatric surgery is now increasingly performed on older patients. Post-operative discharge without cholesterol, diabetes, or hypertension medications is common based on high rates of comorbidity resolution after surgery. We explored the degree to which older patients achieved cardiovascular comorbidity resolution as compared to younger patients.

Methods: A retrospective chart review of patients undergoing laparoscopic Roux en Y gastric bypass between July 2003 and June 2006 at the Stanford Hospital was conducted. Demographics, comorbidity resolution, cardiovascular risk factors, and weight loss in patients at or below and over the age of 50 were compared using Student's t-test and chi-squared analysis as appropriate.



Results: 489 patients were identified. One-year complete data were available for 153 patients (49 in the senior cohort of age >50 and 104 in the junior cohort of age < 50). The senior cohort and junior cohort were similar respectively in % female (78 vs. 84, $p=.17$) preop BMI (48 vs. 47, $p=.34$) and percent BMI loss at 1 year (31 vs 33, $p=0.16$) but the senior cohort had a higher mean of comorbid conditions (4.5 vs. 3.2, $p<.01$). The senior cohort demonstrated less improvement in cardiac risk factors at one year including reductions in cholesterol level at (15 vs. 33, $p=.02$), triglycerides (52 vs. 79, $p=.27$), and LDL (14 vs. 29, $p=.03$). The senior cohort had lower rates of comorbidity resolution for hypertension (65% vs. 78%, $p=.04$) and diabetes (72% vs. 91%, $p=.04$) at 12 months. The senior cohort also had worse levels of homocysteine (9.3 vs. 8.6, $p=.21$), lipoprotein A (3 vs. 2, $p=.23$), CRP (3.2 vs. 2.4, $p=.19$), and a comparable A1C level (5.6 vs. 5.6) at 12 months.

Conclusions: Improvements in pre-operative comorbidities are significantly less pronounced in older patients undergoing gastric bypass as compared to younger patients. It may not be appropriate to routinely discontinue lipid and hypertension medications in post-operative gastric bypass patients over the age of 50.

Bariatric Surgery – P091

INCISIONLESS ACCESS PORT INSERTION METHOD DURING LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING, Eung K Kim MD, Sang K Lee MD, Department of Surgery, College of Medicine, The Catholic University of Korea

Objective: Laparoscopic adjustable gastric banding (LAGB) is a relatively simple procedure with considerable weight loss outcome, sometimes comparable to Roux-en-Y gastric bypass. It is the most frequently performed bariatric procedure in Europe, Australia, and now, it is increasing in frequency in US. We have noticed that people willing to have LAGB are very concerned about the surgical scars after the procedure. Our team has developed a way to implant the access port without making an elongated incision. Methods: Eleven patients who underwent LAGB surgery with this method are included in this study. This method consists of introducing the access port through the umbilical trocar insertion site, thus obviating an elongated incision for the port insertion. After making a supraumbilical incision, about 10-cm long epifascial tunnel is made cephalad to umbilicus and slightly to the patient's left side; then, an 11-mm trocar is inserted after advancing 10 cm in epifascial plane, which is entered into the abdominal cavity through an oblique direction. Using this trocar incision site, it is possible to introduce the LAP-BAND (Inamed Health, Santa Barbara, CA). The rest of the trocars used are all 5-mm ones. After the insertion of LAP-BAND as described by O'Brien and completing gastro-gastric stitches, the end of the tubing system is brought out through the optical trocar site. The access port is connected to the tube and placed on epifascial tunnel after undermining the space. Results: There were 8 females and 3 males in this study. Mean preoperative weight and BMI were 102.4 ± 17.4 kg and 35.9 ± 7.4 kg/m², respectively. There were 2 patients who had seroma collections on port site, which were treated conservatively. No other wound-related complication occurred. Mean excess weight loss at 6 months was 32.9 ± 12.8%. Conclusions: With this incisionless access port insertion method, there is no need for elongating one of the trocar wound. The access port is consistently well localized with palpation above the umbilicus and wound related complication is comparable to the traditional method. We recommend this approach for all morbidly obese patients who wish to have surgical scars similar to that of a laparoscopic cholecystectomy.

Bariatric Surgery – P092

LAPAROSCOPIC GASTRIC BYPASS SURGERY IN AN OBESE SLOW PROGRESSIVE INSULIN DEPENDENT DIABETIC PATIENT, Dan Kolder MD, Vanessa Kuwajima-Smith BS, Timothy Geiger MD, Mayfield Timothy MD, Bruce Ramshaw MD, Roger de la Torre MD, Stephen Scott MD, University of Missouri Hospitals and Clinics

We report an obese 35 year old female who developed type I diabetes mellitus after being diagnosed with type II diabetes. Medical management of her diabetes mellitus had failed on multiple previous insulin and oral hypoglycemic regimens. She had a history of severe insulin insensitivity with insulin autoantibody titers (ICA) of 7.9 U/ml (normal range 0.0-1.0 U/ml). At the initial presentation, the patient's BMI was 33.97 kg/m² and her HgA1C was 11.4%. The patient underwent a laparoscopic Roux-en-Y gastric bypass surgery. During the postoperative period, the patient's blood glucose levels remained in the 100-150 mg/dl, a significant improvement from the preoperative values of 360 mg/dl. In the following post-operative weeks, the patient converted to an euglycemic state, requiring only modest doses of insulin. There is a scarcity of case reports in the literature addressing the effects of gastric bypass surgery in obese autoimmune type I diabetics; the accumulation of such reports are important in understanding the relationship between obesity, insulin resistance, insulin autoantibodies, and the effect of weight loss in the glycemic control of such patients.

Bariatric Surgery – P093

A COMPARISON OF LAPAROSCOPIC AND OPEN REVISIONS OF ROUX-EN-Y GASTRIC BYPASS, Ikram Kureshi MD, A Tavakkolizadeh MD, K Clancy RN, Cesar Escareno MD, David Lautz MD, Brigham and Women's Hospital, Dept of Surgery, Harvard Medical School, Boston, MA

Introduction: The ongoing proliferation of bariatric surgical procedures has led to increasing numbers of patients requiring revisional surgery. Previous studies have reported that the laparoscopic approach for revisional Roux-en-Y gastric bypass (rev-RYGB) is technically feasible with acceptable morbidity and mortality. No studies to date, however, have compared the laparoscopic and open approaches of rev-RYGB. This study compares the outcomes of the 2 different approaches in a single institution.

Methods: This is a retrospective review of 24 consecutive patients who underwent rev-RYGB by a single surgeon. Rev-RYGB was defined as any procedure involving revisional surgery to the stomach and ending with RYGB. Isolated small bowel procedures were excluded. Patient demographics, indications for revision, intraoperative and postoperative morbidity, length of stay, operative time, and 30 day mortality were reviewed in both groups. Student's t-test was used to compare the two groups.

Results: 16 procedures were performed open and 8 laparoscopically. The average age in both groups was 44. Female gender predominated in both the open (94%) and the laparoscopic (88%) groups. Original bariatric procedures were RYGB in all but two patients who had undergone vertical banded gastroplasty. The most common indication for rev-RYGB was symptomatic gastro-gastric fistula in both the open (44%) and the laparoscopic (75%) groups. Other indications included gastrojejunal obstruction, marginal ulcer, intractable reflux, roux limb obstruction, and large pouch size. Average time from the original procedure was 44 months in the laparoscopic group and 43 in the open group. Average operative time for the open group was 207 min and 261 min for the laparoscopic group ($p>0.05$). The average length of stay was 2.4 days in the laparoscopic group and 7.9 days in the open group ($P=0.001$). There was one intraoperative complication of a splenectomy in the open group and none in the laparoscopic group. There was one leak in the open rev-RYGB series, and no deaths in either group.

Conclusion: In this limited series, there was no difference between the two groups in patient demographics, operative time, or intra-operative or postoperative complications. The length of stay, however, was significantly lower in the laparoscopic group compared to the open group. This sug-



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gests that laparoscopic rev-RYGB, despite its technical complexity, may offer patients a faster recovery.

Bariatric Surgery – P094

USE OF 3M? TEGADERM? ABSORBENT CLEAR ACRYLIC DRESSING ON SURGICAL WOUNDS, Brian E Lahmann MD, Christopher D Joyce MD, Midwest Comprehensive Bariatrics, Joliet, IL

This study was an open-label, prospective, non-comparative evaluation the use of a new transparent absorbent dressing on surgical incision wounds. The objective was to evaluate performance of the dressing for this use. Twenty patients that completed Open Gastric Bypass Surgery (OGBS, N=10) or Laparoscopic Gastric Bypass Surgery (LGBS, N=10) were studied. Incisions were closed with subcuticular sutures and 3M ? Steri-Strips? Wound Closure (LGBS group), or with staples (OGBS group). The dressing was applied over the closed incisions in the OR. Dressings were removed prior to discharge or by post-op day-3. Assessments of dressing performance were completed at application and at removal. Data was analyzed with descriptive statistics. There were 5 male and 15 female patients. Mean (SD) Age = 43.6 (10.7) years, Height = 65.6 (3.5) inches, Weight = 284.1 (72.3) lbs. Each LGBS patient had five small incisions (N=50) and each OGBS patient had one or two larger incisions (N=11). At application and removal of the dressings, the vast majority of clinician dressing assessments were rated as Good or Very Good. This included: ability to assess wound through the dressing (100% at application, 98% at removal), conformability (100%), application ease (100%), removal ease (100%), absorbency (98%), adhesion (97%), barrier properties (98%), comfort during removal (98%), overall comfort (100%), non-adherence to wound (100%), and wear-time (98%). There was little (12%) to no (88%) residue left on the skin, and there was little (2%) to no (98%) odor associated with the dressing or wound. Clinician assessments of the value on transparency was High to Very High in 98% of incisions, and overall satisfaction was rated as Good to Very Good in 97% of incisions. Complete approximation occurred in all incisions. **CONCLUSIONS:** The new transparent absorbent dressing performed well and may be an appropriate choice for dressing surgical incision wounds.

Bariatric Surgery – P095

USE OF A BLADED OPTICAL PERITONEAL ACCESS TROCAR IN THE UNINSUFFLATED ABDOMEN; A FIVE-YEAR EXPERIENCE, Timothy R Lapham MD, Michael Tarnoff MD, Julie Kim MD, Scott Shikora MD, Tufts- New England Medical Center

Background: The Visiport is a widely-used bladed optical access trocar that provides convenient, safe peritoneal entry. Although the device is typically used in an abdomen insufflated by closed technique, we have used it as our primary method of entry and insufflation. Although uncommon, injuries associated with abdominal access for laparoscopic surgery can be catastrophic. FDA reporting for injuries associated with the Visiport exists, but the system is voluntary and the rate of injury is unknown. Comprehensive long-term reviews looking at experience with use of this trocar in an uninsufflated abdomen are lacking. We present our 5-year experience.

Methods: From 7/30/2001 to 8/30/2006, laparoscopic access for all bariatric surgery at a single center was gained using the 5mm-12 mm Visiport device without prior insufflation. Three attending surgeons and five laparoscopic bariatric fellows used the device for a total of 1,626 cases, including 1,233 laparoscopic gastric bypass procedures (LGBP) and 393 laparoscopic adjustable gastric band placements (LAGB). All LAGB had an off-midline Visiport insertion. The LGBP entry point was midline except in cases where alternate site access was desired due to prior surgery.

Results: 1,623 of 1,626 (99.8%) entries were uneventful. Three injuries occurred (0.2%). Two required conversion to laparotomy and repair of lateral retroperitoneal bleeding. The other patient had self-limited retroperitoneal bleeding that was managed laparoscopically. All injuries occurred with placement of the trocar in an alternate site off the mid-

line. No injuries occurred with midline placement. There was no long-term morbidity and no mortality associated with the injuries.

Conclusion: Use of the Visiport without prior insufflation is safe in the morbidly obese population. It appears to be safest in the midline, where the layers of the abdominal wall are easily recognized. Alternate site entry requires extra caution because the anatomic layers are less predictable and harder to recognize.

Bariatric Surgery – P096

EFFECT OF BARIATRIC SURGERY ON WEIGHT LOSS IN PATIENTS WITH TYPE 2 DIABETES, Hongchan Lee MD, Leslie Tyrie MD, James J McGinty MD, Blandine Laferrère MD, Julio A Teixeira MD, Division of Bariatric Surgery, Department of Surgery, Division of Endocrinology Diabetes and Nutrition, St. Luke's-Roosevelt Hospital Center, Columbia University

BACKGROUND: Laparoscopic bariatric procedures, Roux-en-Y Gastric Bypass (LRYGBP) and Adjustable Gastric Banding (LAGB), are the most effective interventions resulting in sustained weight loss in morbid obese patients with co-morbid condition such as DM. Studies suggest that patients with diabetes do not respond to weight loss program as well as non-diabetic. Data show that LRYGBP induces more weight loss than LAGB, however, it is unclear whether this applies specifically to patients with diabetes.

OBJECTIVE: To study the weight loss in the 12 months after LRYGBP and LAGB in patients with type 2 diabetes.

METHODS: Chart of 136 patients seen who underwent LRYGBP and LAGB between 2001 and 2005 were reviewed and data collected on age, BMI, duration of DM, DM medications, and % EBWL at 1,3,6, and 12 months. 63 complete data were obtained (LRYGBP=43/116, LAGB=20/20). To compare between LRYGBP and LAGB, an unpaired Student t-test with covariant analysis was used for statistical analysis.

RESULTS: Results are expressed as mean±SD. Mean age was 45.4±10.6yr for LRYGBP versus 45.6±9.7yr for LAGB(p>0.01) and preoperative BMI was 52.5±9.2kg/m² versus 43.25±4.6kg/m²,(p<0.001) respectively. Preoperative duration of DM was 6.4±6.4yr versus 3.5±3.2yr (p<0.001), and the global EBWL was 25.5% for LRYGBP versus 17.2% for LAGB at 1 month(p<0.001), 47.3% versus 27.2% at 3 months(p<0.001), 68.3% versus 32.8% at 6 months(p<0.001), 82.9% versus 40.9% at 12 months(p<0.001), respectively. The percentage of patients out of diabetes medications in 1 month were 65.1% for LRYGBP versus 20.0% for LAGB (p<0.001), 68.6% versus 22.5% in 3 months(p<0.001), 72.1% versus 25.0% in 6months(p<0.001), 95.4% versus 80.1% in 12 months(p<0.001).

CONCLUSIONS: Both weight loss procedures are effective in inducing significant weight loss and improving Type 2 DM. As in non-diabetic, LRYGBP is associated with significantly more weight loss than LAGB in patients with diabetes.

Bariatric Surgery – P097

LAPAROSCOPIC SLEEVE GASTRECTOMY AS AN ALTERNATIVE OPTION IN LOW BMI PATIENTS: INITIAL RESULTS, ANDREAS KIRIAKOPOULOS MD, DIMITRIOS TSAKAYANNIS MD, DIMITRIOS LINOS PhD, 1st Surgical Clinic, Department of Surgery, ??Hygeia?? Hospital, Athens, Greece

Objective: Laparoscopic sleeve gastrectomy (LSG) has been used in high-risk super-obese patients or as a part of a two-stage procedure followed by Roux-en-Y gastric bypass (RYGBP) or duodenal switch (DS) in super-super obese patients. The aim of this study is to evaluate the efficacy of laparoscopic sleeve gastrectomy for morbidly obese patients with BMI<50

Patients and Methods: We have prospectively studied the initial eight patients that underwent laparoscopic sleeve gastrectomy. The operation was performed through one (or occasionally two)12-mm ports and two 5-mm ports, using the Endo-GIA stapler to create a lesser curve gastric tube over a 32-Fr bougie. Study endpoints included operative time, complication rates, hospital length of stay and percentage of excess weight loss (% EWL).



Results: There were three females and five males with mean age 40.5 yrs (range 28-50) and mean BMI 45.95 kg/m² (range 40.7-49.2). Mean operative time was 167.5 min (range 90-240). There were no intraoperative or postoperative complications and all patients discharged on the 2nd postoperative day after an upper GI series and onset of clear liquid diet. At a mean follow-up of 6.25 months the % EWL reached 46% ± 11.2, whereas the most noteworthy feature is the significant loss of appetite reported by all patients

Conclusions: Laparoscopic sleeve gastrectomy has been safe and also highly effective for weight reduction in our small series. It may constitute an acceptable surgical option for low BMI patients, although accrual of more patients and longer follow-up will be necessary to evaluate long-term results.

Bariatric Surgery – P098

EARLY RESULTS OF REMNANT GASTRECTOMY FOR GASTRO GASTRIC FISTULAE AFTER DIVIDED ROUX Y GASTRIC BYPASS FOR MORBID OBESITY, Emil Matei MD, Samuel Szomstein MD, Raul J Rosenthal MD, Cleveland Clinic Florida

Background: Gastro gastric fistula (GGF) is a rare complication of divided Roux-en-Y gastric bypass (RYGBP). The incidence of GGF in our experience is 1.2%. To our knowledge, there is no standardized surgical treatment option for this entity. We present a novel surgical approach that removes the gastric remnant avoiding dissection near the fistulous tract.

Methods: We retrospectively reviewed 606 consecutive patients who underwent divided RYGBP for morbid obesity at our institution. The diagnosis of GGF was made with upper endoscopy, gastrograffin/barium swallow with supine and left lateral decubitus films or CT scan of the abdomen. The indications for surgery (remnant gastrectomy; RG) included pain, weight regain, bleeding and recurrent stricture.

Results: 25 patients were diagnosed with GGF (1.2%). 10 patients were treated medically and 15 surgically with remnant gastrectomy (RG). 11 of the 15 patients with RG had a RYGBP at our institution (73%). All 15 had an antecolic-antegastric divided RYGBP. 14 RG were performed laparoscopically (93%) while one was converted to an open procedure (7%). The mean hospital stay was 4.7 days. Morbidity in 5 patients (33%) was due to pneumonia, wound infection and bleeding. There were no mortalities. Follow up at 11 months showed weight loss in 93% of patients. There was a complete resolution of the pain, ulcer and GGF in 100% of the cases.

Conclusions: Remnant gastrectomy appears to be a safe and efficient surgical approach in the management of GGF.

Bariatric Surgery – P099

HORMONAL VALIDATION OF THE ROLE OF WEIGHT LOSS SURGERY IN THE TREATMENT OF POLYCYSTIC OVARIAN SYNDROME, C A McCloskey MD, S G Mattar MD, A P Courcoulas MD, G G Hamad MD, R Ramanathan MD, P R Schauer MD, M Wilson MD, G M Eid MD, University of Pittsburgh Medical Center and the VA Health Care System

INTRODUCTION: Obesity has been recognized as a major factor in the pathogenesis of polycystic ovarian syndrome (PCOS). In an earlier study, our group has demonstrated that the clinical manifestations of PCOS, significantly improved following surgical weight loss. The aim of the present study was to determine whether surgical weight loss is an effective treatment for PCOS, based on normalization of the hormonal and metabolic abnormalities associated with it.

METHODS: We performed a prospective analysis of women diagnosed with PCOS who underwent laparoscopic Roux en Y gastric bypass (LRYGBP) between January 2004 and June 2005. The diagnosis of PCOS was based on a total testosterone level >40 ng/dl and/or a free testosterone level >5.5 pg/ml, after excluding other causes of hyperandrogenism. Biochemical markers associated with PCOS, including cholesterol, triglycerides, insulin, and free testosterone, were drawn preoperatively and compared at 6 and 12 months

postoperatively.

RESULTS: A total of 14 women completed the study, 3 were lost to follow up. The mean age was 36.2. Mean preoperative BMI was 44.8 ± 1.6. All results are reported at 12 months postoperatively. The mean BMI decreased to 29.1 ± 1.6, with a mean excess weight loss of 66.5%. Total and free testosterone levels decreased from a preoperative mean of 59.0 ± 8.2 ng/dl and 5.9 ± 0.24 pg/ml, respectively, to a mean of 33.7 ± 4.4 ng/dl (p = 0.012) and 2.2 ± 0.26 pg/ml (p < 0.001). Mean insulin levels decreased from 39.3 ± 6.9 mIU/ml preoperatively to 10.0 ± 3.2 mIU/ml (p < 0.001). Mean cholesterol levels decreased from 219 ± 14.9 mg/dl preoperatively to 160.9 ± 7.2 mg/dl (p < 0.001). Mean triglyceride levels were 162.9 ± 17.8 mg/dl preoperatively compared to 71.8 ± 6.72 mg/dl (p < 0.0001). Prior to weight loss, only four of 14 patients (28.5 %) reported regular menses. At follow up, all patients reported having regular menses.

CONCLUSIONS: In obese patients with PCOS, weight loss following LRYGBP results in normalization of biochemical parameters in parallel to the established clinical benefits. These data further support the influential roles of obesity and, in a converse manner, weight loss, on the human hormonal milieu.

Bariatric Surgery – P100

INCIDENCE AND MANAGEMENT OF GASTROJEJUNAL ANASTOMOTIC STENOSIS AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS USING A HAND-SEWN

TECHNIQUE, Sandra Medina-Escobedo MD, Gaby A. Alarcón-Jarsún MD, Miguel F. Herrera PhD, Francisco Fournier MD, Gonzalo Rodríguez MD, Sergio Cañedo MD, The Obesity Clinic, ABC Medical Center, México City, MEXICO.

Introduction: Gastrojejunal strictures are a well-documented complication of RYGBP with frequencies ranging from 3% to 35%. The aim of the present study is to analyze the incidence, presentation, and management of gastrojejunal anastomotic strictures after LRYGBP using a hand-sewn gastrojejunostomy.

Patients and Methods: In an 18-month period, 110 patients underwent LRYGBP. All gastrojejunostomies were hand-sewn in two layers using running sutures (3-0 Poliglicolic acid for the internal and 3-0 Silk for the external layer). A 32 French bougie was used to calibrate the anastomosis giving a final diameter close to 15mm. All patients were followed for a minimum of 6 months. In the presence of dysphagia, food intolerance or vomit, an upper endoscopy was performed. Stenosis was diagnosed when a 9mm diameter endoscope would not pass through the gastroenterostomy without dilatation. Demographics, symptoms, time of occurrence, management, and outcome of patients presenting with stricture of the gastrojejunostomy were analyzed.

Results: A total of 5 patients developed stricture of the gastrojejunostomy (4.5%). There were 3 females and two males, with a mean age of 40.2 years (range 28-54). BMI before surgery was 41.1 Kg/m² (range 36-50). Four patients complained of dysphagia. Postprandial pain was present in 3 patients. One patient also presented vomit. Mean time between surgery and the diagnosis of gastrojejunal stenosis was 3 months (range 1-7). Mean size of the stenosis was 7-9mm. Pneumatic endoscopic dilation to 15-18mm was performed to all patients. Stenosis resolved in all 5 patients after dilation. In a follow-up period of 8 months, none of the patients has experienced recurrence of the stenosis.

Conclusions: Construction of a small (~15mm) gastrojejunostomy using a hand-sewn technique has resulted in a very low rate of gastrojejunal stenosis (4.5%). One pneumatic endoscopic dilation to 15-18mm achieved definitive treatment of the stenosis in all 5 patients.



Bariatric Surgery – P101

A 10-YEAR EXPERIENCE WITH LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING FOR MORBID OBESITY, Reinhard MITTERMAIR MD, S. Obermueller MD, F. Aigner MD, H. Nehoda MD, Department of Surgery, University Hospital Innsbruck, Medical University Innsbruck, Austria

INTRODUCTION: Because of its encouraging early results regarding weight loss and morbidity, laparoscopic adjustable gastric banding (LAGB) has been considered by many as the treatment of choice for morbid obesity. The aim of this study was to assess our 10-years results with the Swedish adjustable gastric banding.

METHODS AND PROCEDURES: Between January 1996 and December 2005 we performed 949 bariatric procedures and therefrom 775 patients underwent LAGB. All data (demographic and morphologic, co-morbidities, operative, and follow-up) were prospectively collected in a computerized databank.

RESULTS: 21 different surgeons (4 bariatric and 17 general surgeons) performed LAGB. There was no mortality or pulmonary embolism. Average total weight loss was 27.4 kg after 1 year, reaching an average total of 42.7 kg after 8 years. Mean excess weight loss was 44% after 1 year and 64% after 8 years, and the BMI decreased from 46.7 to 28.1 kg/m². Complications requiring reoperation occurred in 9.2%. In super-obese patients (BMI > 50 kg/m²) complication rate was 26.7%.

CONCLUSION: LAGB is an effective and safe procedure for the surgical treatment of morbid obesity. Because of the high complication rate super-obese patients should only be treated by experienced bariatric surgeons.

Bariatric Surgery – P102

MATCHED PAIR ANALYSIS OF PROXIMAL VS. DISTAL LAPAROSCOPIC GASTRIC BYPASS WITH 4 YEARS FOLLOW-UP, Markus K. Müller MD, Susanne Räder MD, Stefan Wildi MD, Dieter Hahnloser MD, Pierre-Alain Clavien MD, Markus Weber MD, Department for Visceral & Transplant Surgery; University Hospital Zurich, Switzerland

Objective: To define whether proximal or distal laparoscopic gastric bypass represents the better approach to treat patients with morbid obesity.

Background: While most surgeons perform a proximal gastric bypass with a Roux limb length of 150cm, others have suggested that a longer Roux limb may offer superior weight loss. In a distal gastric bypass the distance from the Roux en-Y anastomosis to the ileocaecal valve is fixed at 150 cm.

Method: A matched pair design using a large prospectively collected database of 402 laparoscopic gastric bypass procedures since 2000 was used. All patients were operated by two surgeons. A total of 25 patients with a primary distal gastric bypass were randomly matched one by one with 25 patients with a primary proximal gastric bypass according to age, gender and preoperative body-mass-index (BMI).

Results: Demographic data as well as preoperative BMI and comorbidities were comparable in both groups reflecting an adequate matching.

Feasibility and safety: All distal gastric bypass operations were performed laparoscopically; one proximal gastric bypass procedure had to be converted to open surgery. Mean operating time was 170 min for proximal and 242 min for distal gastric bypasses (p=0.004). Median hospital stay was 8 days (R: 4-43 d.) for the proximal and 9 days (R: 6-24 d.) for the distal bypass. There was no mortality in both groups. The incidence of overall complications was 52% vs. 64% (p=0.2). Complications: wound infections were noted in 16% of patients in the proximal vs. 32% in the distal group. There was a trend for less late small bowel obstruction due to internal herniation in the proximal gastric bypass group, 8% vs. 20% respectively (p=0.21). Additionally, one patient in the distal gastric bypass group had to be converted to a proximal gastric bypass for severe protein deficiency.

Efficiency: Both groups were comparable in terms of weight loss during the 4 year follow up with no significant difference at any time point. Body mass index decreased at 4

years from 45.9kg/m² to 31.73 in the proximal group and from 45.8kg/m² to 33.11 in the distal group. There was no difference in the prevalence of diabetes, arterial hypertension and dyslipidaemia preoperatively as well as in the follow up.

Conclusion: Proximal or distal laparoscopic gastric bypass are feasible and safe. The distal gastric bypass offers no advantage for weight loss and reduction of co-morbidities.

P103 – Withdrawn

Bariatric Surgery – P104

ENDOSCOPIC FINDINGS IN MORBID OBESE PATIENTS UNDERGOING BARIATRIC SURGERY, Rodrigo Muñoz MD, Camilo Boza MD, Alex Escalona MD, Enrique Norero MD, Maria Jose Contardo, Carolina Valdebenito MD, Francisco Zuñiga MD, Luis Ibañez MD, Department of Digestive Surgery, Pontificia Universidad Católica de Chile

INTRODUCTION - Routine upper endoscopy is not considered in many bariatric programs before surgery. The aim of this study was to determine abnormal endoscopic findings and risk factors for altered upper endoscopy in preoperative evaluation. **PATIENTS AND METHODS-** Upper endoscopy reports were analyzed in patients undergoing gastric bypass between February, 1999 and June, 2006. Univariate and multivariate logistic regression were performed to identify risk factors.

RESULTS- 626 patients were evaluated with upper endoscopy prior to bariatric surgery, 452 women (72%) and 174 (28%), age and preoperative BMI was 42 ± 6,5 kg/m² and 38,5 ± 11 years respectively. An abnormal endoscopy was identified in 288 (46%) patients. Age of patients with abnormal and normal endoscopy was 40 ± 11 and 36,8 ± 11 years respectively (p<0,001). The most common findings were: gastritis 21%, esophagitis 16%, hiatal hernia 10,7%, duodenitis 7,8%, gastric ulcers 2,7%, duodenal ulcers 2,6%, gastric polyps 1,3%, Barrett's esophagus 0,16% and gastric cancer 0,16%. Univariate and multivariate analysis showed that age is an independent risk factor for abnormal endoscopy (odds ratio = 1,03; 95% confidence interval, 1,02-1,05).

CONCLUSIONS- routine preoperative upper endoscopy before bariatric surgery is important in this population for diagnosis and treatment of gastroesophageal disease. Preoperative age was the only independent risk factor for abnormal endoscopy.

Bariatric Surgery – P105

DRAINS AND UPPER GIS AFTER GASTRIC BYPASS SURGERY? ARE THEY NECESSARY?, Nissin C Nahmias MD, Dallal Ramsey MD, Department of Surgery, Albert Einstein Healthcare Network, Philadelphia PA

Introduction: Serious complications after gastric bypass surgery can be diagnosed by clinical indicators alone. The routine use of drains and upper GI series (UGI) has been advocated to aid in the diagnosis and management of gastrojejunal leak after gastric bypass as well as diagnose intraabdominal bleeding.

Methods and procedures: 300 consecutive primary laparoscopic gastric bypass procedures were performed by a single surgeon without the use of routine drains or post-operative upper GI series. All patients were entered prospectively in our database.

Results: There were no adverse events or delays in diagnosis related the lack of routine drains or UGI usage. At the surgeon's discretion, three patients (1.0%) did have a drain placed at the time of surgery due to a particularly difficult gastrojejunal anastomosis - none developed an anastomotic leak. Upper GI series were ordered post-operatively in five patients all for unexplained tachycardia, none of who had abnormal radiographic findings. Three of these patients underwent diagnostic laparoscopy. Only one patient had a leak, which was identified on post-operative day 1 from the gastrojejunal anastomosis. Four patients had clinical signs of a complete GJ obstruction. Two resolved completely within 48 hours, and two patients required endoscopic intervention without the need for UGI. Six patients required a



blood transfusion; all of who developed tachycardia and five were from bleeding in the GI tract.

Conclusions: Routine use of drains and UGI series were not necessary for the safe management of gastric bypass patient in our series. Clinical indicators for leak, obstruction or bleeding were obvious without the additional and sometimes confounding data from UGIs or drains.

Bariatric Surgery – P106

COMPARISON OF THREE DIFFERENT GASTROJEJUNOSTOMY ANASTOMOSIS TECHNIQUES IN LAPAROSCOPIC ROUX EN Y GASTRIC BYPASS (LRYGBP) SURGERY, Surya Prasad M Nalamati MD, Venkata Bodavula MD, Stephanie Seiki BS, Laura Choi MD, Keith Zuccala MD, Leonard Maffucci MD, Madhu Rangraj MD, Departments of Surgery Sound Shore Medical Center Of Westchester, New Rochelle, NY and Danbury Hospital, Danbury, CT.

Introduction- The most important step in the laparoscopic Roux-en-Y gastric bypass (LRYGBP) is the creation of the gastro-jejunosomy. Three different techniques are commonly used to perform this anastomosis at our institutions. They are 1. EEA Stapled anastomosis (ESA), 2. Linear staple Anastomosis (LSA), 3. Hand sewn anastomosis with Endo-stitch device (HSA). We compared the three techniques in terms of operative time, intra operative, early and late complications (bleeding, perforation, leak, wound infection, ulcer, stricture, others).

Methods- We retrospectively analyzed the prospectively maintained bariatric surgery database of four surgeons performing LGBP using the three techniques and compared all the patients undergoing LRYGBP at two hospitals from Dec 2004 to Aug 2006.

Results- 312 procedures were done (n=312) during this period, ESA-100, HSA-102, LSA-110. The mean operative time for ESA was 165, LSA was 128 and HSA was 115 minutes respectively. Overall complications rate in ESA was 12% (n=12), LSA was 11.8% (n=12) and HSA was 12.7% (n=14). Hemorrhage rate in ESA was 2% (n=2), LSA 1.8% (n=2), and HSA 2.9% (n=3). Stenosis rate in ESA was 3% (n=3), LSA 0.9% (n=1) and HSA being 1% (n=1). Anastomotic leaks in ESA were 1% (n=1), LSA 0.9% (n=1), and HSA 1% (n=1). Intestinal perforation in LSA was 1.8% (n=2) and HSA was 1% (n=1). Wound infections in ESA were 6%, LSA 1%, and HSA 0%. Mortality in all three groups was 0%.

Conclusion - HSA technique has lesser operative time when compared to ESA and LSA techniques. Wound infection rate using ESA technique appears to be higher than the other two techniques. Use of a wound protection device is recommended to minimize infections. Other complication rates between ESA, LSA and HSA groups are comparable despite the differences in technique. There was no mortality noted in all the three groups. Overall major complication rates (hemorrhage, leaks, stenosis) in LRYGBP using all the three different G-J anastomotic techniques at our institutions have been low and comparable to Nationally published data.

Bariatric Surgery – P107

A NOVEL TREATMENT APPROACH FOR POSTPRANDIAL HYPOGLYCEMIA AFTER ROUX-EN-Y GASTRIC BYPASS, Richard Nguyen DO, William O Richards MD, Vanderbilt University

Introduction: In this case report we present a novel approach to patient who presented 2 years status post Roux-en-Y gastric bypass surgery with unexplained post-prandial hypoglycemia. Postprandial hypoglycemia after Roux-en-Y gastric bypass surgery has previously been described. A theory that hypoglycemia post gastric bypass was thought at one time to be related to Nesidioblastosis but now that theory is in real question as pathology specimens could not be confirmed.

Methods: The patient's initial symptoms were characteristic of dumping syndrome, with vasomotor symptoms of diaphoresis, weakness, dizziness, and flushing, however she also presented with hypoglycemia with documented accu-checks of 40s-50s. We theorized that this patient presented

with late dumping syndrome with concomitant reactive hypoglycemia. The pt was treated with a laparoscopic revision of her gastrojejunostomy to narrow the outlet.

Results: The procedure was performed laparoscopically with operating ports placed in a fashion similar to our technique for a gastric bypass procedure. Upon examination of the abdomen an intraoperative endoscopy was performed to confirm the location of the gastrojejunostomy intra-abdominally. The gastrojejunostomy was measured to be >30 mm in diameter. We then used a technique that can be best described as a reverse Heineke-mieliwicz pyloroplasty to narrow the lumen. Once this was complete the gastrojejunostomy was narrowed to a size of <10mm.

Conclusions: This procedure has resulted in a delayed gastric emptying of her gastric pouch as well as an immediate and complete resolution of her reactive hypoglycemia. We submit this as a novel approach and treatment to hypoglycemia after Roux-en-Y gastric bypass.

Bariatric Surgery – P108

WOUND PROTECTOR DEVICE DECREASES PORT SITE INFECTION AFTER LAPAROSCOPIC ROUX EN Y GASTRIC BYPASS, John R Pender MD, Michael J Barker MD, Walter J Pories MD, Willaim H Chapman MD, Division of Bariatric Surgery/Minimally Invasive Surgery, Department of Surgery, Brody School of Medicine, East Carolina University, Greenville, North Carolina

Introduction: Wound infections are one of the most frequent complications of the laparoscopic roux en y gastric bypass (LRYGB) procedure. In an effort to reduce the rate of this complication, various techniques have been used. It was hypothesized that routine use of a wound retractor system would reduce this complication.

Methods: A 2.5 cm Alexis® Wound Retractor System (Applied Medical, Rancho Santa Margarita, CA) was used in the 15mm port site of 25 consecutive patients. Retrospectively, the previous 25 LRYGB procedures that were performed without a wound retractor system were examined. The two groups were similar in age, comorbidities, and body mass index. A comparison of infection rates between the two groups was then examined. Statistical analysis was performed.

Results: 5 patients developed wound infections at the 15mm port site in the non-protected group. There were no infections at the 15mm port site in the patients where the device was used. These results were found to be significantly significant with a P value of < 0.02.

Conclusion: Routine use of a wound retractor system in the 15mm port site reduces wound infection rates after laparoscopic roux en y gastric bypass.

Bariatric Surgery – P109

BARIATRIC SURGERY IN THE PRESENCE OF INTESTINAL MALROTATION : EXPERIENCE WITH THE DUODENAL SWITCH.. R Sudan MD, V Puri MD, A Silver MD, A J Wright MD, B F Murray MD, Creighton University Medical Center, Omaha, NE

Introduction - About 102,000 bariatric procedures are performed annually in the US. The incidence of intestinal malrotation (IM) is 1 in 500 & may pose technical problems during bariatric procedures.

Methods - Retrospective review of record of bariatric procedures using IM as keyword. Individual cases were reviewed.

Results - 3 patients with IM underwent 4 bariatric procedures at Creighton University from 2002-6. The cases are summarized.

#1 - A 50 yr old female with BMI 50 was taken up for open duodenal switch (DS) & intraoperatively found to have IM. Meticulous dissection clearly defined the anatomy. Appendectomy was performed as routine. The normal orientation of alimentary limb (AL) (to the right side) & bilipancreatic limb (BPL) (to the left side) (Fig) needed to be reversed. The AL was brought up in retrocolic fashion for a tension-free duodeno-enteral anastomosis & the small bowel was placed in the right abdomen & large bowel in left abdomen following principles of the Ladd procedure. The



SAGES POSTER ABSTRACTS

patient is doing well at 3 yrs followup(FU).
 #2 - A 51yr old male with BMI 60 was taken for laparoscopic gastric bypass & intraoperatively found to have IM. An enteroenterostomy was performed but the roux limb could not reach the stomach safely without tension. The stomach was left undivided & the procedure terminated. At an open operation 6wks later, the enteroenterostomy was reversed & an open DS performed uneventfully as for patient 1. He is doing well at 9 months FU.

#3 - A 58 yr old male with BMI 48 & known IM elected to undergo bariatric surgery. Based upon our experience, robotic DS(65 patients) & DS in IM (2 patients), we performed a laparoscopic/robotic DS uneventfully. He is doing well at 6 months FU.

Conclusion - Open/laparoscopic/robotic DS can be safely performed in IM. Key anatomic principles; meticulous dissection, reversing the orientation of AL & BPL, retrocolic passage of AL, tension free duodeno-enterostomy, appendectomy & following principles of the Ladd operation are important

Bariatric Surgery – P110

THROMBO-EMBOLIC RISKS OF MORBIDLY OBESE PATIENTS UNDERGOING A LAPAROSCOPIC GASTRIC BYPASS WITH ROUX Y LIMB, Philippe J Quilici MD, Alexander S Tovar MD, Carrie McVay MD, Providence Saint Joseph Medical Center and Cedars Sinai Medical Center

A retrospective analysis of 1314 morbidly obese patients who consecutively underwent a standard laparoscopic gastric bypass with Roux Y limb [LGBRY] by an experienced, surgical team was conducted to assess their thrombo-embolic risks.

All surgical candidates were selected using NIH and SAGES guidelines. Non ambulatory patients were excluded. All patients underwent a routine DVT-PE prophylaxis which included pneumatic stockings, intra and post-operative 5000 Units of sub-cutaneous heparin every eight hours and an aggressive, mandatory pre and post-operative ambulatory protocol.

The age range of the patients was 15 to 71 years old. Mean BMI was 44.4, mean operative time was 58 minutes and mean hospital stay was 2.6 days. 218 patients did not receive routine heparin prophylaxis for various reasons. Two temporary vena cava filters were placed. No deep venous vein thromboses were noted. Two severe thrombo-embolic events were reported: one non lethal pulmonary embolus and one mesenteric ischemia in two patients with undiagnosed genetic, hyper-coagulable states.

This analysis demonstrates the thrombo-embolic risks for patients undergoing LGBRY is lower than previously reported in high volume bariatric centers and can be dramatically reduced with an aggressive pre and post-operative ambulation protocol.

Bariatric Surgery – P111

THE UTILITY OF ROUTINE POSTOPERATIVE UPPER GI SERIES FOLLOWING GASTRIC BYPASS Asok Doraiswamy MD, Jason J Rasmussen MD, Jonathan Pierce MD, William Fuller MD, Mohamed R Ali MD, UC Davis Medical Center

Background: Routine UGI studies following laparoscopic Roux-en-Y gastric bypass (LRYGBP) has the potential advantage of early identification of anastomotic complications. The aim of our study was to evaluate the efficacy of routine post-operative UGI and its relation to clinical outcomes.

Methods: Over a three year period, 516 patients underwent LRYGBP followed by routine post-operative UGI studies. Data were collected regarding the results of the UGI, clinical parameters, and patient outcomes. Study groups were composed of patients with a normal UGI (Group I, n=455), abnormal UGI not requiring further intervention (Group II, n=36), and abnormal UGI requiring further intervention (Group III, n=25). Statistical significance was set at alpha=0.05 level for all analyses.

Results: The three study groups were not statistically different in mean age (42) or BMI (45) and were predominantly female (90%). Most patients (95%) had an uneventful post-operative course (Groups I & II). Anastomotic complications

(GJ & JJ) were uncommon (1.3%). The sensitivity of the UGI for anastomotic leak in this study was low (33%). However, all patients with alimentary limb obstruction (n=3) had UGI evidence of this complication. Of the 516 UGI reports, there were only 25 (4.8%, Group III) which were abnormal and required some form of intervention ranging from serial imaging (84%) to re-operation (16%). Of the various clinical parameters examined (Table 1), the patients in Group III demonstrated a significantly higher prevalence of fever (p<0.001), tachycardia (p<0.01), vomiting (p<0.001), and POD1 leukocytosis (p<0.005).

	Group I (n=455)	Group II (n=36)	Group III (n=25)
Fever(T>38.5)	36 (8%)	2 (5.5%)	8 (32%)
Tachy(P>100)	98 (22%)	8 (22%)	12 (48%)
Tachy(P>110)	58 (12.7%)	5 (14%)	10 (40%)
Tachy(P>120)	13 (2.8%)	1 (2.7%)	5 (20%)
Hypotension	6 (1.3%)	5 (14%)	0 (0%)
Nausea	199 (43.7%)	19 (53%)	15 (60%)
Vomiting	10 (2.2%)	4 (11%)	5 (20%)
Fluid Balance(>2L+)	50 (11%)	7 (19%)	2 (8%)
Fluid Balance(>3L+)	14 (3%)	3 (8.3%)	1 (4%)
Leukocytosis POD 0	402 (88%)	29 (81%)	21 (84%)
Leukocytosis POD1	57 (12.5%)	10 (28%)	9 (36%)

Conclusion: Our data suggest that routine UGI after LRYGBP has limited utility as it may result in unnecessary intervention based on false positive results or a delay in treatment based on false negative results. We advocate selective UGI imaging following LRYGBP based on the patient's clinical factors, particularly fever and tachycardia.

Bariatric Surgery – P112

MARGINAL ULCERATION AFTER LAPAROSCOPIC GASTRIC BYPASS: AN ANALYSIS OF PREDISPOSING FACTORS IN 260 PATIENTS. Jason J Rasmussen MD, William Fuller MD, Mohamed Ali MD, UC Davis Medical Center

Background: Marginal ulceration (MU) after Roux-en-Y gastric bypass (RYGB) is diagnosed in 1-16% of patients. The factors predisposing patients to MU are still unclear.

Methods: A total of 260 patients who underwent laparoscopic RYGB were retrospectively reviewed. Data regarding demographics, comorbidities, BMI, H. pylori infection, gastrojejunal (GJ) anastomotic leaks, post operative bleeding, operative time, type of suture material and marginal ulcer formation were collected. Fisher's exact test was used to statistically analyze discrete variables and the student's t-test was used for continuous variables. Statistical significance was set at alpha =0.05.

Results: The overall MU rate was 7%. The various factors hypothesized to affect MU following laparoscopic RYGB are detailed in Table 1. Demographic data (age, gender distribution, BMI) did not differ significantly between patients who developed MU and those who did not (p >0.05). Similarly technical factors (choice of permanent or absorbable suture for the GJ anastomosis, attending as primary surgeon, robotic GJ, operative time, and post-operative hematocrit drop) were not statistically different between the two groups (p >0.05). Finally, the prevalence of comorbidities (diabetes, hypertension, obstructive sleep apnea, musculoskeletal complaints, dislipidemia, GERD and PUD) did not differ significantly between the two groups (p >0.05). However, pre-operative H. pylori infection, that was adequately treated, was twice as common among the patients who developed MU compared to those who did not, 32% vs. 12% respectively (p = 0.02). All patients who developed MU had complete resolution of symptoms with PPIs and sucralfate. No reoperations were required for MU.

Conclusion: H. pylori may potentiate marginal ulcer formation. We hypothesize that H. pylori damages the mucosal barrier in a way that persists post operatively which may precipitate MU even when the organism was medically eradicated.



	No	MU	P		No	MU	P
Age	42	40	NS	PUD	3%	0%	NS
% Male	10%	11%	NS	H pylori	12%	32%	0.02
BMI	44	45	NS	Permanent suture	53%	47%	NS
Diabetes	23%	16%	NS	Absorbable suture	47%	53%	NS
Hypertension	49%	37%	NS	Attending Primary	22%	11%	NS
Sleep Apnea	50%	37%	NS	Robotic	22%	5%	NS
Musculoskeletal	79%	74%	NS	OR time (min)	179	172	NS
Dyslipidemia	42%	37%	NS	Intraop Leak	8%	16%	NS
GERD	49%	53%	NS	Hct drop	7%	5%	NS

Bariatric Surgery – P113

INTERNAL HERNIAS AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS ARE PREVENTED WITH BIOABSORBABLE SEAMGUARD® MATERIAL, M T Allemang BS, D B Renton MD, V K Narula MD, K E Hinshaw BS, K M Reavis MD, B J Needleman MD, W S Melvin MD, D J Mikami MD, The Ohio State University Department of Surgery, Center for Minimally Invasive Surgery

Background: Internal hernias are an important and common complication following RNYGB. The two potential spaces that internal hernias can occur are the jejunostomy mesenteric defect and the retro Roux limb space. The jejunostomy is usually closed with a running stitch; however the retro Roux limb space remains a common potential space for hernias. We hypothesize that substantial tissue bonding will prevent a Peterson's hernia by utilizing Gore Bioabsorbable SEAMGUARD® Material (BSG) on the mesentery staple line of the jejunum during creation of a Roux limb. We evaluated the BSG as a preventative measure for the development of these hernias in post-op laparoscopic gastric bypass patients.

Methods: We have prospectively followed 417 patients undergoing roux-en-Y gastric bypass since February 2005. Patients are routinely followed in clinic and we have performed all necessary re-operations since then.

Results: We have seen no internal hernias from the retro Roux limb space in the 417 patients where BSG was used on the mesentery staple line of the jejunum. A single patient who underwent laparoscopic gastric bypass with BSG on the small bowel mesentery developed a port site hernia on POD #37. This patient was taken to the operating room for laparoscopic repair of her port site hernia and abdominal exploration. During the hernia repair, we explored the retro Roux limb space where the BSG was previously applied. We could not separate the Roux limb from the transverse colon or transverse mesocolon where there was contact with the BSG.

Conclusion: BSG may be a possible way to prevent retro Roux hernias in patients undergoing laparoscopic Roux-en-Y gastric bypass. An animal study is currently being conducted to evaluate the tissue bonding between the BSG applied to the small bowel mesentery and the mesocolon.

Bariatric Surgery – P114

ANTI-XA LEVELS OF TWO PROPHYLACTIC DOSING REGIMENS OF LOW MOLECULAR WEIGHT HEPARIN DURING LAPAROSCOPIC BARIATRIC SURGERY, Brea O Rowan, David A Kuhl, Marilyn D Lee, David S Tichansky MD, Atul K Madan MD, University of Tennessee Health Science Center and Regional Medical Center at Memphis

Introduction: Prophylactic anticoagulation is important during laparoscopic bariatric surgery. The correct dose for low molecular weight heparin, specifically enoxaparin, in the morbidly obese is not known. We investigated anti-Xa levels in laparoscopic bariatric surgery patients utilizing two different regimens of prophylaxis. Our hypothesis was that a higher dose of enoxaparin is needed to obtain appropriate anti-Xa levels.

Methods: Laparoscopic bariatric surgery patients were included in this study. The study was divided into two consecutive phases: Phase 1 (dose of 30 mg Q 12) and Phase 2 (dose of 40 mg Q12). Anti-Xa levels were drawn 4 hours after 1st and 3rd dose.

Results: There were 19 patients in Phase 1 and 33 patients in Phase 2. No differences in weight, height, body mass index, and gender were noted between both groups. Phase 1 patients had lower anti-Xa levels after both 1st and 3rd

dose compared to Phase 2 patients (0.06 vs. 0.14; $p < 0.05$ and 0.08 vs. 0.15; $p < 0.05$; respectively). More patients in Phase 2 had appropriate anti-Xa levels for prophylaxis (0.18 - 0.44) than Phase 1 after both 1st and 3rd dose (31% vs. 0%; $p < 0.02$ and 42% vs. 9%; $p = 0.10$ respectively).

Conclusions: Most patients did not have appropriate levels of anti-Xa even at the 40 mg Q12 dose. The lower dose (30 mg Q12) is too low for a majority of morbidly obese patients. Further studies need to examine the safety and efficacy of higher doses of enoxaparin.

Bariatric Surgery – P115

LONG TERM OUTCOME OF LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING IN PATIENTS WITH ESOPHAGEAL DYSMOTILITY, Jayaraj Salimath MD, Samuel Szomstein MD, Raul Rosenthal MD, Cleveland Clinic Florida, Weston, Florida

The prevalence of GERD, esophageal manometric abnormalities, and nutcracker esophagus are high among the morbidly obese. Laparoscopic adjustable gastric banding (LAGB) has proven long-term weight loss with low morbidity. This study evaluates the clinical outcome of LAGB in patients with esophageal dysmotility on esophageal manometry. **Methods:** 100 patients underwent esophageal manometry as a preoperative evaluation for LAGB. A single reviewer evaluated all manometric tracings. Patients with esophageal dysmotility were identified and their charts were retrospectively reviewed. Clinical and telephone interviews were conducted on patients who underwent LAGB. **Results:** Out of the 100 patients who underwent esophageal manometry between 2003 and 2004, we identified 24 (24%) patients with esophageal dysmotility. 13 (54.1%) patients underwent LAGB, 3 (12.5%) had laparoscopic Roux-en-Y gastric bypass (LRYGB), and 8 (33%) had not undergone any surgery. Of the 13 patients who underwent LAGB, 11 patients were contacted while 2 could not be reached. One patient had band removal after one year and underwent LRYGB due to poor weight loss. In the other 10, average weight loss was 47.5lbs (range 10 - 129lbs) with an average 3.1 band adjustments (range 1-6).

Conclusion: Postoperative emesis and GERD are the most common complaints in patients with abnormal manometric findings. In our study, patients who did not suffer from GERD preoperatively developed reflux symptoms approximately one to two years after band placement. Patients with the least amount of weight loss attributed their poor results to the fact that they could not to undergo afford band adjustments.

Bariatric Surgery – P116

UTILIZATION OF THE INTRAGASTRIC BALLOON (BIB) IN PRE-OPERATIVE PREPARATION FOR SUPER OBESE PATIENTS WITH HIGH SURGICAL RISK COMPARING WITH TWO STEPS SURGERY, José A Sallet, João C Marchesini MD, Maurélio R Ribeiro MD, José A Sallet, João C Marchesini, Maurélio R Ribeiro Jr., Carlos E Pizani, Keila Komoto, Paulo C Sallet, Roberto Tussi

Background: Superobese patients show a high surgical risk (major complications in 30% and mortality rate of 5-12%). The present study evaluates the use of BIB as a preoperative procedure aiming an initial weight loss and reduction of surgical risk.

Methods: From November 2000 to February 2003, 24 super-obese patients (mean BMI= 60.3 ± 10.1 kg/m²) were treated with the BIB for at least four months before surgical treatment: 19 male (BMI= 59.0 ± 9.6) and 5 female patients (BMI= 65.3 ± 11.7). They showed associated diseases, including systemic arterial hypertension (13 cases), diabetes mellitus (5 cases), sleep apnea (10 cases), hypercholesterolemia (5 cases) and osteoarthritis (8 cases).

Results: Patients showed mean percent excess weight loss (%EWL) of 23.4 ± 11.0%, mean percent total weight loss (%TWL) of 13.6 ± 6.5%, and mean BMI reduction of 8.4 ± 4.9 Kg/m². More than 80% of patients showed improvement in hypertension and diabetes mellitus, with sleep apnea changed from severe to minimal. Surgical risk was reduced from ASA III-IV (before the BIB) to ASA II. All these patients were submitted to bariatric surgery (GB, LAGB or BPD).



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Two patients had wound infection (8.3%). There was no mortality.

Conclusions: Our results showed that the intragastric balloon is an effective technique in order to prepare super-obese patients in preoperative time, reducing the two steps surgery in super obese patients in more than 75 % and their major complications and mortality.

Bariatric Surgery – P117

LAPAROSCOPIC ROUX-EN-Y GASTRIC BY PASS WITH DISTAL JEJUNUN-ILEAL DIVERSION - TECHNIQUE AND RESULTS, José A Sallet MD, Carlos E Pizani MD, Fábio L Bonaldi MD, José A. Sallet, Carlos E. Pizani, Fábio L. Bonaldi, Roberto Tussi, Jeovana Leal, Paulo C. Sallet.

Background: During november 98 to april 2005 we performed 2560 bariatric procedures that including: 21% Lap-Band, 49% Gastric By Pass, 26% BIB and 4% BPD (Duodenal Switch). The choice of the method was defined by protocols developed into a multidisiplinary team, considering BMI, psychological and eating profile, surgery risk, agreement to phisical activity and patients expectation.

Methods: In the first two years, we performed Gastric By Pass with Ring in 180 cases with 85% of excess weight loss after two years. We perceived with this kind of surgery the patients had too much difficult with solid foods. Therefore we decided to perform the surgey without ring. There was 274 cases with 69% of excess weight loss in two years and better eating quality.

Thecnique; In the last four years we began to perform Laparoscopic Roux-en-Y Gastric By Pass with a Distal Jejunun-Ileal Diversion distant about 1,5 to 2,0m from ileocecal valve. The surgery is all performed in a supra-mesocolic abdominal area. The gastroenteoanastomosis is always pre-gastric and precolic performed with linear stapler and and we first make the enteroenteroanastomosis an than devide the intestine. So that, we cant test the both anastomosis with metilene blue.

Results and Conclusion: We had done 595 cases using this method, with 86% of excess weight loss two years after the surgery. With this thecnique we are able to reduce surgery time, avoid ring complications (ersion, sleepage), getting the same percentual of excess weight loss not using ring, no nutritional effects in long term, and much better eating quality for the patients.

Bariatric Surgery – P118

THROMBOSIS OF THE LAP-BAND SYSTEM, Danny A Sherwinter MD, colin J Powers MD, Alan C Geiss MD, Syosset Hospital, North Shore Long Island Jewish Health System

The laparoscopic adjustable gastric band (LAGB) has proven itself a procedure with excellent long-term weight loss results and extremely low morbidity and mortality. The LAGB has become an indispensable addition to the armamentarium of most bariatric surgeons. Common complications associated with the Lap Band system include gastric prolapse, band erosion, hardware infection and port/tubing leakage. We report a case of a patient suspected of having a Lap-Band leak. He presented with a clinical course of multiple adjustments without restriction and inability to aspirate the expected volume from the band. Following adjustment under fluoroscopy he became severely dysphagic. He underwent urgent operative exploration and was found to have an intact but over-inflated band. Under close inspection, a clot in the proximal band was noted acting as a ball valve allowing the addition of fluid but not aspiration. This case highlights the absolute importance of preventing blood and particulate matter from entering the Lap-band system both at the initial operation and at subsequent adjustments.



Bariatric Surgery – P119

TWO STEPS LAPAROSCOPIC BILIO-PANCREATIC DIVERSION WITH DUODENAL SWITCH AS TREATMENT OF HIGH-RISK SUPER OBESE PATIENTS: ANALYSIS OF COMPLICATIONS, GIANFRANCO SILECCHIA PhD, ALESSANDRO PECCHIA MD, GIOVANNI CASELLA MD, MARIACHIARA FIORITI MD, MARIO RIZZELLO MD, FRANCESCO GRECO MD, NICOLA BASSO MD, Department of Surgery ?Paride Stefanini?, Policlinico ?Umberto I?, University ?La Sapienza? Rome, Italy

AIM: To prospectively analyze the incidence of complications after 2 steps laparoscopic bilio-pancreatic diversion with duodenal switch (Lap BPD-DS) in high risk super-obese patients.

METHODS: Between 10/2002 and 08/2006, 71 high risk super-obese patients (BMI>50 kg/m2 with at least 2 major comorbidities: diabetes, OSAS, hypertension) underwent Lap BPD-DS first step (sleeve gastrectomy) (GROUP I, M=28, F=43, mean age 43,3±10 years). Mean BMI was 56,5±6 kg/m2. 4 patients with Prader-Willi syndrome were included in the study. First step was performed using 5 trocars, harmonic scalpel or radiofrequency dissector and linear stapler to obtain a 100-120 ml gastric pouch. After 9-16 months 25 patients (GROUP II, BMI 43±8 kg/m2) underwent second laparoscopic step of BPD-DS (duodeno-ileostomy, ileo-ileostomy, common channel 100 cm).

RESULTS: 3 conversions for massive hepatomegaly occurred (3,1%). In one case the procedure was completed in a single step. GROUP I: Mean operative time was 105±10 minutes with a preoperative mean ASA score 3,4±0,5. Mean post-operative hospital stay was 5,5 days. In 5 cases the procedure was indicated as revision for failure of adjustable gastric banding. Major post-operative complications were registered in 11 patients (15,4%): 8 bleeding; 2 stapler-line leakage; 1 transient acute renal failure. One laparoscopic reoperation for hemoperitoneum was carried out. 1 patients dead for pulmonary embolia. GROUP II: Mean operative time was 201±27 minutes with a pre-operative mean ASA score 2,7±0,8. Major post-operative complications were registered in 5 patients (20%): 2 bleeding, 2 duodeno-ileal stenosis, 1 rhabdomyolysis. One case of internal hernia required laparoscopic reoperation. Overall reoperation rate was 2/96 (2%).

CONCLUSIONS: Two steps Laparoscopic Bilio-Pancreatic Diversion with duodenal switch seems to be an attractive alternative in high risk super-obese patients, in order to reduce mortality and major postoperative complications. Laparoscopic sleeve gastrectomy is a standard, safe and effective procedure inducing a significant Excess Weight Loss before second step. The high incidence of post-operative complications was registered in cases of revisional surgery.

Bariatric Surgery – P120

MANAGEMENT OF RETAINED AND SECONDARY COMMON BILE DUCT STONES AFTER ROUX-EN-Y GASTRIC BYPASS SURGERY: CASE REPORT & REVIEW OF THE LITERATURE, Ian Soriano MD, Olga Tucker MD, Juan Salceda MD, Ramon Mourelo MD, Almudena Moreno MD, Samuel Szomstein MD, Raul J Rosenthal MD, Cleveland Clinic Florida

Background: The presence of common bile duct stones at the time of cholecystectomy or retained stones after a com-



mon bile duct exploration in a patient with a previous roux-en-y gastric bypass surgery represents a diagnostic and therapeutic challenge because oral access to the biliary tract is lost.

Methods: We present an interesting case and review the literature to identify the diagnostic and therapeutic options available and propose an algorithm for managing this uncommon but difficult entity. Results: A 32-year-old female presented 4 years after undergoing a laparoscopic Roux-en-Y gastric bypass with right-upper quadrant pain, nausea and vomiting. Work-up revealed cholelithiasis and choledocholithiasis. She underwent a laparoscopic cholecystectomy, intraoperative cholangiogram, t-tube placement and outpatient radiologic stone extraction to manage both secondary common duct stones and subsequent retained stones. An algorithm for managing secondary and retained common bile duct stones is presented. Conclusions: Clinical presentation and diagnosis of common bile duct stones in the post-gastric bypass patient are as diverse as each patient, and there are several treatment options – both operative and non-operative. Given the complexity of the situation, an algorithmic approach is appropriate. Both the bariatric and the general surgeon who manage these patients should know all available techniques and select the intervention most appropriate for each case.

Bariatric Surgery – P121

BARIATRIC OPERATIONS: LOW MORTALITY IN A HIGH VOLUME BARIATRIC SURGERY CENTER, D J Stephens MD, J K Saunders MD, S Belsley MD, H Schmidt MD, A Trivedi MD, D Ewing MD, R Capella MD, V Iannace MD, D Davis MD, A Wasielewski RN, S Moran, G H Ballantyne MD, Hackensack University Medical Center

Certification as a Center of Excellence is now required for Medicare patients. This mandate assumes that specialty centers achieve superior outcomes. Do high volume bariatric surgery centers, in fact, achieve a low operative mortality?

AIMS: The aim of this study was to determine the in-hospital mortality for patients in our high volume bariatric surgery center over the last nine years. **METHODS:** Electronic medical records for all patients undergoing bariatric operations at Hackensack University Medical Center between 1998 and July 2006 were retrieved. This database was queried for patient characteristics, types of procedures, hospital length of stay, and status at discharge.

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	Totals	Mortality
Total	116	183	288	343	918	984	964	938	423	5365	0.13%
RYGB	111	156	209	240	330	412	318	225	98	2099	0.19%
LRYGB	5	27	79	268	470	421	427	355	125	2177	0.14%
LAGB	0	0	0	35	118	151	219	358	208	1089	0.00%
Deaths	0	1	0	1	2	0	0	3	0	7	

RESULTS: 5365 patients underwent bariatric operations at our center between 1998 and July 2006: 2099 open gastric bypasses (RYBG), 2177 laparoscopic gastric bypasses (LRYGB) and 1089 laparoscopic adjustable gastric bandings (LAGB). 75.5% were women and 24.5% men. Median age was 41 (13-79 years old), Body Mass Index 45.5 kg/m² (35-92) and hospital length of stay for all patients 3 days (1-46). Three patients died following LRYGB (0.14%), four following RYGB (0.19%) and none after LAGB with an overall mortality of 0.13% for all bariatric procedures. **SUMMARY:** During a nine year period, 5365 bariatric operations were accomplished at Hackensack University Medical Center with an overall mortality of approximately 1 in 1000 patients. These findings support the concept that high volume Bariatric Surgery Centers achieve excellent outcomes and suggest that surgical volume may represent an appropriate criterion for certification as a Center of Excellence.

Bariatric Surgery – P122

DOES REQUIRING SMOKE CESSATION PRIOR TO BARIATRIC SURGERY PRODUCE SUSTAINED SMOKING ABSTINENCE, Stephanie Strauss MD, Steven J Heneghan MD, Bassett Healthcare, Cooperstown New York

Introduction: Bariatric surgery when performed in appropriate candidates has been shown to produce long term health

benefits. Nicotine use currently is the single behavioral issue that produces more illness as compared to obesity in Americans. Whether requiring smoking cessation prior to bariatric surgery produces long term abstinence is currently unknown. The purpose of this study is to examine the success of requiring smoking cessation prior to approval for bariatric surgery in producing long term abstinence.

Methods: All patients who had undergone bariatric surgery at a single institution were examined over a three year period. Program requirement included a 15 pound weight loss and smoking cessation for 30 days proven by urine analysis in all smokers. An anonymous written survey was mailed to 193 consecutive surgical patients. Ninety eight had undergone laparoscopic adjustable gastric banding and ninety five had undergone laparoscopic roux-en-y gastric bypass. There were no mortalities in either group at 30 days and at study follow-up which approximated 18 months. 100 of the 193 (52%) patients responded to the survey which asked if they had been smoking prior to surgery and whether they were currently smoking.

Results: Twenty of the 100 responders indicated they were smokers within 30 days of orientation to our program. Eleven (55%) of the twenty stated they were currently not smoking. Nine (45%) of the 20 stated they had resumed smoking by the time of the survey.

Conclusions: Requiring both a modest weight loss and smoking cessation prior to bariatric surgery is feasible. In our population, 20% of surgical patients were able to lose 15 pounds and stop smoking prior to bariatric surgery. Smoking cessation prior to bariatric surgery leads to sustained abstinence in over 50% of patients at 18 months.

Bariatric Surgery – P123

OUR PRACTICAL PROCEDURE FOR LAPAROSCOPY-ASSISTED DISTAL GASTRECTOMY WITH LYMPH NODES DISSECTION, Tatsushi Suwa MD, Kenichi Okada MD, Tomoyuki Tamada MD, Tomomi Sata MD, Tomoo Shatari MD, Takayuki Furuuchi MD, Yoshifumi Takenaka MD, Masayoshi Sakuma MD, Mito Red Cross Hospital

Laparoscopy-assisted gastrectomy (LAG) has been performed widely these days. LAG usually needs more surgical members and longer operation time than conventional open surgery. We have developed practical procedure that needs only two surgeons and shorter operation time. Our procedures are following.

1. A 5 cm upper median incision was made. Using Kent mini-retractor, the lymph nodes dissection along the right gastroepiploic vessels were performed.
2. A 12 mm trochar was inserted below the navel for a laparoscope and a 5 mm trochar was inserted in the upper right abdomen for a snake retractor to pull up lateral segment of liver, and a 12 mm trochar was inserted in the upper left abdomen for operator's right hand. An abdominal wall sealing device (Lap-Disk) was used for a 5 cm incision and a 12 mm trochar was set for operator's left hand through Lap-Disk.
3. Laparoscopically, additional dissection for lymph nodes along the right and left gastroepiploic vessels were made, and the lesser omentum was cut. The stomach was pulled up using taping technique, which helps to get better surgical view in the deep area along the left gastric vessels. The left gastric vein and artery was clipped and cut safely. The lymph nodes along the lesser curvature were dissected laparoscopically.
4. Through a 5 cm incision, the stomach was cut by Linearcutter at the oral excisional line. By pulling up the distal stomach through a 5 cm incision, the base of right gastroepiploic vessels were easily identified and exposed, then the suprapyloric and inflapyloric lymph nodes were dissected and the right gastroepiploic vessels were tied and cut.
5. The duodenum was cut with purse-string suture device (Purstring) and the resectional stomach was cut off. The anterior wall of residual stomach was partially cut and opened. Through this small window, the gastroduodenostomy was made by the anastomotic device (ILS 29 mm) with the double-stapling technique. The small anterior wall window was closed by hand suturing.



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RESULT

We have performed this LADG procedure in over 50 cases. The mean operation time was within 3 hours with less blood loss. The outcome of this procedure was excellent.

Bariatric Surgery – P124

THE FOLLOW-UP METHOD FOR REMNANT STOMACH AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS OF MORBID OBESITY- APPLICATION OF DOUBLE-BALLOON INTESTINAL ENDOSCOPY- Nobumi Tagaya¹ PhD, Kazunori Kasama² PhD, Eiji Kanehira² PhD, Keiichi Kubota¹ PhD, ¹Second Department of Surgery, Dokkyo Medical University, Tochigi, ²Department of Surgery, Yotsuya Medical Cube, Tokyo, Japan

Morbid obesity has become a serious social problem. The treatment for complications associated with morbid obesity is necessary. We had applied laparoscopic Roux-en-Y gastric bypass for morbid obesity from February 2002. Although the complications associated with morbid obesity were improved by surgical procedure, the investigation of remnant stomach after surgery is still not resolved. The patient who had the family history of gastric cancer was added the resection of remnant stomach, however, it required more operation time. There are two major problems with regard to performing this procedure in Japan: the high occurrence rate of gastric cancer and how to investigate the remnant stomach. To resolve these problems we introduced double-balloon intestinal endoscope to observe the remnant stomach. We reported the technique of double-balloon intestinal endoscope for the remnant stomach after laparoscopic Roux-en-Y gastric bypass of morbid obesity. There was no trouble to put the endoscope forward with observation. We used an overtube same as routine work of oral endoscope. Although a learning curve is necessary to perform double-balloon intestinal endoscope, there were no major obstacles for the observation and passage of esophagus, gastric small pouch, lifted jejunum, the jejunojejuno-anastomosis, Y loop, duodenum and remnant stomach. The use of double-balloon technique enabled us to observe the gastrointestinal tract after laparoscopic Roux-en-Y gastric bypass without the influence of length between gastrojejunostomy and jejunojejunosomy.

Bariatric Surgery – P125

FACTORS PREDICTING GASTROJEJUNOSTOMY STRICTURE AFTER GASTRIC BYPASS FOR MORBID OBESITY, Mark Takata MD, Ruxandra Ciovisa MD, Stanley Rogers MD, John Cello MD, Eric Vittinghoff PhD, Guilherme M Campos MD, Bariatric Surgery Program, University of California San Francisco.

Background: Gastrojejunostomy stricture after gastric bypass (GBP) has been reported in 4% to 27% of patients. **Objectives:** To determine factors that predict gastrojejunostomy (GJ) stricture following GBP. **Setting:** University tertiary referral center.

Patients: Three-hundred and sixty-two consecutive morbidly obese patients that underwent open or laparoscopic GBP. **Outcome Measure:** GJ stricture following GBP requiring endoscopic dilatation.

Methods: Proportions were compared using Fisher's exact test. Logistic regression was performed to define the independent predictors of stricture. Predictors considered were age, gender, BMI, comorbidities, surgical technique (linear vs. EEA 21mm vs. EEA 25mm circular stapler; open vs. laparoscopic; retrocolic vs. antecolic roux), and surgeon experience (< 51 cases).

Results: Sixteen of 362 patients (4.4%) developed a stricture. The frequency was higher after EEA 21mm compared to linear stapler and EEA 25mm techniques. A higher rate of strictures was found with retrocolic roux (Table).

Technique	n (%)	Stricture n(%)
Linear Stapler	195 (53.9)	9 (4.6)
EEA 25mm	154 (42.5)	4 (2.6)
EEA 21mm	13 (3.6)	3 (23.1)*
Antecolic Roux	297 (82)	10 (3.4)
Retrocolic Roux	65 (18)	6 (9.2)**

*p=0.01 21 vs. 25mm, p=0.03 21mm vs. Linear, **p=0.048 ante vs. retrocolic.

There was a trend toward higher stricture rate related to surgeon experience (7.4% first 50 cases vs. 2.6% after, p=0.06). The use of EEA 21mm was the only independent predictor of a stricture (odds ratio 6.2; 95%CI 1.5-26, p=0.01). **Conclusion:** The use of an EEA 21mm stapler strongly predicts GJ stricture following GBP. The EEA 25mm and the linear stapler techniques have similar and low stricture rates.

Bariatric Surgery – P126

WEIGHTLOSS SURGERY AFTER NISSEN FUNDOPLICATION: CONSIDERATION FOR LAPAROSCOPIC SLEEVE GASTRECTOMY, Janos Taller MD, Jay Grove MD, Department of Surgery, Naval Medical Center, San Diego

Clinically, obesity and GERD go hand-in-hand. The obesity epidemic continues to affect patients who have had anti-reflux procedures many years ago. These operations, often performed by laparotomy, add to the complexity in the re-operative arena. Descriptions of weight loss procedures after anti-reflux operations in the obese are controversial at best. Some authors suggest conversion to RGB as the procedure of choice. We propose that the vertical sleeve gastrectomy (VSG) is a simpler and superior alternative.

Our patient is a 47 y/o female with previous open Nissen fundoplication & cholecystectomy for severe GERD. Her life-long struggle with obesity also remains an issue. Recent weight gain of 50+ lbs over the last 5 years has contributed to her hyperlipidemia and worsening GERD & DJD. She is 68 inches tall and weighs 241 lbs with a BMI of 37+. Her physical exam was notable only for a large vertical midline abdominal scar. Preoperative UGI confirmed the presence of an intact fundoplication. She completed our pre-operative bariatric program and desired a "restrictive only" procedure for weight loss. She consented to laparoscopic conversion of Nissen fundoplication to VSG, possible open.

A total of 4 ports were used for her operation. Extensive adhesiolysis provided access to the upper abdomen to define her fundoplication. Her wrap was taken down with blunt dissection & electrocautery. A sleeve gastrectomy was then performed with endoscopic staplers along a 32 French bougie beginning 8 cm proximal to the pylorus and carried vertically up to the angle of His. The integrity of the gastric pouch was tested with methylene blue and a JP drain left in the re-operative field.

Her operation was completed in 204 minutes with 150 ml EBL. UGI on POD#1 revealed no leak. Her drain was removed on POD#2 and she was discharged home on a bariatric liquid diet. She experienced no complications and has lost 30 pounds as of her 5 week follow-up. She now rarely has reflux and her back pain has resolved.

VSG has traditionally been described as the first stage to a more complex weight loss procedure. In the face of previous anti-reflux surgery and the hostile post-operative abdomen, we propose the Lap VSG is a safe procedure that may be offered to patients pursuing weight loss surgery. Further more, lacking the requirement for substantial small bowel adhesiolysis and mobilization or anastomosis, the Lap VSG may prove to be the simpler, more desirable, procedure.

Bariatric Surgery – P127

LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING (LAGB) IN SUPER-OBESE PATIENTS, THE RIGHT CHOICE?, Wouter W te Riele MD, J M Vogten PhD, D Boerma PhD, M J Wiezer PhD, B van Ramshorst PhD, Sint Antonius Ziekenhuis, Nieuwegein, the Netherlands

Introduction To address the issue of long term efficacy of LAGB in the treatment of superobese patients (body mass index [BMI] >50 kg/m²), we have performed a single-center study of LAGB in superobese patients (BMI>50 kg/m²).

Methods Patients who underwent LAGB in our institution between 1995 and 2006 were included in the study. The study population was divided into a superobese group (SO) with a BMI >50 kg/m², and a control group with a BMI <50 kg/m². Primary end point was percentage of successfully

treated patients after 5 years of follow-up. Successful treatment was defined as an excess weight loss (EWL) of at least 30%. Mann-Whitney U and Chi-squared tests were conducted to evaluate continuous and discrete variables, respectively. P-values <0.05 were considered significant.

Results 491 patients were subjected to LAGB. 107 patients were included in the SO group, 384 patients were included in the control group. There was no difference in age (39.0 vs 38.5; p=0.4) or gender distribution (men 15.0 vs 16.7%; NS) between both groups. Median preoperative BMI was 54.0 kg/m² in the SO group (50.0-71.7 kg/m²) versus 43.7 kg/m² in the control group (36.2-49.9 kg/m²) (p<0.001). Median follow-up was 48 months (4-117 months) in the SO group versus 45 months (2-127 months) in the control group (p=0.55). In both groups, 15% (58/384 vs 16/107; NS) of patients were lost to follow-up after 5 years.

No mortality was observed in either group. The conversion rate was significantly higher in the SO group as compared to the control group (10.3 vs 2.1%; p<0.001). Complication rates were comparable and included band slippage (13.0 vs 13.1%; NS), port-a-cath complications (8.3 vs 8.4%; NS), wound infection (4.2 vs 4.7%; NS) and reoperations due to complications (25.3 vs 28.0%; NS) in the SO and control group, respectively. The number of patients that underwent secondary gastric bypass surgery due to insufficient weight loss was significantly higher in the SO group (18.7 vs 2.3%; p<0.001).

Median excess weight loss 5 years after surgery was 39.0% in the SO group and 39.8% in the control group. The percentage of successfully treated patients 5 years after LAGB was significantly lower in the SO group than in the control group (49.9 vs 65.0%; p<0.01).

Conclusion In super-obese patients the minimally invasive LAGB is successful in 50% of cases after a 5 year follow-up period. These findings should be taken into account in the surgical management of super-obese patients.

Bariatric Surgery – P128

EVALUATION OF PERIOPERATIVE DEXMEDETOMIDINE ADMINISTRATION FOR LAPAROSCOPIC GASTRIC BYPASS,

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PURPOSE: To evaluate the effects of administering dexmedetomidine, a selective alpha-2 receptor agonist with sedative and analgesic properties, to patients undergoing laparoscopic Roux-en-Y gastric bypass performed by a single surgeon. Of main concern was the drugs effect on postoperative pain, narcotic requirements, respiratory status, and length of hospitalization.

METHODS: A retrospective analysis of a single surgeon's experience with dexmedetomidine administration during lap RNY GBP was performed by chart review of patients undergoing the procedure from 1/06 thru 8/06 at a single institution. A total of 60 lap GBP were performed - 13 patients were excluded from review (4 for incomplete data, 2 for undergoing concomitant surgical procedures, 3 for history of chronic pain, and 4 for history of narcotics abuse). Of the remaining patients 34 received a standardized administration of dexmedetomidine, and 13 received typical anesthetic/analgesic agents. The majority of patients were female (35). The avg. age and BMI in the drug group was 48 and 47.5 respectively; in the control group 44.5 and 47.3 respectively. Comorbidities in both groups included tobacco use, DJD, diabetes, HTN, COPD, and obstructive sleep apnea and prevalence was similar in comparison groups.

A comparison of outcomes made by evaluating postoperative pain scores (scale of 1-10), narcotic administration/requirements (# of doses and total amount), supplemental oxygen requirements and respiratory rate at multiple points within the first 24hrs post op. Total length of hospitalization was also evaluated. Student's t test and non-parametric analyses were used for statistical analyses.

RESULTS: There were no statistically significant differences between the two groups among the parameters evaluated. Pain scores were similar between the two groups at all points measured during the first 24 hrs (p= 0.18, 0.46, and

0.48). In addition, the average pain score for 24 hrs was also similar (p=0.48). The total number of doses of narcotics received and total amounts were also similar between the two groups and showed no statistically significant difference. Length of hospitalization was equivalent (4.07 day and 4.16 days).

CONCLUSIONS: The administration of dexmedetomidine during lap GBP does not appear to influence postoperative pain, narcotic requirements, or length of stay, nor did use cause or prevent any untoward respiratory events. Further study necessary.

Bariatric Surgery – P129

MOVING TO LAPAROSCOPY FOR BILIOPANCREATIC DIVERSION WITH DUODENAL SWITCH WITHIN THE LEARNING CURVE: WHAT DIFFERENCE DOES IT MAKE?,

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From February 2002 to June 2006 we intended to perform 84 biliopancreatic diversions with duodenal switch (BPD-DS) (Marceau procedure). The first 24 patients had open surgery (BPD) for a BMI of 46.4 ± 6.8. The 60 most recent operations were begun laparoscopically (LBPB) for patients with a BMI of 49.8 ± 7. There was no difference in age between the 2 groups (mean 43.4 and 41.5 respectively). 8 BPD (33%) and 13 LBPB patients (21.6%) had a previous bariatric surgery (all but one gastric banding). One patient in BPD and 3 in LBPB had only a sleeve gastrectomy because of cirrhosis, ventilatory problems during laparoscopy or poor exposure/adhesions. Of the remaining 57 LBPB patients, 21 (36.8%) were converted to open: 4 deliberately, 9 for poor exposure/adhesions, 1 inability to create pneumoperitoneum, 3 duodenal injuries, 3 staplers problems and 1 bleeding. The operation duration was significantly longer for LBPB (245 ± 45 mn) compared to BPD (190 ± 41 mn) (p<0.0001) but the hospital stay was significantly shorter after LBPB (8.6 ± 8.6 days) than after BPD (13.8 ± 14 days) (p=0.049). For the 36 totally laparoscopic cases of LBPB the operative time was 234 ± 40 mn. Although there were more complications after BPD (47.8%) there was no significant difference with LBPB (35%). The rate of anastomotic leak/intra abdominal abscess was also higher after BPD (21.7% vs 12.7%) but not significant. There was one postoperative death (1.7%) in the LBPB group after conversion to open in a BMI 80 patient who developed gluteal rhabdomyolysis. 2 of 23 BPD patients (8.7%) were reoperated on for their complications (leaks/intra abdominal abscess and bleeding) compared to 9 LBPB (15.8%) but this was not significant. 3 BPD and 9 LBPB patients were readmitted (for bowel obstruction, vomiting, hypoalbuminemia). The rate of late reoperation was significantly higher after BPD (65%) compared to LBPB (12.5%) with p<0.0001. Indications were incisional hernia (12 BPD and 2 LBPB patients) and revision/reversal (2 BPD and 5 LBPB patients) and the revision rate was similar between the 2 groups. At 2 years both groups share a mean BMI of 31. Because of a higher preoperative BMI the weight loss after LBPB is greater although not significant. Although responsible for a significantly longer operative time with a high conversion rate the move to laparoscopy for BPD-DS adding a «learning curve within the learning curve» did not worsen the initial results with a comparable effect on weight loss.

Bariatric Surgery – P130

SINGLE-STAGE LAPAROSCOPIC SLEEVE GASTRECTOMY FOR WEIGHT LOSS IN MORBID OBESITY,

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Laparoscopic sleeve gastrectomy (LSG) is now considered an alternative surgical option for morbid obesity. We performed a retrospective review of a prospectively maintained database of patients undergoing LSG from Nov 2004 to Sept 2006 as a one-stage restrictive procedure. 107 LSGs were performed. 93 (87%) were primary procedures; M:F=1:3,



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mean age 42 yrs (range 13-79), mean BMI 43kg/m² (range 35-66). All procedures were completed laparoscopically. The mean duration of surgery was 94 mins (range 60-180) with a mean blood loss of 65 mls (range 20-300). The mean length of hospital stay was 2 days. 1 patient underwent reintervention for abdominal pain on postoperative day (POD) 1 requiring laparoscopic primary closure of a staple line leak close to the gastroesophageal junction. Short-term outcome data is available on 66 patients (71%) who have been followed for >3 mon; 52 patients (56%) have >6 mon follow-up with >1 yr follow up in 16 patients (17%). The mean weight loss is 24kg (range 19-30) at 6 mon and 51kg (range 24-44) at 1 yr. A further 14 patients (13%) had a LSG after failed laparoscopic adjustable gastric banding (n=11), failed attempt at laparoscopic Roux-en-Y gastric bypass due to adhesions (n=1), or previous jejunoileal bypass with weight regain (n=2); M:F=1:4, mean age 48 yrs (range 16-69), mean BMI 41kg/m² (range 35-55). Only 1 procedure was not completed laparoscopically (7%). This patient had a jejunoileal bypass >30 yrs previously and had chronic renal and liver failure. All 11 laparoscopic adjustable bands were removed during the same procedure. Mean operative time was 122 mins (range 85-180), mean blood loss was 98 mls (range 40-200), and mean length of hospital stay was 2.9 days (range 2-4). 1 patient underwent reintervention for abdominal pain on POD 2 requiring primary closure and omental patchplasty of a presumed ischaemic perforation adjacent to the staple line secondary to a coagulation injury. In summary, 2 patients required reintervention in our series resulting in a major complication rate of 1.8%. All patients had a gastrograftin swallow on POD 1 allowing early leak detection. A further 3 patients required readmission for mild dehydration. In conclusion, LSG is an effective and safe primary restrictive procedure to achieve weight loss.

Bariatric Surgery – P131

THE ROLE OF THE BARIATRIC SURGEON IN ENDOSCOPIC MANAGEMENT OF PATIENTS AFTER WEIGHT LOSS SURGERY, O Tucker MD, S Szomstein MD, P Fajnwaks MD, T Escalante-Tattersfield MD, E Matei MD, R Rosenthal MD, The Bariatric Institute, Cleveland Clinic Florida, Florida, USA

Introduction: In Jan 2005 at the Bariatric Institute, Cleveland Clinic Florida, we initiated a program of bariatric surgeon-performed upper gastrointestinal (GI) endoscopies on our bariatric patient population.

Methods + Procedures: A retrospective review was performed on all patients who had an upper GI endoscopy performed by two bariatric surgeons from Jan 2005 to Sept 2006.

Results: Since Feb 2000, 2238 laparoscopic bariatric procedures were performed; 1706 primary Roux-en-Y gastric bypass (LRYGB), 229 primary adjustable gastric bands, 92 primary sleeve gastrectomies. From Jan 2005 to Sep 2006, 862 upper GI endoscopies were performed; 394 in the endoscopy suite under sedation and 468 in the operating room under general anesthesia of which 412 (86%) were performed in patients undergoing LRYGB to check anastomotic integrity. In 1 patient (0.2%) the anastomosis was oversewn due to a minor leak demonstrated at upper GI endoscopy. Indications for postoperative endoscopic suite performed upper GI endoscopy were nausea (85%), vomiting (85%), epigastric pain (10%) or dysphagia (15%) after LRYGB. Findings included no abnormality in 108 (27%), mild gastritis in 60 (15%), moderate gastritis in 8 (2%), esophagitis in 17 (4%), gastrojejunal (GJ) anastomotic ulceration in 24 (6%), and GJ anastomotic stricture (GJAS) in 62 (16%). 96 balloon dilations were performed in 60 patients with GJAS. Only 7 (11%) required >3 balloon dilations for symptom resolution, while 38 (61%) required only 1 dilation. 4 of 62 (6%) patients with GJAS required surgical intervention; 2 for removal of silastic ring after vertical banded gastric bypass, and 2 with a persistent stricture. Endoscopic retrieval of pills, impacted food and bezoar was successful in 3 patients with pouch outlet obstruction. Endoscopic removal of eroded bands were performed successfully in 2 patients avoid-

ing the need for surgery. Complications included non-lethal arrhythmia in 2, hypoxemia in 1, and GJ perforation post dilation requiring laparoscopic repair in 3 (5%).

Conclusions: In our experience, bariatric surgeon performed upper GI endoscopy is safe, and facilitates management of postoperative complications.

Bariatric Surgery – P132

IS CONCOMITANT CHOLECYSTECTOMY NECESSARY IN OBES PATIENTS UNDERGOING LAPAROSCOPIC GASTRIC BYPASS SURGERY?, O Tucker MD, P Fajnwaks MD, T Escalante-Tattersfield MD, S Szomstein MD, R Rosenthal MD, The Bariatric Institute, Cleveland Clinic Florida, Florida, USA

Routine cholecystectomy in patients undergoing laparoscopic gastric bypass is controversial. Morbid obesity is associated with a high prevalence of cholecystopathy and increased risk of cholelithiasis during rapid weight loss. Trans-oral access to the biliary tree is lost after gastric bypass. In the era of open bypass surgery cholecystectomy was performed routinely to avoid a second laparotomy. We performed a retrospective review of a prospectively maintained database of patients undergoing laparoscopic Roux-en-Y gastric bypass (LRYGB) from Feb 2000 to Aug 2006. 1696 LRYGBs were performed. All had a preoperative USS to detect gallbladder (GB) pathology. 42 (2.5%) had previous cholecystectomy and were excluded from further analysis. 205 (12%) had GB pathology; cholelithiasis in 199 (83%), sludge in 5 (4%), and a polyp in 1 (0.5%). Cholecystectomy was not indicated for sludge or polyp size <1cm. 123 patients (60%) had a concomitant cholecystectomy at LRYGB, while 82 patients (40%) did not. Of these 120 (97%) were completed laparoscopically with insertion of an additional 5mm operating port. Concomitant cholecystectomy added a mean operative time of 20 mins (range 15-25). One patient developed a bile leak from an accessory biliary radicle requiring diagnostic laparoscopic transgastric ERCP (LTG-ERCP). Of the 82 patients who did not have cholecystectomy 16 (19%) have required subsequent cholecystectomy presenting with biliary colic (n=8), acute cholecystitis (n=6), and choledocholithiasis (n=2). All procedures were completed laparoscopically. 1 patient required transcystic CBD exploration (TCCBDE) with stone retrieval. 89 patients (5.2%) without preoperative GB pathology developed symptomatic cholelithiasis after LRYGB. Of these, 69 (4%) had a cholecystectomy, of which 98.5% were completed laparoscopically. 3 patients presented with gallstone pancreatitis and 2 with obstructive jaundice. 3 required TCCBDE and 1 LTG-ERCP with stone retrieval. 20 patients (1%) did not have further surgery. Another patient who had a cholecystectomy in 1983 presented with choledocholithiasis requiring LTG-ERCP with stone retrieval. In our experience, concomitant cholecystectomy at LRYGB for GB pathology is safe, feasible, and avoids subjecting patients to a second surgical procedure.

Bariatric Surgery – P133

COMPLICATIONS OF SLEEVE GASTRECTOMY WITH WRAPPING USING PTFE IN A PORCINE MODEL, Kazuki Ueda MD, Michel Gagner MD, Luca Milone MD, Sergio J Bardaro MD, Weill Medical College of Cornell University & Kinki University School of Medicine

Background: The safety and efficacy of laparoscopic sleeve gastrectomy for morbid obesity has been well established. However, short term weight regain may occur due to gastric dilatation. The efficacy and feasibility of the sleeve gastrectomy with wrapping using PTFE dual mesh was previously demonstrated. The aim of the study was to review complications of gastric wrapping using PTFE dual mesh.

Methods: Eleven Yorkshire pigs weighing 20-25kg underwent the sleeve gastrectomy with wrapping using PTFE dual mesh (wrap group, 8 pigs) or sleeve gastrectomy only (control group, 3 pigs) to compare weight loss. The operative procedure in the wrap group was performed: 1) omental dissection with left gastroepiploic vessels and short gastric vein dissection, 2) creation of gastric sleeve (approximately 200ml of size) using endoscopic linear staplers, 3) creation of two windows and tunnels at the lesser omentum, 4) wrap



up the gastric sleeve with PTFE dual mesh (17X14cm) and attach with endoscopic linear staplers. The postoperative animals were weighed weekly up to 8 weeks.

Results: Initial body weight, Operation time, and removed stomach size were similar in both groups. Postoperative weight gain up to 8 weeks was significantly slower in the wrap group than in the control group ($p=0.007$). Minor complications include such as regurgitation, vomiting, appetite loss, and port site infection. Those complications were improved within 1 week after surgery. In major complication, two mortalities (one was in the control group and another one was in the wrap group) were seen due to staple line failure and small bowel obstruction. After the completion of 8-week observation, of 7 pigs in the wrap group, the gastric erosion due to PTFE dual mesh were seen in 3 animals (38%).

Conclusion: Sleeve gastrectomy with wrapping using PTFE dual mesh is feasible and slow weight gain in a porcine model producing less gastric distention. However, PTFE dual mesh gastric wrapping resulted in erosion in 38% of animals. This material is not the ideal compound for gastric wrapping, and a new biomaterial need to be tested before human application.

Bariatric Surgery – P134

STAPLE LINE REINFORCEMENT IN LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS: SEAMGUARD OR PERISTRIPS?, Sherman Yu MD, Terry Scarborough MD, Erik Wilson MD, The university of texas health science center houston

Introduction With the increase in the use of staple line reinforcement in laparoscopic Roux-en-Y gastric bypass (LRYGB), there is little evidence to determine which product to use. The most touted benefit has been a decrease in intra-operative and post-operative bleeding. There are two main products. Peri-strips is non-absorbable whereas, Seamguard is bio-absorbable. Our aim is to determine if one product has an advantage over the other in LRYGB.

Materials and Methods From a prospectively collected bariatric database, all patients who had their gastric pouches created with Peri-strips were compared to the same number of consecutive patients who had Seamguard used instead. All patients underwent a LRYGB performed similar to the Higa technique. Outcomes and complications were tracked for 12 months after surgery. Patient complications associated with the gastric pouch were compared with the chi-squared method.

Results From November 2002 until November 2003, 118 patients had their gastric pouches created using Peri-strips. Subsequently, we switched to Seamguard and reached 118 patients by August 2004. Pre-operative factors for Peri-strips versus Seamguard patients were similar, including BMI (49.9 vs. 50.1), age (43 vs 44) and number of comorbidities (5.8 vs 5.8). There were no re-operations or postoperative bleeding requiring transfusion in either group. One patient in this study died secondary to a pulmonary embolus. The Peri-strips group had no leaks, whereas the Seamguard group had one subclinical anastomotic leak ($p=.32$). Nausea and vomiting were present in 3 patients with Peri-strips versus 8 patients with Seamguard ($p=.12$). Pouch erosion of Peri-strips was seen in 6 patients (5%), but not in any of the Seamguard patients ($p=.01$).

Conclusions The non-absorbable nature of Peri-strips resulted in pouch erosion in 5% of patients. However, nausea and vomiting was not statistically different between the two. These are often common complaints among the bariatric population, and their causes may be difficult to discern. Leak rates were also not statistically different and neither had a leak from the staple line of the gastric pouch. Both types of staple line reinforcements prevented significant postoperative bleeding. Seamguard is preferable to Peri-strips in LRYGB because it does not erode. A prospective, randomized trial would need to be performed to draw further conclusions.

Bariatric Surgery – P135

BENEFIT OF PATIENT CONTROLLED LOCAL ANESTHETIC INFUSION DEVICE AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS (LRYGB), John G Zografakis MD, Adrian G Dan MD, Mark Pozsgay DO, Debbie Pasini RN, Summa Health System Hospitals - Bariatric Care Center

Background: Morbidly obese patients are at increased risk for postoperative respiratory complications which may be compounded by the use of IV narcotics. This abstract details our experience with a non-narcotic based, patient controlled infusion catheter system.

Methods: 50 consecutive patients underwent LRYGB using a standard 6 port access method. At the completion of the procedure two fenestrated 5 cm catheters attached to the infusion device (300cc of 0.5% marcaine) were inserted into the subcutaneous tissue. The system delivers a constant 5cc/hour of local anesthetic, with the availability of a 2cc/hour bolus controlled by patient demand. The system is removed on the morning of POD#2. Other breakthrough medications available to the patient in addition to the infusion device include scheduled IV ketoralac, IV morphine and subsequently PO propoxyphene / acetaminophen on POD#1. **Results:** Of the 50 patients, 48% (24/50) used 2 or fewer doses of IV narcotics. Of these 18% (9/50) used no IV narcotics after surgery and 15/50 (30%) used 1 or 2 doses. None of these patients had any pulmonary catheter site complications. There were no catheters that were inadvertently removed.

Conclusion: The use of a patient controlled, non-narcotic infusion device is an effective method of providing postoperative pain control with minimal respiratory complications in patients undergoing LRYGB. In addition, the use of this system allows patients to control their own pain medication, while allowing for a decrease in nursing time for medicine administration.

Basic Science

(cellular bio, physiology) – P136

DIFFERENT PNEUMOPERITONEUM PRESSURES EFFECT THE PROPORTION OF CARBON DIOXIDE DIFFUSION THROUGH THE PERITONEUM AND THROUGH OPEN SMALL BOWEL AS REFLECTED BY END TIDAL CARBON DIOXIDE (ETCO₂): OBSERVATION IN A SMALL ANIMAL MODEL, Shmuel Avital MD, Samuel Szomstein MD, Raul Rosenthal MD, Yehuda Sckornik MD, Avi A Weinbroum MD, Department of Surgery A1 and Post Anesthesia Care Unit3, Tel-Aviv Sourasky Medical Center, Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel and Division of Laparoscopic Surgery2, Cleveland Clinic Florida, Weston, Florida, USA.

INTRODUCTION: We have previously demonstrated that end-tidal carbon dioxide (ETCO₂) increases when the small bowel is perforated during CO₂ pneumoperitoneum. The aim of this study was to assess the effect of this phenomenon in different CO₂ pressure levels.

MATERIALS AND METHODS: Three groups of 8 Wistar rats each were anesthetized, tracheostomized, and mechanically ventilated with fixed tidal volume and respiratory rate with vital signs and ETCO₂ monitoring. After a stabilization phase of 30 minutes, CO₂ pneumoperitoneum was established to 5mmHg, 8 mmHg and 12mmHg in each different group and maintained for 30 minutes. A small bowel perforation was then created and pneumoperitoneum was maintained for another 30 minutes.

RESULTS: There were no significant changes in blood pressure throughout the experiment in all groups. Ventilatory pressures increased in all groups after induction of pneumoperitoneum and remained elevated during the pneumoperitoneum with bowel perforation. In the 5mmHg group, there was a significant modest increase in ETCO₂ following induction of pneumoperitoneum (39.4 to 41.1, $p=0.014$), and a further increase following the small bowel perforation (41.1 to 42, $p=0.001$). In the 8 mmHg and 12mmHg groups, there was no significant change in ETCO₂ after induction of pneumoperitoneum however; a dramatic



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increase in ETCO₂ in both groups was recorded following the small bowel perforation (39 to 50 in the 8 mmHg group, $p=0.001$ 35.1 to 49.8, in the 12 mmHg group $p=0.002$).

CONCLUSIONS: ETCO₂ increases when small bowel is perforated during CO₂ pneumoperitoneum. The increase is pressure-dependent. Below a certain intraperitoneal pressure (5-7 mmHg in the rat), ETCO₂ would increase mildly after induction of pneumoperitoneum and would further rise moderately upon perforating the bowel. In higher intra-abdominal pressure (≥ 8 mmHg in a rat), no increase in ETCO₂ is predicted after induction of pneumoperitoneum. However, a substantial ETCO₂ increase is expected following bowel perforation. As sustained before, there is a critical pneumoperitoneum pressure level, above which the peritoneal capillaries are pressurized, thus occluded, and CO₂ diffusion is minimal. When small bowel is perforated it serves as the only port of exit for CO₂ load, leading to a substantial increase in ETCO₂. We believe such a gradient exists in humans, for which the magnitude of ETCO₂ elevation could monitor small bowel perforation deliberately or accidentally.

Basic Science (cellular bio, physiology) – P137

THE EFFECT OF SURGERY ON GRANULOCYTE GENE EXPRESSION; A MICROARRAY ANALYSIS., A Belizon MD, I Kirman PhD, A Hoffman MD, S Kumara PhD, A Offodile BA, M Foster BA, D Moradi BA, S Jain BA, V Cekic RN, R L Whelan MD, Columbia University Medical Center

Animal models have consistently shown enhanced tumorigenesis after major surgical trauma, the cause of this enhanced growth remains unclear. We previously demonstrated, in humans, that surgical trauma causes significant alterations in the plasma levels of proteases and related factors which may have a stimulatory effect on tumor growth and spread early after surgery. Some of these alterations involve cells involved in the inflammatory response, particularly granulocytes. In this study, a focused microarray analysis was carried out in an effort to gain insight into how surgery affects the expression of genes related to protease regulation within granulocytes.

Methods: 8 pts between the ages of 65-75 undergoing elective minimally invasive sigmoid colon resection with the final pathologic diagnosis of adenocarcinoma between Aug 2005 and Jan 2006 were included in this study. After obtaining informed consent, blood was drawn preoperatively and on Postop days 1 and 3. Granulocytes were isolated from the blood using a combination of gradient centrifugation and magnetic microbead separation. The cells were subsequently lysed and the mRNA extracted after which the mRNA was hybridized to the GE Array Q series, a specialized microchip specific for 96 human protease related genes.

Results: Relative to the preop baseline, the mean expression level of 7 genes showed significant changes 24 hrs after surgery. In addition 5 genes showed significant alterations on postop day 3 when compared to their average preop expression. Of interest was the POD 1 downregulation of the integrin beta 7 gene, a protein known to be important in the adhesion and chemotaxis of cells involved in tumor growth regulation. Additionally, matrix metalloproteinase 9, 14 & 17 (all known tumor growth promoters) were significantly upregulated 24 hrs after surgery. On POD 3 TGF beta 1 expression was significantly increased when compared to baseline; TGF beta 1 is also implicated in tumor growth and spread. Conclusion: Surgical trauma affects the genetic expression of granulocytes in the immediate perioperative period. A number of the up-regulated genes are thought to play important roles in the regulation of tumor growth and spread. These findings need to be verified in a larger group of pts in microarray as well as via RT-PCR and on the protein level. Nevertheless, the microarray study of circulating immune cells merits further study and may provide further insight into surgery's impact on the host.

Basic Science (cellular bio, physiology) – P138

EARLY RESULTS OF THE USE OF NOVEL PROTEOMIC AND METABOLOMIC ASSESSMENT TOOLS TO ASSESS METABOLIC RESPONSE TO WEIGHT-LOSS IN PRE AND POST-LAGB PATIENTS., John M Bennett BA, Abigail C Polley PhD, Ian J Colquhoun PhD, Gwenalle Le Gall, Elizabeth K Lund PhD, Ian T Johnson PhD, Michael Rhodes MD, Institute of Food Research and BUPA Hospital Norwich

Introduction: The development of methods to separate and quantify all the components of the human proteome and metabolome allows us to explore the entire plasma response to obesity and obesity surgery. The use of these tools will enable the investigation of changes occurring in response to metabolic adjustments that occur during weight reduction following obesity surgery.

Method: We are undertaking a prospective, controlled study of morbidly obese patients undergoing laparoscopic adjustable gastric banding. Fasted blood tests are taken pre and at 3 and 6 months post-surgery for obese patients and at identical time points for normal subjects to control for seasonal variations in metabolome expression. Proteomic assessment involves 2-D gel electrophoresis of albumin/ IgG depleted plasma using pH gradient strips and isoelectric focusing followed by gel separation on 10% homogenous polyacrylamide gels. Metabolomic assessment is based around liquid chromatography-mass spectrometry and nuclear magnetic resonance spectroscopy.

Results: Five morbidly obese patients, 4F and 1M (median age 40 years (27-55), mean pre-op BMI 47.3 Kg^m-2 (41.4-59) and three age/ sex matched controls (mean BMI of 24 (21-26) have been recruited and sampled to date. Pre- and 3 months post-operative plasma samples have undergone proteomic and metabolomic assessment. Initial results show a spectrum of protein changes that will be qualified using a robotic spot-picking system and identified by MALDI-TOF and Q-TOF mass spectrometry.

Discussion: The preliminary results show the viability of this method for broad spectrum metabolic assessment in this group, and its utility in the search for proteome and metabolome differences associated with obesity related disease.

Basic Science (cellular bio, physiology) – P139

LAPAROSCOPIC BARIATRIC SURGERY-INDUCED WEIGHT LOSS ENHANCES THE SPECIFIC IMMUNE SYSTEM., Silas M Chikunguwo MD, Stacy Brethauer MD, Vijaya Nirujogi MD, Suthep Udomsawaengsup MD, Tracy Pitt DO, Bipan Chand MD, Philip R Schauer MD, The Cleveland Clinic Foundation

BACKGROUND. Morbid obesity is a low-grade chronic inflammatory disease that may be associated with specific immunological dysfunction. Studies on genetically obese rodent models have demonstrated improvement in immunological function with weight loss. In humans, the effect of surgically induced weight loss on the specific immune system has not been clearly elucidated. Our hypothesis is that surgically-induced weight loss enhances specific immunological functions. Analyzing lymphocyte and monocyte counts in bariatric patients who had lost weight following Laparoscopic Roux-en-Y gastric bypass and adjustable gastric banding tested this hypothesis.

METHODS. Patients who had undergone Laparoscopic Roux-en-Y-gastric bypass and adjustable gastric banding were selected. Those with signs of either infection or hematopathology were excluded. Pre- and post-operative complete blood counts (CBC with differentials) previously measured by standard hematological methods were analyzed for lymphocyte and monocyte counts and correlations with percentage excess weight loss (%EWL) determined. The results were statistically analyzed using Student's t-test.

RESULTS: Eighty bariatric surgical patients were analyzed. Of these, 70 patients had undergone laparoscopic Roux-en-Y gastric bypass and 10 had laparoscopic adjustable gastric

banding. Cellular counts showed an upward trend with either decrease in BMI or increase percentage excess weight loss (%EWL). Lymphocyte counts increased by 30% to 40% and monocytes by 20-30% with EWL above 10%. The enhanced counts remained within standard normal ranges. The increase in the counts of these cells was not dependent on the length of time from surgery, but rather on the degree of weight loss alone. Trends in lymphocyte and monocyte counts were similar between procedure types.

CONCLUSION: The data are consistent with the viewpoint that surgically induced weight loss is associated with enhanced immunocompetence. Therefore, Laparoscopic Roux-en-Y gastric bypass and banding are not only weight loss operations, but also appear to be adaptive immune restorative procedures.

Basic Science

(cellular bio, physiology) – P140

EFFECT OF BLOOD GAS CORRECTION ON TISSUE BLOOD FLOW DURING CARBON DIOXIDE PNEUMOPERITONEUM, Yunus Yavuz MD, Kirsten Rønning, Jon Erik Grønbech, Ronald Mårvik, National Center for Advanced Laparoscopic Surgery, Department of Surgery, St.Olav's Hospital, 7006 Trondheim

Background: CO₂ pneumoperitoneum induces an increase in partial pressure of CO₂ (PaCO₂) in the arterial blood unless corrected by ventilatory adjustments. The effect of usual level of CO₂ pneumoperitoneum (i.e. 10-12 mmHg) on the tissue blood flow is known to be limited; however, little is known about what happens if hypercapnia is allowed. The aim of this study was to compare effect of blood gas correction on tissue blood flow in the intra- and extra-abdominal structures, in particular in the peritoneal tissue where the CO₂ pneumoperitoneum induces a noticeable vasodilatation.

Materials and Methods: In a group of pigs (n=8), increase in PaCO₂ was reversed by increasing tidal volume after induction of CO₂ pneumoperitoneum of 10 mmHg (corrected group). In another group of pigs (n=8), blood gas correction was not attempted (uncorrected group). Tissue blood flow in various organs was measured at the basal level, 60th, 90th and 120th minutes by colored microsphere method.

Results: In the uncorrected group, CO₂ pneumoperitoneum of 10 mmHg increased PaCO₂ in arterial blood from a base level of 4.5-5 to 7 kPa (i.e. mild hypercapnia). Peritoneal blood flow increased significantly in both groups in all measurements. However, this increase was more prominent in the corrected group. Tissue blood flow in the central nervous tissue was increased in both corrected and uncorrected groups and it was significantly higher in the uncorrected group. The blood flow in the rest of the organs remained stable.

Conclusion: The increase in the peritoneal blood flow is a local effect of CO₂ pneumoperitoneum, however increase in the blood flow in the central nervous is due to hypercapnia. Mild hypercapnia has a minor effect, if any, on tissue blood flow in most of the intra- and extra-abdominal organs.

Colorectal/Intestinal Surgery – P141

LAPAROSCOPIC MANAGEMENT OF COMPLICATED CROHN'S DISEASE, Yaron Armon MD, Alex Mintz MD, Joseph Alberton MD, Petachia Reissman MD, Shaare-Zedek Medical Center, Jerusalem, Israel

Introduction: Crohn's Dis. in its complicated forms like large inflammatory mass, complex fistulae including entero-cutaneous/colonic or vesicle, extensive colonic disease, and recurrent disease in patients who had previous open resections presents a surgical challenge in both open and laparoscopic approaches.

Aim: to assess the feasibility safety and outcome of laparoscopy in complicated Crohn's dis. in a high volume IBD center.

Patients and Methods: Retrospective analysis of prospectively collected data of all consecutive patients who were defined as complicated disease based on the presence of a large inflammatory mass (>15cm) and/or complex fistulae.

All pts. were prepared with enteral or parenteral feeding, had a complete GI workup and had a laparoscopic assisted procedure.

Results: 45pts. (27M 18F, Age 15-52, mean 28 y) were operated between 2002- 2006. Mean duration of dis. was 7y and 76% of pts. were on corticosteroids. 6pts. had a previous ileocolic resection. 37pts. had an inflammatory mass usually located in the RLQ or pelvis, 33pts. had 50 various fistulae including: 15 ileo-sigmoid, 11 ileo-ileal, 10 ileo-vesicle, 4 ileo-cutaneous, 3 ileo-cecal, 2 sigmo-vesicle, 2 ileo-transv. colon, 1 sigmo-cutaneous, 1 recto-vaginal, 1 ileo-vaginal. 86 procedures were performed in the 45pts. including: 31 ileocolic resections, 13pts. had a total of 32 stricturoplasties, 13 repair of sigmoid fistula, 10 SB resection, 10 urinary bladder repair, 4 segmental sigmoidectomy, 5 subtotal/total colectomy. 4pts.(8.8%) were converted due to the large inflam. mass and limited exposure. Mean OR time was 227 min(45-350), and length of stay - 9 days(5-23). Major morbidity of bleeding, leak and abscess occurred in 3pts.(6.6%,1 in each). **Conclusions:** Disease severity in complicated Crohn's dis. commonly requires several procedures to be performed in each patient, and a relatively long hospital stay. However, despite of the technical challenges, laparoscopic management is feasible and safe in experienced centers.

Colorectal/Intestinal Surgery – P142

A COMPARISON OF HAND-ASSISTED LAPAROSCOPIC (HAL) AND LAPAROSCOPIC COLECTOMY FOR THE TREATMENT OF DIVERTICULAR DISEASE., John M Aversa Jr DQ, Andrea Ferrara MD, Paul R Williamson MD, Joseph T Gallagher MD, Samuel DeJesus MD, Alvaro Garcia MD, Colon and Rectal Clinic of Orlando

Purpose: Compare the clinical outcomes of HAL colectomy with conventional laparoscopic colectomy for patients with diverticular disease.

Methods: We reviewed our prospectively collected data base for laparoscopic surgery from 4/2002 to 8/2006 and extracted all consecutive cases that were performed for both acute and chronic diverticular disease.

Results: Fifty-nine surgeries were performed over the time period for both acute and chronic diverticulitis with and without abscess. Thirty cases were performed utilizing HAL approach and 29 were performed utilizing a conventional laparoscopic approach. Four of the 29 conventional laparoscopic cases were converted to open yielding a conversion rate of 14%. These converted cases were all complex in nature and their postoperative clinical data was excluded from further analysis. There were no conversions in the HAL group. The operation performed was sigmoid colectomy in a 95% of cases and LAR resection in the remaining 5%. Demographics were similar for both groups. In the HAL group 44% of patients were female and 56% were male with a mean age of 55.5(28-81). In the laparoscopic group 53% of patient were female 47% were male with a mean age of 51(39-68). BMI was 27.2 for the HAL group and 28.1 for the laparoscopic group. The HAL group had a proportionally higher percent of complicated cases 53% versus only 12% in the completed conventional laparoscopic group. There was no statistical significance between the two groups with regard to: length of stay, operative blood loss, time to clear liquid diet, time to flatus or use of post operative analgesics. There was a slight difference in operative time favoring the HAL group 200 min (127-237) compared with the conventional laparoscopic group 224 min (145-348) with p = 0.1. The complication rates were similar, 23% in the HAL group and 20% in the conventional laparoscopic group.

Conclusion: With regards to length of stay, return of bowel function and analgesic use HAL colectomy for diverticular disease appears to maintain the benefits of the conventional laparoscopic approach. In addition HAL approach extends the complexity of cases which can be completed utilizing a minimally invasive approach without compromising safety or lengthening operative time.



SAGES POSTER ABSTRACTS

Colorectal/Intestinal Surgery – P143

SHORT-TERM RESULTS OF LAPAROSCOPIC SURGERY VERSUS OPEN SURGERY FOR RADICAL TREATMENT OF PATIENTS WITH COLORECTAL CANCER, Jeong-Heum Baek MD, Gil-Jae Lee MD, Jae Hwan Oh MD, Department of Surgery, Gil Medical Center, Gachon University of Medicine and Science

Introduction: The safety and oncologic outcomes of laparoscopic surgery for colorectal cancer remain controversial. The aims of this study are: (1) to assess the safety and the efficacy of laparoscopic colorectal surgery compared to those of conventional open surgery; and (2) to compare the disease-free survival (DFS) rates between laparoscopic and open colorectal surgery for radical treatment of patients with colorectal cancer. **Methods:** From January 2001 to December 2005, 583 patients underwent laparoscopic or conventional open surgery. To assess for radical surgery of colorectal cancer, we excluded subjects who had cases of emergency operations, conversion in laparoscopic surgery, stage IV cancer, or synchronous non-colorectal cancer. A total of 471 patients were enrolled for this study. The following parameters between the two groups were assessed: operation time, transfusion, days to flatus, length of distal margin, number of acquired lymph nodes, morbidity, mortality, and DFS rate. Survival data were analyzed using Kaplan-Meier curves. **Results:** There was no difference in the numbers of lymph nodes dissected nor in the lengths of the distal margins of the resected bowels of the laparoscopic group (LG) compared to the open group (OG) in colon cancer and rectal cancer, respectively (P>0.05). Also no difference was found in operation time, transfusion, days to flatus, hospital stay, postoperative complications such as bleeding, anastomosis leakage, ileus, and postoperative mortality (P>0.05). No significant difference was found in DFS rates of all stages and each stage (I, II, III) by comparing LG with OG in colon cancer and rectal cancer, respectively (P>0.05, Table).

	OG (n=169)	LG (n=62)	P value
Colon cancer			
5yr DFS (%)	77.6	90.2	0.255
	OG (n=159)	LG (n=81)	P value
Rectal cancer			
5 yr DFS (%)	68.8	84.6	0.348

Conclusions: The laparoscopic technique does not seem to present any disadvantages and this technique is safe and feasible for colorectal cancer. No difference was found between laparoscopic and open surgery in terms of short-term morbidity and DFS for colorectal cancer.

Colorectal/Intestinal Surgery – P144

OUTCOME OF LAPAROSCOPIC COLORECTAL SURGERY IN OCTOGENARIANS., Carmen Balague PhD, Eduardo Targaron PhD, Pilar Hernandez MD, Carmen Martinez MD, Rodrigo Medrano MD, Juan Marin MD, Rene Berindoague PhD, Jorge Garriga PhD, Manuel Trias PhD, Hospital de la Sta. Creu i St. Pau

Patients over 80 years are increasing. Open colorectal surgery in these patients is associated with increased morbidity. Laparoscopic colorectal resection (LCR) can be done safely. However, the surgical outcomes are not enough documented.

Aim: To evaluate the surgical outcomes of LCR in a prospective serie of 112 patients older than 80 years diagnosed of colorectal cancer. **Material & methods:** Jan/98-Febr/06. Performed 507 laparoscopic resections for colorectal cancer. Data prospectively recorded. Patients divided in 3 groups of age: Group I: <70 years, Group II: 70-79 years and Group III: over 80 years. We compare the results.

Results:

Table I: Surgical and postoperative results
Group I Group II Group III
n 210 185 112
Mean age 60 75 84
Sex (m -f) 120 - 90 126 - 59 61 - 51
Comorbidity 36% 55% 47%
Previous surgery 29% 39% 43%
T4 19% 21% 13%
Operative time 152 152 148
Perop complications 30% 32% 30%
Conversion 15% 18% 20%
Postop complications 32% 33% 34%
Anastomotic leakage 4% 6% 3%
Hospital stay (d.) 7 8 9
Reoperation 2% 9% 3.5%
Mortality 0.5% 2.7% 1%

Table II: Procedures

Group I Group II Group III
Right col 42 (20%) 61 (33%) 36 (32%)
Left col 13 (6%) 16 (9%) 4 (3%)
Sigma res 72 (34%) 50 (27%) 28 (25%)
anterior res 49 (23%) 34 (18%) 20 (18%)
APR 26 (12%) 19 (10%) 14 (12.5%)
Colectomy 27 (12%) 0 (0%) 1 (0.8%)
Hartmann 28 (12%) 4 (2%) 7 (6%)
Palliat treat 29 (12%) 1 (0.5%) 2 (1.7%)

Conclusion: Laparoscopic colorectal resection is safe and feasible in elderly patients. Postoperative recovery and quality of life have to be evaluated

Colorectal/Intestinal Surgery – P145

INTRAOPERATIVE GAMMA PROBE LOCALIZATION OF THE URETERS: A NOVEL TECHNIQUE, Todd Berland MD, S L Smith MD, P Metzger MD, K L Nelson PhD, G P Fakhre MD, H K Chua MD, O L Burnett MD, J Falkensammer MD, H J Hickman DO, R A Hinder MD, Mayo Clinic Jacksonville

INTRODUCTION: Localizing the ureters during surgery can be a challenging task. Ureteral stent placement, currently the gold standard, is an invasive procedure. The aim of this study was to evaluate the feasibility of using the gamma probe to intraoperatively identify the ureters after an intravenous injection of a radiopharmaceutical. If gamma probe localization of the ureters is possible, the need for ureteral stent placement could be obviated. This concept has never before been described, and offers a non-invasive alternative to ureteral stenting.

METHODS: 10 patients (6 male, 4 female) undergoing elective, abdominal surgery were prospectively enrolled in this study. The mean age was 51.9 years (range 30 - 71 years). An average dose of 4.5 mCi (range 2.8 - 5.3 mCi) of technetium-99m labeled diethylene-triamine-penta acetate (Tc-DTPA) was administered intravenously prior to localization of the ureters. The gamma probe was used to localize the ureter, and the correct identification of the ureters was confirmed when gentle manipulation induced the typical ureteral peris

RESULTS: Gamma counts were significantly elevated in all ureters examined. When compared to background counts, increased gamma counts were present over the ureter in all patients with an average increase of 465%. The technique was modified after being used in the first three patients and was standardized for patients 4 through 10. Data from those patients were analyzed. After a single injection of Tc-DTPA, the gamma probe was used in two patients at two different times during the operation to further define the temporal limitations of this technique. Both ureters could be correctly identified using the gamma probe at a mean of 15 minutes (median=10 minutes) after a single Tc-DTPA injection. (range 4 - 41 minutes). The mean background count was 80 (range 50 - 130). The mean ureter count was 393 (range 128 - 700). The average percent increase of each ureter count to its specific background count was 465% (range 256%- 1077%). The difference was statistically significant for all values (p < 0.001).



CONCLUSION: This novel technique of gamma probe localization of the ureters is feasible and may offer a non-invasive approach for ureteral identification. A significant increase in gamma counts over the ureter could be consistently demonstrated for an extended period after a single injection of Tc-DTPA.

Colorectal/Intestinal Surgery – P146

LAPAROSCOPIC COLECTOMY FOR “BENIGN” COLORECTAL NEOPLASIA: A WORD OF CAUTION, Marc Brozovich

MD, Thomas E Read MD, Salgado Javier MD, William Harb MD, Robert P Akbari MD, James T McCormick DO, Philip F Caushaj MD, Division of Colon and Rectal Surgery, Western Pennsylvania Hospital, Cincinl Campus of Temple University School of Medicine. Pittsburgh, PA, USA.

Purpose : Endoscopically unresectable “benign” colorectal polyps are considered by some surgeons as ideal cases for their early laparoscopic colectomy experience. Our hypotheses were: (1) a substantial fraction of patients undergoing laparoscopic colectomy for “benign” colorectal neoplasia will have adenocarcinoma on final pathology; and, (2) in our practice, we perform an adequate laparoscopic oncologic resection for “benign” polyps as evidenced by margin status and nodal retrieval.

Methods: Data from a consecutive series of patients undergoing laparoscopic colectomy (on an intention to treat basis) for endoscopically unresectable neoplasms with benign preoperative biopsy histology were retrieved from a prospective database and supplemented by chart review.

Results: The study population consisted of 63 patients (mean age 67, mean BMI 29). 2/63 cases (3%) were converted to laparotomy because of extensive adhesions (n=1) and equipment failure (n=1). Colectomy type: right/transverse (n=49, 78%); left/anterior resection (n=10, 16%); subtotal (n=4, 6%).

Invasive adenocarcinoma was found on histologic analysis of the colectomy specimen in 14/63 (22%), standard error of the proportion 0.052. Staging of the 14 cancers: I (n=6, 43%); II (n=3, 21%); III (4, 29%); IV (1, 7%). Median nodal harvest was 12 (range 5-21) and all resection margins were free of neoplasm.

By univariate analysis, neither dysplasia on endoscopic biopsy nor lesion diameter was predictive of adenocarcinoma, although sample size may be too small to adequately assess these variables. 8/23 (35%) patients with dysplasia on endoscopic biopsy had adenocarcinoma on final pathology vs. 6/40 (15%) with no dysplasia (p=0.114, Fisher’s exact test). Mean diameter of benign tumors was 3.2cm (range 0.5-10.0cm) vs. 3.9cm (range 1.5-7.5cm) for adenocarcinomas (p=0.189, t-test).

Conclusions: A substantial fraction of endoscopically unresectable colorectal neoplasms with benign histology on initial biopsy will harbor invasive adenocarcinoma, some of advanced stage. This finding supports the practice of performing oncologic resection for all patients with endoscopically unresectable neoplasms of the colorectum. The inexperienced laparoscopic colectomist should approach these cases with caution.

Colorectal/Intestinal Surgery – P147

ANAL PAP SMEAR IN HIGH RISK PATIENTS: A POOR

SCREENING TOOL, Neil Cambroner MD, Katia Papalezova MD, Cesar Santiago MD, Jason Penzer MD, Christian Hirsch MD, Scott Hanan MD, Cabrini Medical Center, NY, NY

Anal cancer and anal intraepithelial neoplasia is rare in the general US population, with an incidence of 0.8 per 100,000. However, the incidence is increased by 25 to 50 times in homosexual men, and even moreso in those presenting with HIV and/or AIDS. The association of HPV infection with cervical neoplasia in women has been well documented in the literature and it is from this experience that the association of HPV with anal cancer has been deduced. However, there are multiple other factors influencing the development of anal cancer- including HIV seropositivity, a history of sexually transmitted infections, and participation in anally per-

ceptive intercourse. The controversy surrounding routine cytological screening for intra-anal HPV stems from the unknown natural history of HPV infection, and the absence of any cure. This study was designed to assess the accuracy of Anal Pap Smears in predicting the histological grade of anal intraepithelial lesions and in detecting anal cancer. The literature suggests that anal cytology by has a sensitivity between 50 and 75 percent, with variations depending on the study, or the definitions of the staging classifications. Our study which includes 143 individuals, of whom 105 are HIV positive, shows a poor correlation between the cytological and the histological results in a high risk population. The sensitivity of PAP read as high grade intraepithelial neoplasia, condyloma, or squamous cell carcinoma on anoscopy and biopsy was 58%. The specificity of PAP read as normal or low grade intraepithelial neoplasia to exclude high grade neoplasia, condyloma, or squamous cell cancer was only 22%.

Anal PaP Smear in High Risk Patients? A poor tool

In the light of these findings, we advocate routine close surveillance of these high risk patients with anoscopy, excision, ablation, and biopsy of any suspicious visible lesions rather than screening with Ana PaP smear.

Colorectal/Intestinal Surgery – P148

AN INFECTIOUS COMPLICATION OF LAPAROSCOPIC

APPENDECTOMY: FIFTH DAY SYNDROME, SENOL CARILLI

MD, AYDIN ALPER MD, AZIZ KAYA MD, ALI EMRE MD, VKF AMERICAN HOSPITAL GENERAL SURGERY DEPARTMENT

Appendectomy is the second most common general surgical procedure following lap cholecystectomy and the most common intra-abdominal surgical emergency with a life time risk of 6%. Traditionally infectious complications of appendectomy represented by wound infections and intra-abdominal abscess in many articles. Here, we describe another infectious complication with a historical cohort study of adult patients on for suspected appendicitis by open (OA) or lap appendectomy (LA).

METHOD Between 1996 to 2004 we have performed 582 emergency appendectomies in a private setting hospital. 162 of them were OA, 402 were LA and 18 started as LA and turned to open. Mean age was 30,87 (13-87) and 298 of them were male 284 were female. Pathological diagnoses of the specimens were; uninfamed appendix vermiformis 62, periappendicitis 8, carcinoid and metastatic tumors 6, perforated 14 and remaining diagnosis were changed from acute appendicitis to gangrenous appendicitis. Overall complication rate is 6.87%. Postoperative complications after OA were; 1 status epilepticus, 2 pneumonia, 13 extended ileus, 8 wound infection, 2 postop diarrhea. Complications following LA were; 4 pneumonia, 9 extended ileus, 3 postop diarrheas, 2 intra-abdominal abscesses, 5 fifth day syndrome (FDS). There was no mortality.

CONCLUSION FDS was originally described as a complication of traditional appendectomy in children. Typically the syndrome presented after an uneventful immediate postoperative course, the child would have a febrile painful small bowel obstruction with signs of localized peritonitis in the right iliac fossa. In medical literature there are only several articles and these are describing the syndrome on children. In our limited series we have experienced that the condition is not confined to pediatric population. Mean age of the patients with FDS was 36 (24-55). Their readmission dates were differed between 3-6th postop days. All they had abdominal pain, fever, localized peritonitis, paralytic ileus and leukocytosis. Its etiology is most probably perop fecal spillage. Radiological signs were air-fluid levels suggesting paralytic ileus on plain x ray, and ultrasound and CT scan reveal loculated fluid around the edematous caecum. The importance of the syndrome is originated from its treatment which differs from an abscess. Cessation of oral feeding, starting IV fluid and parenteral antibiotic treatment with covering colonic flora are adequate treatment.



SAGES POSTER ABSTRACTS

Colorectal/Intestinal Surgery – P149

THE MANAGEMENT OF PERFORATED APPENDICITIS: LAPAROSCOPIC VERSUS OPEN APPENDECTOMY, Arthur M Carlin MD, Sameeh Kawar MD, Henry Ford Hospital

Introduction: The purpose of this study is to compare the surgical outcomes of laparoscopic and open appendectomy in patients with perforated appendicitis. The literature has yielded conflicting results regarding the benefit of laparoscopic appendectomy in the management of perforated appendicitis. The primary concern is the potential for increased risk of infectious complications with the laparoscopic approach.

Methods: A retrospective review was performed to evaluate the outcomes of laparoscopic versus open appendectomy. Student's t-tests and X2 analyses were utilized to determine differences in continuous and nominal variables respectively, and significance assumed at $p < 0.05$.

Results: Appendectomy was performed in 146 patients (age ≥ 15 years) with perforated appendicitis at our teaching institution from February 2000 through March 2006. The mean age was 47 ± 18 years with 86 male patients (59%). The mean operative time and length of stay were 88.5 ± 33 minutes and one week, respectively. Open appendectomy was performed in 119 patients. Laparoscopic appendectomy was attempted in 27 patients and completed successfully in 5. The operative time was significantly longer in the laparoscopic as compared to the open appendectomy group (109 ± 32 vs. 81 ± 31 minutes; $p = 0.028$). There were no differences in the rates of postoperative cardiovascular, respiratory, gastrointestinal, or renal complications. The rate of postoperative wound infections was similar between both groups (7.4% lap vs. 7.6% open). The rate of postoperative intra-abdominal abscess formation was significantly higher in the laparoscopic as compared to the open appendectomy group (26% vs. 8%; $p = 0.019$). There was no difference in length of stay between the open and laparoscopic appendectomy groups, however, postoperative intra-abdominal abscess was a significant predictor of increased length of stay (11.8 vs. 6.7 days; $p = 0.003$). There was no correlation between postoperative intra-abdominal abscess formation and age, sex, operative time, or presence of comorbidities including diabetes.

Conclusion: Laparoscopic appendectomy for perforated appendicitis is associated with a high conversion rate, prolonged operative time, and an increase in postoperative intra-abdominal abscess formation.

Colorectal/Intestinal Surgery – P150

A RESIDENT'S EXPERIENCE WITH HAND-ASSISTED VS. STRAIGHT LAPAROSCOPY FOR LEFT COLECTOMY: IS THERE REALLY A DIFFERENCE? Bradley J Champagne MD, Edward C Lee MD, Guy R Orangio MD, Wayne Ambroze MD, David Armstrong MD, Brian Valerian MD, Feustel Paul PhD, Case Medical Center, Albany Medical Center, Georgia Colorectal Clinic

Background: Several studies comparing the effectiveness of hand-assisted colectomy (HAC) and straight laparoscopic colectomy (SLC) have been published. It has been suggested that HAC may help residents progress along the learning curve but there is currently no evidence to support this claim. These previous studies include procedures performed by staff surgeons or residents at various skill levels and report operative times and conversion rates as their primary endpoints. Furthermore, the actual role of the resident or staff surgeon as either the first assistant or primary surgeon is routinely not addressed. We report the experience of a single resident, training with both techniques, HAC and SLC, during residency and fellowship. The percentage of cases completed by the resident as the operating surgeon was the primary endpoint.

Methods: All patients who underwent left-sided HAC or SLC by a single resident, starting as the primary surgeon, were included. When the assisting staff surgeon assumed the role of the operating surgeon during the procedure it was recorded as an incomplete case for the resident. Operative times and conversions were included as secondary end-

points. All values below are reported as mean (range).

Results: A single resident started 147 laparoscopic colectomies as the primary surgeon during residency and colorectal fellowship including 81 left sided procedures. There were 44 patients in the HAC group and 37 SLC patients. There were no differences in patient demographics, diagnoses, ASA class, number of previous surgeries, and type of surgery. Cases done by straight laparoscopy were more likely to be completed by the resident than those done by HAC (SLC 88%, HAC 72%; $p = .06$). There were also differences in operative time favoring SLC (HAC 142 min (100-170) vs. SLC 133 min (95-195); $p = 0.04$). Complications were similar in the two groups (HAC 19% vs. SLC 21%) as were conversions (HAC 5.6% vs. SLC 4.5%) and length of hospital stay (HAC 4.9 days (2-10) vs. SLC 4.4 days (2-13); $p = 0.17$).

Conclusion: We feel that the percentage of cases completed by the resident as the operating surgeon is the most appropriate primary endpoint in determining the most effective approach for teaching laparoscopic colectomy. Residents and colorectal fellows may have more success completing straight laparoscopic colectomy than adjusting to the novel hand-assisted approach

Colorectal/Intestinal Surgery – P151

LAPAROSCOPIC RESECTION FOR RECTAL CANCER : ONCOLOGIC OUTCOMES IN 139 CONSECUTIVE PATIENTS WITH A MINIMUM FOLLOW-UP OF 2 YEARS. GS Choi MD, IT Lee MD, MJ Jo MD, SH Jun MD, Division of Colorectal Surgery, Department of Surgery, Kyungpook National University Hospital,

Background: One of the most controversial areas of laparoscopic colorectal surgery is that of rectal cancer. The aim of this study was to assess oncologic outcomes of the patients with rectal cancer who underwent surgery by laparoscopic techniques with a minimum follow-up 2 years. **Methods:** Between December 2002 and September 2004, a single surgeon (GSC) performed laparoscopic resection for 139 unselected rectal cancer patients (male, 77) without distant metastasis. Pre- and post-operative chemoradiation was given in 5 and 17 patients, respectively. Operating time, length of postoperative hospital stay, complications, oncologic outcomes were evaluated. **Results:** Mean operating time was 251 minutes and mean length of postoperative hospital stay was 11 days. In 89.2% of the patients, a surgical procedure with sphincter preservation was performed. The rate of conversion to the open approach was 4.3%. Overall morbidity rate was 20.9% and anastomotic leakage occurred in 11.3% (14 of 124 patients in whom sphincter preservation was undertaken). There was no postoperative mortality. Mean distal resection margin was 2.8 cm. Mean numbers of harvested lymph nodes was 18. The circumferential resection margin was positive in 5 patients (3.6%). 84 patients (60.4%) had T3 (78)/T4 (6) lesions. Distribution of TNM stages was 0:I:II:III = 3.6%:27.3%:30.2%:38.1%. With a mean follow-up of 32 months, the local recurrence rate was 4.3%. Systemic recurrence occurred in 12.9%. No portsite recurrence was observed. Overall and disease-free 3-years survival rates were 91.1%, 80.2% respectively.

Conclusions: Laparoscopic resection for rectal cancer could be safely performed in terms of operative parameters and oncologic outcomes. Randomized controlled trials and long-term follow-up are needed to confirm these results.

Colorectal/Intestinal Surgery – P152

ELECTIVE LAPAROSCOPIC LEFT COLONIC RESECTION FOR NON COMPLICATED DIVERTICULITIS: WHEN IS IT BEST TO OPERATE? élie k chouillard BA, toufic j ata BA, abe I fingerhut BA, From the Department of Digestive Surgery of the Centre Hospitalier Intercommunal de Poissy, France

In non complicated acute diverticulitis, resection is indicated after one or two episodes according to the patient's age (more than 55 years) or associated comorbidities. However, the exact timing of elective operation has not been determined with precision. As compared to open surgery, elective laparoscopic left colonic resection for non complicated acute diverticulitis decreases post-operative complications. However, the conversion rate to laparotomy is associated

with increased postoperative morbidity rates. Patients operated within three months of the last episode of diverticulitis were compared to case-matched patients operated beyond the third month after the last spurt. We studied the impact of time interval to surgery on outcome parameters including operative incidents, postoperative complications and pathologic findings.

As compared to the results of patients who had early resection, the conversion rate as well as the overall abdominal morbidity rate was decreased. Outcome after early surgery is significantly hindered by marked residual inflammation in the first three months after the last episode of acute spurt. Laparoscopic left colonic resection for acute diverticulitis is best performed beyond the third month after the last acute episode.

Colorectal/Intestinal Surgery – P153

LAPAROSCOPIC TOTAL COLECTOMY FOR BENIGN COLONIC DISORDERS, Abhay Dalvi MS, Pinky Thapar MS, Ramkrishna Prabhhu MS, Avinash Supe MS, Mukta Bapat MD, Shobhna Bhatia MD, Department of General Surgery, Surgical Gastroenterology* and Gastroenterology*, Seth G.S. Medical college & K.E.M Hospital, Mumbai, India.

Laparoscopic total colectomy (LTC) with ileal pouch anal anastomosis (IPAA) is an emerging option for diseases affecting the entire colon (ulcerative colitis and familial adenomatous polyposis). Due to compromised medical condition of patients with Inflammatory bowel disease, a staged procedure is often advised. Open surgery involves a long incision, and re-intervention during staged surgery makes operations difficult, prolongs in-hospital stay and has a high incidence of postoperative subacute intestinal obstruction (SAIO). We analyse our data of LTC with IPAA as a staged procedure in patients with refractory ulcerative colitis (UC) and familial adenomatous polyposis (FAP).

A total of 11 patients (5 men) with median age 27 years (range 18-35) underwent LTC with IPAA from March 2003 - Aug 2006. Seven patients suffered from UC and 4 patients had FAP. Three had three stage procedure - all UC (1st stage LTC, 2nd stage IPAA with covering ileostomy and 3rd stage closure of ileostomy), 7 had two stage - 4 UC and 3 FAP (1st stage LTC with IPAA and proximal ileostomy, 2nd stage closure of ileostomy). Only one patient of FAP underwent single stage LTC with IPAA.

Median to lateral colonic dissection was done using monopolar electrocautery in 6 patients and harmonic scalpel in 5 patients. Pfannenstiel incision was used to deliver the specimen. All patients underwent stapled IPAA.

The operative time ranged from 150 - 300 min (median 180 min). Only patient with FAP required conversion due to bleeding. Blood loss in all other patients was minimum not requiring any transfusion. All patients were on full oral diet by 4th post-operative day. No major complications were encountered except one patient developed SAIO which settled with conservative treatment. Other 10 patients were discharged by 8th day. It was interesting to note that at second or third stage of interventions, minimum or no adhesions were encountered.

Most of these patients require a staged procedure. Open surgery becomes morbid with repeated interventions prolonging the recovery as it involves long incision against Pfannenstiel incision in LTC and adhesions in subsequent interventions. Laparoscopic intervention for colectomy offers a distinct advantage by lesser blood loss and faster recovery in the first stage, decreased difficulty in second and / or third procedure. We propose that LTC with stapled IPAA is a definite option for patients with diseases of the colon requiring pancolectomy.

Colorectal/Intestinal Surgery – P154

MINIMALLY INVASIVE TREATMENT OF RECTOVAGINAL FISTULA, Giancarlo D'Ambrosio MD, Luigi Solinas MD, Luciana Barchetti MD, Angelo De Sanctis MD, Mario Guerrieri MD, Giovanni Lezoche MD, Adriana Rotundo MD, Emanuele Lezoche MD, Il Clinica Chirurgica - Policlinico Umberto I - University of Rome "La Sapienza"

Introduction: Rectovaginal fistulas (RVFs) represent a difficult matter. Surgical treatment of RVF may be accomplished through different surgical routes: transanal, transvaginal, perineal, transabdominal and a laparoscopic approach has been reported. The most employed techniques are direct suture, muscular flap or mesh with a success rate of 40-85%.

We present a new approach that utilize the T.E.M. to remove the fistula and the scar tissue around.

Methods:

-Technique: the patient is placed in prone position on the operative bed. The fistula is clearly identified by the 3D TEM direct vision and a wide excision of the margins is performed. The dissection of rectovaginal septum orally and laterally is performed by TEM and the aboral part introducing the finger in the dissected area of the septum. The Buess rectoscope is introduced again and the suture of the vaginal edge is performed in order to obtain a longitudinal suture. The emostasis is carefully verified and a trasverse suture line is performed in the rectal wall. No drainage was required.

-Patients: Four patients were operated on with this innovative technique in two years period. All the patients were referred us from other institutions and the fistula was related to transvaginal hysterectomy in 1 case and in the other 3 cases occurred after low anterior resection with stapler.

Results: Postoperative course was uneventful and the patients were discharged 2 days after operation. Very low dose of analgesics was required, oral intake started after 24 hours and mobilization was obtained at the same day of operation. All the patients had a previous stoma that was closed 30 days later after endoscopic and radiological examination.

Conclusion:

We strongly recommended this approach in the treatment of RVFs that avoid any incision of perineal area with no risk to damage sphincter fibres and function.

Colorectal/Intestinal Surgery – P155

LAPAROSCOPIC-ASSISTED SIGMOID COLECTOMY FOR VOLVULUS, Bastian Domajenko MD, Ahmed Ahmed MD, Thad J Boss MD, Department of Surgery, Highland Hospital, University of Rochester Medical Center

Sigmoid volvulus (SV) is a disease of the elderly and debilitated that carries a high mortality. We report the case of a 70-year-old female patient presenting with a large bowel obstruction (LBO), whose radiographic findings suggested SV. The volvulus was decompressed with rigid sigmoidoscopy and a rectal tube was placed. Following bowel prep, the patient was taken for surgery. Pneumoperitoneum was achieved using a 5-mm optical trocar inserted at the umbilicus. A 2nd 5-mm port was inserted in the epigastrium. Initial laparoscopic examination revealed a lengthened redundant loop of sigmoid colon with little room in the abdominal cavity. We therefore modified our initial attempt of a fully laparoscopic sigmoid colectomy to a laparoscopic-assisted procedure. A 5 cm incision was made in the LLQ. The sigmoid was grasped at the apex and extracted in such a way as to splay out the redundant loop on the surface of the abdomen, with the proximal and distal parts of the loop aligned side by side. A stapled side-to-side anastomosis was performed.



The intervening mesentery was then divided and the redundant loop of sigmoid colon resected using the linear stapler. The colon was returned to the abdominal cavity and the wound closed in layers. Total operative time was 51 minutes. The patient had an uncomplicated postoperative



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course and was discharged the following day. Colonic volvulus accounts for 5% of LBO in North America. The standard treatment for SV is sigmoid resection. Few reports exist in the literature of laparoscopic-assisted sigmoid colectomy in the setting of volvulus. The minimally invasive approach described here is ideal in the high risk or elderly patient who presents with acute SV when a totally laparoscopic resection is not technically feasible.

Colorectal/Intestinal Surgery – P156

LAPAROSCOPIC TREATMENT OF CROHN'S DISEASE: SINGLE SURGICAL TEAM EXPERIENCE, Ismail Hamzaoglu MD, Tayfun Karahasanoglu MD, Bilgi Baca MD, Ilknur Erenler Kilic MD, Department of Surgery, Istanbul University Cerrahpaşa Medical School, Istanbul, Turkey

Background: Surgical intervention is generally mandatory in Crohn's disease when the steroid refractory complications; recurrent bowel obstruction, intraabdominal abscess and internal or external fistula occurred. Herein, we present the results of patients who had been operated on for Crohn's disease.

Methods: The patients who underwent laparoscopic and open surgical intervention for Crohn's disease were evaluated, retrospectively. Indications for surgery, intraoperative findings, postoperative complications, follow-up results were reviewed.

Results: Between January 2000 and August 2006, 49 patients with Crohn's disease were operated. There were 23 female and 26 male whose mean age was 36 (21-58) years. Indications for surgery were as follows; bowel obstruction (n=32), internal fistula (n=5), external fistula (n=2), anal stricture due to perianal involvement (n=4), liver abscess (n=1), ileum perforation (n=1) and tumor development (n=1). While 19 patients underwent laparoscopic surgery, 30 patients underwent conventional surgery. The performed laparoscopic operations were; ileocecal resection (n=13), partial small bowel resection (n=2), right hemicolectomy (n=1), left hemicolectomy (n=1), total colectomy (n=1), drainage of liver abscess (n=1). Mean hospital stay after laparoscopic surgery was 5 (2-10). There was no complication and mortality in laparoscopically operated patients. Mean follow-up time was 28 (3-59) months. Histopathologic examinations revealed that one patient had tuberculosis.

Conclusions: Laparoscopic treatment of Crohn's disease offered substantial advantages in terms of more rapid recovery, shortened hospital stay and better cosmetic advantages. There was no increase in complications, as compared with open surgery.

Colorectal/Intestinal Surgery – P157

SINGLE SURGICAL TEAM EXPERIENCE FROM TURKEY FOR ULCERATIVE COLITIS, Ismail Hamzaoglu MD, Tayfun Karahasanoglu MD, Bilgi Baca MD, Ilknur Erenler Kilic MD, Istanbul University Cerrahpaşa Medical Faculty Department of General Surgery

Background: During follow up period of patients with ulcerative colitis, surgery may be necessary. In this study the results of the patients who were operated on by the same surgical team for ulcerative colitis were presented.

Methods: Patients underwent surgery for ulcerative colitis were reviewed, retrospectively. Operative data, postoperative complications, early and late outcomes were presented.

Results: Between January 1999 and August 2006, 44 patient underwent surgery for ulcerative colitis. There were 14 female and 30 male patients. Mean age was 38 (18-70) years. Surgical indications of patients were; pancolitis in spite of medical therapy (n=12), complications of medical therapy (n=6), uninterrupted steroid intake (n=6), subsequently occurred sigmoid colon cancer (n=1), lower gastrointestinal bleeding (n=5), perforation (n=1), acute fulminant or toxic colitis (n=13). While 30 patients were operated on electively, 14 patients were operated on urgently. Elective surgical procedures were performed as single staged (n=17) and two staged (with loop ileostomy, n=13) operations, emergency procedures were performed as two (n=7) and three (n=5) staged operations. In two patients, total colecto-

my with end ileostomy were performed. Laparoscopic resection was performed in 18 patients. Two of the elective surgical procedures were redo operations (pouch excision and new pouch reconstruction). Mean postoperative hospital stay was 11 (4-42) days. Mean mortality rate was 4% (n=2). Minor complication rate was 9% and major complication rate was 20%. Major complications were; pouch leakage (n=3), rectal stump leakage (n=1), acute mechanical intestinal obstruction (n=4), ileostomy complications (n=1). In one patient after the closure of the ileostomy, pouch leakage was occurred and ileostomy was done. Mean follow up period was 35 (1-92) months. Average stool frequency was 4 (2-9) times /day. In 6 % of the patients, chronic pouchitis developed.

Conclusions: When the functional and clinical outcomes was evaluated, the treatment choice in ulcerative colitis should be restorative proctocolectomy. In the cases of acute colitis or patients receiving high-dose steroid, we recommend two or three staged procedures. Totally (colon and rectum resection with intracorporeal anastomosis) laparoscopic restorative proctocolectomy is our preferred method.

Colorectal/Intestinal Surgery – P158

LAPAROSCOPIC SURGERY IN COLORECTAL CANCERS: EXPERIENCE WITH 57 PATIENTS, Tayfun Karahasanoglu MD, Ismail Hamzaoglu MD, Bilgi Baca MD, Ilknur Erenler Kilic MD, Department of Surgery, Istanbul University Cerrahpaşa Medical School, Istanbul, Turkey

Purpose: The aim of this study was to evaluate the results of patients laparoscopically treated for colorectal cancer. Patients and methods: Between August 2001 and August 2006, 57 consecutive patients who had laparoscopic resection due to colorectal cancer were evaluated retrospectively on a prospective database. Histopathologic results, operative findings, postoperative complications and follow-up data were reviewed.

Results: Mean age of patients was 62 (32-91) years including 23 female and 34 male were operated on for colorectal neoplasms. Tumor localizations were: right colon (n=9), transverse colon (n=4), left colon (n=8), sigmoid colon (n=4) and rectum (n=32). There were 20 low anterior resection, 12 abdominoperineal resection, 10 left hemicolectomy, 9 right hemicolectomy, 4 anterior resection, 1 subtotal colectomy and 1 restorative proctocolectomy. Mean duration of operation was 160 (120-360) minutes. Mean postoperative hospital stay was 7 (3-24) days. Mean follow-up period was 14 (1-60) months. Mortality rate was 1% and morbidity rate was 14%. No local recurrence occurred in the postoperative period. There were one patient developed carcinomatosis peritonei in the second year of follow-up and one patient with metachronous rectum cancer. Mean number of resected regional lymph nodes was 16 (6-48). According to AJCC, staging was as follows; 40% (Stage I), 21% (Stage IIA), 7% (Stage IIIA), 13% (Stage IIIB), 11% (Stage IIIC) ve 8% (Stage IV).

Conclusion: Laparoscopic surgery in the treatment of colorectal cancer is a safe method providing general benefits of minimal invasive surgery such as short hospital stay, minimal pain, faster recovery and early return to daily activities.

Colorectal/Intestinal Surgery – P159

VIRTUAL REALITY SURGERY SIMULATION SYSTEM FOR LAPAROSCOPIC ASSISTED COLORECTAL SURGERY WITH PATIENT-SPECIFIC ANATOMY, Ken Eto MD, Shigeyuki Suzuki PhD, Naoki Suzuki PhD, Asaki Hattori PhD, Makoto Kosuge MD, Akinori Oda MD, Masato Yokoyama MD, Michiaki Watanabe MD, Masaichi Ogawa MD, Hideyuki Kashiwagi MD, Sadao Anazawa MD, Katsuhiko Yanaga MD, Department of Surgery, The Jikei University School of Medicine

Objective: We developed a virtual reality surgery simulation technique for laparoscopic assisted colorectal surgery (LACS). We believe this system allows for a safer operation by enabling the surgical team to visualize the anatomy preoperatively, practice the specific surgical maneuvers for the specific patient, and decrease the potential for complications specific to LACS.



Methods and procedures: We have been creating a virtual reality surgery simulation system for LACS utilizing patient-specific anatomy. These computer simulated tissue models were created by utilizing the sphere-filled method that enables visualization of real-time deformations and is based on patient-specific data obtained from CT-angiograms. The model aims to simulate tissue deformation effects on the mesentery and blood vessels caused by manipulations during laparoscopic colectomy. We aimed to represent anisotropic deformations of these models by analyzing the direction of the vessel structures. The system allows surgeons to practice surgical maneuvers and mesenteric vessel ligation which require greater skill than in conventional surgery. It enables surgeons to know the anatomy of patients pre-operatively, and to anticipate variations in the vascular anatomy. Virtual laparoscopic instruments were controlled by manipulation of two PHANTOM devices. As a result, the surgical maneuvers of laparoscopic colectomy such as pushing and grasping of the mesentery and its vessels could be simulated. Additionally, surgeons can practice dissecting, isolating and dividing the vessels with virtual laparoscopic instruments.

Results: At this time, we present our virtual computer simulated model of right colon and mesenteric anatomy. Based on these models, we have performed 5 cases of laparoscopic right colectomy utilizing this simulation. Four cases were for ascending/cecal colon cancer and 1 case for diverticulitis. From our model, we knew in advance that 4 of the 5 cases did not have a right colic artery. There were no operative or post-operative complications.

Conclusions: We believe this virtual reality surgery simulation system for LACS with patient-specific anatomy helps to make LACS safer and easier. Additionally, it represents a novel and emerging technique for laparoscopic surgical training which can be used to teach residents as well as established surgeons without laparoscopic experience or training.

Colorectal/Intestinal Surgery – P160

PRESACRAL LYMPHANGIOMA: RARE CAUSE FOR CYSTIC PRESACRAL TUMOR, G. Peter Fakhre MD, Jeffrey Albright MD, Philip Metzger, Mayo Clinic Jacksonville

Presacral tumors are rare lesions, typically categorized as congenital, inflammatory, osseous, neurogenic, or miscellaneous in origin. These cystic or solid neoplasms may be benign or malignant. Lymphangiomas are uncommon lesions, most commonly occurring in the neck, where they are known as cystic hygroma. Fewer than 5% of lymphangiomas occur intraabdominally, occurring in the omentum, retroperitoneum, and bowel mesentery. We report only the second reported case of a cystic lymphangioma presenting as a presacral mass. The lesion was identified incidentally on a CT scan in a 69-year-old man during evaluation for a pulmonary embolism. The patient underwent a successful resection via a posterior parasacrococcygeal approach.

Colorectal/Intestinal Surgery – P161

LAPAROSCOPIC COLECTOMY FOR COLON CANCER. DOES CONVERSION AFFECT THE OUTCOME?, Mariano M Faresi MD, Michael Hellinger MD, Laurence Sands MD, Floriano Marchetti MD, Jackson Memorial Hospital

BACKGROUND: Laparoscopic-assisted colectomy (LAC) has evolved as a technical option in the treatment of colorectal cancer, and has proven to have oncologic outcomes comparable to open colectomy (OC). The aim of this study is to analyze the results of a large LAC group from a single teaching institution, and the impact that conversion to OC has on the outcome.

METHODS: Since October 1995 to September 2005, 101 patients underwent laparoscopic-assisted colectomies for colorectal adenocarcinoma. The study group was divided into A) cases completed laparoscopically (83 patients) and B) patients who required conversion to OC (18 patients). All procedures were performed by senior residents supervised by board certified colorectal surgeons. A retrospective review of a prospective database was performed. Reasons for conversion were intraoperative complications (6

patients), unfavorable anatomy (11 patients) and equipment failure (1 patient). Outcome measures included short term morbidity and mortality, conversion rate, pain, length of hospitalization, local recurrence, metastasis and overall survival.

RESULTS: The 30-day mortality and overall morbidity were 3.6% and 16.8% for non-converted patients, versus 0% (P=1.0) and 50% (P<0.004) for the converted group. Analysis of the morbid groups showed an intraoperative complications incidence of 7% in group A, and 44% in group B (P=0.056). Mean length of stay was 5.2 days in group A, and 9.1 days in group B (P=0.0006). Overall local recurrence was 2.4% and occurred only in non-converted patients; however this difference was not statistically significant (P=1.0). Kaplan-Meier survival analysis showed no differences between study groups (log-rank test P=0.25).

CONCLUSION: The LAC technique for colorectal cancer can be taught to surgery residents in a controlled and safe manner. Conversion to open negatively affects morbidity, however, early mortality and overall survival are not altered. Conversion does not increase the incidence of local recurrence or abdominal wall implants.

Colorectal/Intestinal Surgery – P162

PROSPECTIVE EVALUATION OF FUNCTIONAL RESULTS AFTER LAPAROSCOPIC COLECTOMY FOR DIVERTICULAR DISEASE, A. Forgiione MD, J. Leroy MD, M. Simone MD, C. Bailey MD, F. Rubino MD, D. Mutter MD, J. Marescaux, IRCAD-EITS/ University Louis Pasteur, Strasbourg, France

Introduction: The aim of this study was to evaluate quality of life (QoL), sexual and urinary function after laparoscopic colectomy for diverticular disease.

Materials and methods: A prospective clinical study was carried out from March 2005 to May 2006. All patients undergoing elective laparoscopic sigmoid resection for diverticular disease were included. Age, sex, BMI, ASA status, comorbidities, number of episodes of diverticulitis and operative data were recorded. Functional results were evaluated before and 3, 6 and 12 months postoperatively: quality of life using the Gastrointestinal QoL Index (GIQLI); sexual and urinary function using the International Index of Erectile Function (IIEF-5) and International Prostate Symptom Score (IPPS-6) for male and the Urogenital Distress Inventory (UDI-6) for female patients.

Results: Laparoscopic sigmoidectomy was carried out in 41 patients (21 males, 20 females). Mean age was 58 years (37-78), BMI 27 (21-38) and the average episodes of acute diverticulitis 2. ASA status of the patients was I (25), II (12) and ASA III (2). Conversion occurred in 1 case (2.4%) and post-operative complications in 3/41 (7%). Mean follow-up was 12,6 months (4-18). Postoperatively, QoL was significantly improved at 3, 6, 12 months without changes in sexual and urinary function (Table).

	Pre-op	3 months	6 months	12 months	p value
GIQLI	100 (55-135)	113 (66-137)	112 (56-138)	112 (56-138)	<0.05
IIEF-5	19 (10-25)	20 (6-25)	19 (13-25)	18 (6-25)	ns
IPPS-6	6.4 (0-21)	5 (0-11)	5.3 (1-9)	8 (1-23)	ns
UDI	3 (0-11)	2 (0-6)	3.6 (0-9)	1.6 (0-3)	ns

Conclusion: Laparoscopic approach for sigmoid disease does not affect sexual and urinary functions and appears to improve QoL. The use of QoL indexes might help in the decision to operate on patients after uncomplicated episodes of diverticulitis.

Colorectal/Intestinal Surgery – P163

ANOTHER WAY TO TREAT THE APPENDICEAL ROOT IN LAPAROSCOPIC APPENDECTOMY, Miguel Garcia-Oria MD, J Domingo MD, F Gomez MD, E Piedrafita MD, M Bolarin MD, C Segendorf MD, Department of Surgery, Hospital de Figueres, Girona. Spain.

Background: One of the important technical details in laparoscopic appendectomy (LA) is the treatment of the appendiceal root. LA can be performed applying endostaplers or endoloops at the appendiceal root, or with extracorporeal appendectomy.

Methods: All patients with suspected acute appendicitis (AA) submitted by the first author to exploratory



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laparoscopy during the period from June 2003 to August 2006 were analyzed. We report data of patients with laparoscopic intracorporeal knotting of the appendiceal root. Outcomes including length of stay, intraoperative blood loss, operative time and complications were prospectively registered.

Results: 69 surgical procedures were performed for suspected AA, 29 open approach, 40 by laparoscopy (L). 5 cases were excluded for the analysis (1 perforated appendicitis with lack of appendiceal root, 1 appendiceal phlegmon treated with drainage, 1 endostapler appendectomy, 1 perforated ulcer, 1 internal hernia). Data of the 35 LA with intracorporeal knotting of the appendiceal root were as follows: Mean age was 27.2 years (range, 10-49), females 20 (57.1%), postoperative LOS 3.2 days (1-9), surgical blood loss 20 (1-200) ml, there were 28 (80%) ASA 1 cases, and 7 (20%) ASA 2.

Operative time 70 (37-170) min, conversion rate 1 (2.8%). AA with peritonitis or abscess were 9 (25.7%), regular AA 19 (54.3%) and 7 (20%) were not AA in histological analysis. Complications were 1 (2.8%) case of small intraabdominal abscess not requiring drainage, 2 (5.5%) minor infections of the umbilical port, and 1 (2.8%) urinary tract infection. Reoperation, readmission or UCI were not required in any case. There was no mortality.

Conclusion: The intracorporeal knotting of appendiceal root in cases of laparoscopic appendectomy is feasible and seems to have similar results than other established techniques.

Colorectal/Intestinal Surgery – P164

LAPAROSCOPIC TOTAL PROCTOCOLECTOMY AND LAPAROSCOPIC TOTAL ABDOMINAL COLECTOMY: SINGLE SURGEON EXPERIENCE, Kelly A Garrett MD, Nitin G Malhotra MD, Edward C Lee MD, Department of General Surgery, Albany Medical Center, Albany, NY, USA

INTRODUCTION: In the minimally invasive era, laparoscopic total proctocolectomy (LTPC) and laparoscopic total abdominal colectomy (LTAC) have presented a challenge to the general surgeon due to longer operative times, high conversion rates and steep learning curves. This paper analyzes a single surgeon's (ECL) experience with LTPC and LTAC in the treatment of inflammatory bowel disease (IBD), familial polyposis syndromes (FPS), colonic inertia (CI) and colon cancer.

METHODS: 48 patients who underwent LTPC and LTAC were identified from a single surgeon's database (ECL) from March 2001 to July 2006. Data for this population of patients was collected by chart review and analyzed retrospectively.

RESULTS: Of 48 patients identified, there were 31 females and 17 males. Mean age was 33 with a range of 10-71. 38 cases were done electively and 9 were done emergently. LTPC and LTAC were performed on a total of 30 and 18 patients respectively. Of the 30 patients that had LTPC, 29 had creation of an ileo-anal J-pouch and one had an end ileostomy. 15 of the 18 patients that underwent LTAC had creation of an ileorectal anastomosis and 3 had an end ileostomy. 31 patients had a preoperative diagnosis of IBD, 8 patients had FPS, 7 had CI and 1 had colon cancer. The overall mean surgical time was 258.9 minutes (range 137-330) for LTPC and 194.3 minutes (range 155-259) for LTAC.

Average length of stay was 8.6 days for LTPC and 9.2 days for LTAC. Average return of bowel function was 3.3 days for LTPC and 4 days for LTAC. Open conversion was required in 2 patients undergoing elective LTPC and 2 undergoing LTPC on an emergent basis. A total of 7 (14.6%) patients had early complications which included SMV thrombosis (1), ileus (3), wound infection (2) and DVT (1). 12 (25%) patients had late complications which included bowel obstruction (3), pouch leak (1), abscess (1), colitis (1) and readmission for dehydration (5). There were no mortalities.

CONCLUSIONS: When performed by an experienced colorectal surgeon, we believe that LTPC and LTAC have equivalent outcomes when compared to open approaches. In our experience, these procedures can be safely performed in the elective as well as the emergent setting with no difference in conversion rates. The laparoscopic approach for the management of colorectal diseases has become the standard of care at our institution.

Colorectal/Intestinal Surgery – P165

LAPAROSCOPIC APPROACH TO ACUTE SMALL BOWEL OBSTRUCTION: REVIEW OF 1047 CASES, B. Ghosheh MD, J. R Salameh MD, Department of Surgery, University of Mississippi Medical Center, Jackson, Mississippi

BACKGROUND: Acute small bowel obstruction has been a relative contraindication for a laparoscopic management approach. However, as experience with laparoscopy grows, more surgeons are attempting it for this indication. The exact success rate, benefits, as well as risk of bowel injury and other complications have been unclear. The purpose of this study is to define the outcomes of laparoscopy for acute small bowel obstruction through a metaanalysis of published cases.

METHODS: A literature search of the Medline database was performed using the key words: laparoscopy, adhesiolysis, and bowel obstruction. Further articles were identified from the reference lists of retrieved literature. Only English language studies were reviewed. We excluded studies that included patients with chronic abdominal pain and/or chronic recurrent small bowel obstruction and/or gastric or colonic obstruction, when the data specific to acute small bowel obstruction could not be extracted. Data was analyzed with an intention to treat.

RESULTS: Eighteen studies from 1994 to 2005 were identified. Laparoscopy was attempted in 1047 patients for acute small bowel obstruction. The most common etiologies of obstruction included adhesions 83.0% (815/982), abdominal wall hernia (3.1% or 31/982), malignancy (2.9% or 29/982), internal hernia (1.9% or 19/982) and bezoars (0.8% or 8/982). Laparoscopic treatment was possible in 693 cases with a conversion rate was 33.8%. Causes of conversion were dense adhesions (27.1% or 58/214), need for bowel resection (23.3% or 50/214), unidentified etiology (13.1% or 28/214), iatrogenic injury (10.3% or 22/214), malignancy (7.5% or 16/214), inadequate visualization (4.2% or 9/214), hernia (3.3% or 7/214) and other causes (11.2% or 24/214).

Morbidity was 15.5% (150/967) and mortality was 1.5% (16/1032). There were 45 reported recognized intraoperative enterotomies (6.7%), but less than half resulted in conversion. There were however 9 missed perforations, including one trocar injury, often resulting in significant morbidity. Early recurrence (defined as recurrence within 30 days after surgery) occurred in 2.1% (22/1032).

CONCLUSION: Laparoscopy is a safe and effective procedure for the treatment of acute small bowel obstruction with acceptable risk of morbidity, bowel injury and early recurrence.

Colorectal/Intestinal Surgery – P166

LAPAROSCOPIC MANAGEMENT OF SMALL BOWEL OBSTRUCTION: ANALYSIS OF THE SALTS DATABASE, Dieter Hahnloser, Markus K Mueller, Markus Schaefer, Department of Visceral and Transplantation Surgery, University Hospital Zurich, Switzerland

Background: Laparoscopy for small bowel obstruction (SBO) is not well established. The aims of this study were to review the outcomes of a nationwide prospective multicenter study.

Methods: Analysis of all patients operated from 1995-2004 for SBO based on the prospective database of the Swiss Association for Laparoscopic and Thoracoscopic Surgery (SALTS).

Results: 460 patients with a mean age of 52 years (± 19) underwent either emergency operation within 24 hours ($n=283$, 62%) or elective laparoscopy ($n=177$, 38%) after a mean of 2.2 days (± 5.8). 82% of operations were performed by surgeons with experience of >100 laparoscopies. Adhesions (61%) or an isolated band (31%) were the main causes of SBO. Intraoperative complications occurred in 15.2%, 36% of them could be managed laparoscopically. The conversion rate was 30% (39% inability to visualize the site of obstruction, 30% small target incision for resection, 22% complication, 9% various). Local surgical complications were noted in 44 patients (9.6%) including 16 wound infec-

tions and 6 missed perforations (1.3%). General (cardiac and pulmonary) postoperative complications occurred in 7.6%. 10 patients (2.2%) were readmitted within 30 days and overall mortality was 0.4%. Emergency operations were significantly shorter (87% <120 minutes vs. 71%, $p < 0.001$) with a higher conversion rate (38% vs. 17%, $p < 0.001$), but without increased intraoperative (17% vs. 12%, $p = 0.1$) or total postoperative complication rate (18% vs. 16%, $p = 0.8$). However, conversion regardless the time of surgery was associated with significant increased morbidity (49% vs. 23%, $p < 0.001$) and prolonged hospitalization (13.5 vs. 6.5 days, $p < 0.001$). **Conclusion:** Laparoscopic management of small bowel obstruction is safe and feasible in experienced hands and is not associated with increased morbidity in an acute situation. However, conversion should be preemptive and not reactive. Patient selection remains crucial.

Colorectal/Intestinal Surgery – P167

HAND-ASSISTED LAPAROSCOPIC TOTAL COLECTOMY FOR ULCERATIVE COLITIS WITH SIGMOID COLON CANCER, Shigeoki Hayashi MD, Minoru Matsuda MD, Motoo Yamagata MD, Tadatoshi Takayama MD, Division of Digestive Surgery, Nihon University School of Medicine

Background and Aim: The laparoscopic procedure has been successfully used to perform colonic resections. Inflammatory bowel diseases like ulcerative colitis (UC) appear as an indication for laparoscopic surgery. We performed Hand-assisted Laparoscopic Total Colectomy (HALTC) for an UC patient with sigmoid colon cancer.

Methods: First six trocars were inserted, one 12 mm beside the umbilicus (laparoscope), two 5 mm trocar in the right side abdomen, two 12 mm trocars in the left side abdomen, and one 12 mm trocar in the middle lower abdomen. After lymphnode resection around inferior mesenteric artery, the artery was ligated with the medial approach. Sigmoid colon was mobilized. And the proximal rectum was transected using ENDOGIA. 7 cm Gelpport incision was made at the umbilical incision. Under manual guidance mobilization of the large bowel, the mesenteric dissection by Ligasure was performed from cecum to sigmoid. The lower rectum was cut off and sleeve mucosal resection of residual lower rectum was done. The hand-port was removed and the colon was taken out through the middle wound. The terminal ileum was transected and ileocolonic artery was preserved. Then, J-pouch of terminal ileum was made with ENDOGIA. The ileal pouch-anal anastomosis was done and temporary covering ileostomy was made at the right lower abdomen. Therefore the HALTC was completed.

Results: HALTC was done for 68 years old man as UC with sigmoid colon cancer. He was discharged without complication. Four months later, the covering ileostomy was closed. **Conclusion:** HALTC with systematic resection of lymphnode for sigmoid colon cancer is possible, safe and efficacy.

Colorectal/Intestinal Surgery – P168

CHANGES IN ANORECTAL PHYSIOLOGY AFTER ANAL SPHINCTER RADIOFREQUENCY REMODELING (SECCA PROCEDURE), Roman M Herman MD, Piotr Walega MD, Michal Nowakowski MD, Jerzy Salowka MD, Marcin Nowak MD, Jacek Sobocki MD, 3rd Department of General Surgery Jagiellonian University, Krakow, Poland

The main doubt reducing enthusiasm for the radiofrequency remodeling technique (secca) was based on lack of physiological studies, which may explain the possible pathomechanism of improvement of symptoms. The aim of this study was clinical physiological evaluation of the anorectal function prior and during 6 months follow-up after the secca procedure.

14 fecal incontinence (FI) patients (2 male and 12 female, mean age 52,9 ranged 41-78 years) have been enrolled into the study. The standard technique and secca device was used (Curon Medical, Fremont, CA USA). The following parameters were evaluated at baseline, 3 and 6 months after the procedure: continence (CCF-FI, FI-SI scores), improvement (FI-QoL, patient diary, VAS), electromyography (EAS-superficial, IAS-needle), rectal electro- and thermosensitivity,

barostat, anal manometry, morphology (endoanal ultrasound).

Comparing to baseline, 3 and 6 months average results were as follows: CCF-FI 12,0-9,0-9,4; FI-SI 35,6-34,7-35; compliance 5,1-3,8-4; manometry BAP 30-39-40, SAP 65-87-95; electrosensation 16-51-45, thermosensation 0,7-0,25-0,3, respectively. In FI-QoL scale significant improvement in 3 of 4 measures was observed, as well as IAS and EAS electromyography improvement.

Secca remodeling is safe and seems to be effective method of FI treatment. It reduces the frequency and severity of FI symptoms, and improves patient's quality of life. This effect seems to be related to restored anorectal sensitivity and recto-anal coordination, however effect on IAS morphology and function is also detectable.

Colorectal/Intestinal Surgery – P169

EVALUATION OF LAPAROSCOPE-ASSISTED COLECTOMY FOR THE PATIENTS WITH ACUTE ABDOMEN, Eiji Ikeda MD, Okayama Red Cross General Hospital

With 3-years experience of laparoscope-assisted colectomy (LAC), we have expanded its indication to the patients with acute abdomen from April 2002. Among 330 cases of LAC for 7 years and 9 months, 33 cases of acute abdomen were treated with LAC, which included 27 cases of intestinal obstruction and 6 of peritonitis. The indication of LAC for acute abdomen has been decided to be localized peritonitis or intestinal obstruction which is decompressed before operation to obtain enough working space for LAC. The patients who underwent emergency LAC were retrospectively compared with 54 cases of colonic acute abdomen which underwent open surgery or 297 cases of elective LAC. The proportion of the patients who were built colostomy, the amount of intraoperative bleeding and postoperative complication were significantly lower in emergency LAC group compared with open surgery group. Though 19 complications occurred in open surgery group, mild wound infection was seen in 2 case and no operative mortality was seen in emergency LAC group. The conversion rate to open surgery and incidence of complication of emergency LAC is as much as elective LAC cases. The cases of colon cancers were included in emergency LAC group, but all patients have passed without recurrence during median postoperative period of 26 months. LAC is useful for selective cases of acute abdomen.

Colorectal/Intestinal Surgery – P170

LAPAROSCOPIC EXCISION OF A MALIGNANT MESENTERIC CYST IN A 22 YEAR-OLD FEMALE, William A Jakobleff MD, Jonathan Reich MD, Carlos Martinez MD, Alexander Abkin MD, Nicholas Bertha DO, Morristown Memorial Hospital, Morristown, NJ

Background: Mesenteric cysts are a rare entity occurring in about 1 of every 140,000 hospital admissions. Sixty percent of these occur in the small bowel mesentery, while 24% occur in the large bowel mesentery. Although rare, their malignant transformation has been reported.

Methods: We present the case of a 22 year-old female who presented to our institution with complaints of right upper quadrant abdominal pain. A mass was palpable on exam. A confirmatory CT scan demonstrated a mesenteric mass in the region of the hepatic flexure. The patient was taken to the operating room for a diagnostic laparoscopy and excision of the mass. The mass was enucleated laparoscopically and removed from the peritoneum in an Endocatch device.

Results: Pathology confirmed the diagnosis of mesenteric cyst with moderate-poorly differentiated adenocarcinoma.

Discussion: Data supports the use of both laparoscopic and open techniques for excision of mesenteric cysts. This case demonstrates the potential malignant transformation of a usually benign entity. Four lymph nodes included in our specimen were all negative for malignancy. The currently available literature does not advocate for further treatment.



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Colorectal/Intestinal Surgery – P171

STAPLED HEMORRHOIDOPEXY IS ASSOCIATED WITH A HIGHER RECURRENCE RATE OF INTERNAL HEMORRHOIDS COMPARED TO CONVENTIONAL EXCISIONAL SURGERY: FOLLOW-UP TO A META-ANALYSIS, S Jayaraman MD, P Colquhoun MD, Department of Surgery, University of Western Ontario

In a recently published Cochrane Meta-Analysis of 12 randomized controlled trials (RCTs) comparing stapled hemorrhoidopexy (SH) to conventional hemorrhoidectomy (CH), we demonstrated that SH was associated with a greater risk of hemorrhoid recurrence (OR 3.85) and the symptom of prolapse (OR 2.96) in studies with long term follow-up. The purpose of this study is to update the analysis with more recently published trials.

A systematic review of RCTs comparing SH and CH with long-term results was performed using the Cochrane methodology. Included studies had a minimum follow-up of 6 months and compared circular stapled hemorrhoidopexy to excisional hemorrhoidectomy. Studies were analyzed for clinical and statistical heterogeneity. Primary outcomes were hemorrhoid recurrence, hemorrhoid symptom recurrence, complications and pain. A random effects model was used to calculate a meta-analysis.

An additional 3 RCTs were added to the original 12 trials. The results show that patients are even more likely to have recurrent internal hemorrhoids in long term follow-up (OR 3.97, 95% CI 1.64-9.59, $p < 0.002$). Similarly, patients are even more likely to complain of prolapse (OR 3.60, 95% CI 1.51-8.56, $p < 0.004$). Patients who received SH were more likely to have external anal skin tags (OR 1.62, 95% CI 1.00-2.62, $p < 0.05$). Non-significant trends favoring CH continue to be seen in the proportion of asymptomatic patients, bleeding, soiling/difficultly with hygiene/incontinence, and the need for further surgery. Non-significant trends favoring SH are still seen in pain, pruritis ani and symptoms of anal obstruction/stenosis.

Patients receiving SH continue to experience a higher likelihood of hemorrhoid recurrence and are more likely to complain of prolapse in long-term follow-up compared with CH.

Colorectal/Intestinal Surgery – P172

OUTCOMES OF LOCAL EXCISION OF T1 RECTAL CANCERS: OPEN TRANSANAL VS ENDOSCOPIC MICROSURGICAL, O Jazaeri MD, E Schochet MD, J Obuch BA, R Riether MD, S Eid MS, J Matulay BA, R Sinnott DO, Lehigh Valley Hospital

Introduction: Recent reports have questioned the adequacy of local excision (LE) for early rectal cancers. Transanal Endoscopic Microsurgery (TEM) allows for increased exposure, magnification, and more precise tissue handling over conventional transanal excision (TA). We propose that TEM may improve recurrence and survival outcomes in T1 patients due to the inherent advantages over TA with regard to adequacy and handling of specimens.

Methods: A retrospective review of all rectal cancers treated at our institution since 1990 was undertaken with IRB approval. 58 patients with T1 adenocarcinoma of the rectum who underwent TEM (n=19) or TA (n=39) were included. Mean follow-up was 4.9 and 7.7 years while mean age at the time of surgery was 68.1 and 67.4 years in the TEM and TA groups, respectively. Kaplan-Meier survival analysis and univariate linear regression were used to examine factors affecting local recurrence and survival.

Results: For TEM and TA, overall local recurrence rates were 21% and 15.4%, respectively, 5-year overall survival rates were 89.5% and 84.6%, respectively, and 5-year disease-specific survival rates were 100% and 97.4%, respectively. None of these differences reached statistical significance. Univariate analysis failed to identify any significant predic-

tors of recurrence including lymphovascular invasion, tumor grade, distance from anal verge, mucinous features, or margin status. There were four local recurrences in the TEM group occurring between 1.1 and 4 years. Two were salvaged with no evidence of disease at years 5 and 6. One patient died from other causes 3 years after his recurrence. One patient died from bulky disease resistant to treatment at year 6, 18 months post recurrence. The six local recurrences in the TA group occurred between 3 months and 9 years post surgery. Three were salvaged with no evidence of disease at years 2, 14, and 15. Two patients failed salvage therapy and died 3.5 and 1.5 years following their recurrences. One patient died from other causes 3 years after his recurrence. **Conclusion:** TEM appears to offer no significant survival advantage over TA in the treatment of early rectal cancers. For properly selected early-stage patients, the role of local excision remains an option, although close surveillance for up to 5 years remains obligatory. The roles of adjuvant and neoadjuvant therapies are evolving and may ultimately confer additional benefits to this patient population.

Colorectal/Intestinal Surgery – P173

LAPAROSCOPIC ASSISTED DIVERTICULAR RESECTION FOR SITUS INVERSUS TOTALIS, Sanjay Jobanputra MD, Bashar Safar MD, Steven D Wexner MD, Cleveland Clinic Florida, Weston, FL

Background: Situs inversus totalis is a rare condition where the abdominal and thoracic cavity structures are opposite of their usual position. Laparoscopic colonic surgery for this patient population is not well described. There are only two reported cases of laparoscopic sigmoid resection for diverticulitis. **Methods:** We present a third case of laparoscopic colectomy for diverticulitis in a patient with situs inversus totalis and a description of the operative procedure. **Results:** Our patient was a 62 year old female with a history of situs inversus totalis who had been hospitalized for multiple episodes of diverticulitis in the past and three episodes over a one month period. She was subsequently scheduled for laparoscopic sigmoid colectomy. The procedure included the use of four trocars, one umbilical, and the others on the left side of the abdomen, opposite our normal placement for sigmoid colectomy. The sigmoid colon was noted on the right side and a large phlegmon was also noted. The colon was mobilized and an incision was made through the patient's prior C-section incision to allow removal of the large phlegmon. **Conclusion:** Patient tolerated the procedure well and was discharged home on postoperative day 5 without complications.

Colorectal/Intestinal Surgery – P174

A TECHNIQUE FOR LAPAROSCOPIC FEEDING JEJUNOSTOMY USING A BALLOON-TIP CATHETER, Amit RT Joshi MD, Eugene Rubach MD, Gary R Gecelter MD, North Shore-Long Island Jewish Health System

BACKGROUND: Many techniques of totally laparoscopic jejunostomy have been described. Most use needle-catheters or T-tubes. We describe a technique that allows use of an ordinary 16-French catheter (red rubber or equivalent) to maximize versatility of post-operative feeding and medication administration. We find that the pre-placement of trans-abdominal sutures allows easy introduction of a catheter.

METHODS: We use three 5-mm trocars (for one flexible laparoscope and two operating instruments). After identifying the ligament of Treitz, an appropriate segment of proximal jejunum is chosen. We place two intra-corporeal 3-0 sutures just proximal and distal to the proposed enterotomy. We then pull the ends trans-abdominally using a suture passer. By placing traction on the proximal suture, the bowel is correctly oriented so that the proposed enterotomy site faces the camera and the distal jejunum is in a straight line. The enterotomy is made using a harmonic scalpel. The catheter is introduced through the abdominal wall using one of the trocar sites and fed into the distal jejunum while the distal jejunum is kept on traction. An air-insufflation test is performed to ensure intra-luminal positioning. The balloon



at the tip of the catheter is inflated with 1cc of saline. Both sutures are then tied firmly to approximate the bowel to the abdominal wall, and the catheter is secured with a drain stitch to the skin.

RESULTS: We have used this specific technique in 2 patients. Operative times were less than 1 hour in both cases. There were no intra- or post-operative complications.
CONCLUSIONS: We find this technique to be a simple and elegant one, that requires only standard laparoscopic instruments and materials. The ability to place a large-bore catheter allows for reliable administration of tube feeds and medications. Furthermore, because the insertion of the tube is directly visualized, it can be used with greater confidence. We find that the pre-placement of two trans-abdominal stitches correctly orients the bowel to allow for easy placement of the catheter.

Colorectal/Intestinal Surgery – P175

OUTCOME OF LAPAROSCOPIC SURGERY IN LOWER RECTAL CANCER, Akiyoshi Kanazawa MD, Shinichi Sugimoto MD, Hiroshi Takeda MD, Atsuo Tokuka MD, Nobuhiro Ozaki MD, Shimane Prefectural Central Hospital

INTRODUCTION: A correct surgical approach to rectal cancer today has to make due allowance for both improved overall survival with local control of disease and preservation of the sphincter and urinary functions. In this paper, we reported the postoperative morbidity and functional outcome related to the procedures.

METHOD: Between July 2002 and December 2005, 78 cases laparoscopic resection with autonomic nerve-sparing method for rectal cancer was performed at our department.
RESULTS: 31 cases of low anterior resection, one case of intersphincteric resection, 8 cases of abdominoperineal resection and 5 of Hartmann operation were performed. The overall postoperative morbidity was 12.8 percent (include 5 cases of SSI) one case of anastomotic leakage was observed in both groups. There was no postoperative mortality in all cases. Concerning with post operative urinary function, the urinary function was excellent when the bi-lateral nerve system was preserved

CONCLUSION: This study shows laparoscopic surgery for lower rectal cancer could be one of suitable strategy for advanced rectal cancer

Colorectal/Intestinal Surgery – P176

LAPAROSCOPIC RESECTION ALLOWS EARLIER CHEMOTHERAPY THAN OPEN RESECTION IN STAGE III COLORECTAL CANCER, SUNG-BUM KANG MD, JUN-SEOK PARK MD, KWANG-SIK CHUN MD, KYOUNG-HO LEE MD, YOUNG-HOON KIM MD, Department of Surgery1, Department of Diagnostic Radiology2, Seoul National University College of Medicine, Seoul, Korea

Introduction: Lacy's randomized trials in Barcelona showed that laparoscopic resection (LAP) had superior oncologic outcome to open resection (OPEN) in 73 patients with stage III colorectal cancer. But, there remained unclear whether LAP has oncologic superiority or not in comparison with OPEN. We aimed to compare oncologic outcomes between LAP and OPEN in stage III colorectal cancer. **Methods:** A series of 103 patients with stage III colorectal cancer were included (44 LAP, 59 OPEN). The followings were excluded; T4 lesion (n=9), no adjuvant therapy (n=13), and preoperative chemoradiation therapy (n=5). We compared oncologic clearances, postoperative outcomes, interval to beginning of chemotherapy, and recurrence on median follow-up of 18 months in both groups. **Results:** Median number of resected lymph node was more in OPEN (20, LAP vs 30, OPEN; $P<0.01$). LAP recovered faster than OPEN, with earlier recovery of bowel movement and shorter hospital stay. Morbidity was lower in LAP (13.6%, LAP vs 32.2%, OPEN; $P<0.05$). The interval from operation to beginning of chemotherapy was shorter in LAP (22.37.5, LAP vs 30.176.5 days, OPEN;

$P=0.002$). Recurrence rate was not different statistically (6.8%, LAP vs 11.9%, OPEN; $P>0.05$) and all were recurred in distant organ. **Conclusion:** LAP was more effective than OPEN for stage III colorectal cancer in terms of less morbidity, earlier recovery, and earlier chemotherapy. Less morbidity in LAP allows earlier chemotherapy, which may be associated with oncologic superiority of LAP in stage III colorectal cancer.

Colorectal/Intestinal Surgery – P177

IS ROUTINE MOBILIZATION OF SPLENIC FLEXURE NECESSARY IN LAPAROSCOPIC RESECTION OF RECTOSIGMOID CANCER?, SUNG-BUM KANG MD, JUN-SEOK PARK MD, KWANG-SIK CHUN MD, YOUNG-HOON KIM MD, KYOUNG-HO LEE MD, Department of Surgery, Department of Diagnostic Radiology, Seoul National University College of Medicine, Seoul, Korea

Purpose: Rectosigmoid cancer is different from the cancer of descending colon or splenic flexure in the necessity of routine mobilization of splenic flexure. We aimed to compare short-term oncologic outcomes between laparoscopic (LAP) and open surgery (OS) in rectosigmoid cancer, and to evaluate the necessity of routine mobilization of splenic flexure.

Methods: A series of 264 consecutive rectosigmoid cancer were included (119 LAP, 145 OS). The following patients were excluded: T4 lesion (n=29), no anastomotic surgery (n=35), total colectomy (n=6) and mobilized splenic flexure (n=30). We mobilize the splenic flexure only if it is necessary to decrease the tension at anastomotic line. Oncologic clearances including postoperative outcomes were compared in both groups.

Results: Operation time was no difference (212 min, LAP vs 195 min, OS). Mean length of proximal resection margin was longer in OS (11.4cm vs 15.3, $P<0.01$), and the mean number of resected lymph node was more in OS (21.5 vs 27.2, $p<0.01$). But, the length of proximal resection margin was not correlated with number of resected lymph node ($p=0.69$, correlation coefficient=-0.038). Recovery of bowel movement and hospital stay were better after LAP than OS. On the follow-up of 18 months, local recurrence rate was not different (0.9%, LAP vs 1.4%, OS, $p>0.05$)

Conclusion: LAP does not increase the oncologic risk in spite of its shorter length of proximal resection margin. We suggest that routine mobilization of splenic flexure don't give oncologic benefit although it may increase the length of proximal resection margin in rectosigmoid cancer.

Colorectal/Intestinal Surgery – P178

USEFULNESS OF LAPAROSCOPIC SURGERY FOR PERFORATED OR ABSCESS FORMING APPENDICITIS, GOUTAROU KATSUNO MD, MASAKI FUKUNAGA MD, TOSHIKI IBA MD, KUNIHICO NAGAKARI MD, MASARU SUDA MD, SEI-ITIROU YOSHIKAWA MD, AKIO KIDOKORO MD, Department of Surgery?A Juntendo Urayasu Hospital, Juntendo University

[Aim]: Although laparoscopic appendectomy (LA) is widely performed in many countries, use of LA for the treatment of appendicitis with perforation or abscess formation has not yet been fully established. The aim of this study was to compare LA with conventional open appendectomy (OA) for perforated or abscess-forming appendicitis, with special emphasis on postoperative complications.

[Methods]: A total of 617 patients with complete follow-up data underwent appendectomy between May 1995 and May 2006. A total of 342 patients underwent LA, while 275 underwent conventional OA. We retrospectively analyzed the clinical outcomes of 187 patients who had undergone appendectomy for perforated or abscess-forming appendicitis during the study period. Ninety-seven of these patients had undergone LA, while 84 had undergone OA. LA was performed using a three-trocar technique and Surgitie™ (Autosuture, USSC). Parameters were background factors, surgery, postoperative length of stay, and postoperative complications.

[Results]: Overall complication rate was significantly higher in the open group (incidence, 39.3%) than in the laparoscopic-



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ic group (14.4%; $p < 0.001$). Wound infection was significantly more common in the open group (incidence, 31%) than in the laparoscopic group (7.2%; $p < 0.001$). Intraabdominal infection was equally common in the two groups. Hospital stay was significantly shorter in the laparoscopic group ($p < 0.001$). Amount of intraoperative bleeding was significantly higher in the open group ($p < 0.001$).

[Conclusion]: Our findings indicate that LA is safe and useful even for the treatment of appendicitis with perforation or abscess formation

Colorectal/Intestinal Surgery – P179

LAPAROSCOPIC RIGHT HEMICOLECTOMY FOR INTES-TINAL INTUSSUCEPTION, F M Kiernan MD, M Joyce MD, C K Byrnes DO, W Torregiani MD, P Neary MD, F B Keane MD, Division of Colorectal Surgery, Department of General and Vascular Surgery, and department of Radiology Adelaide and Meath Hospital, Tallaght, Dublin 24

Introduction: Adult intussusception is rare and usually associated with carcinoma in

50 % of cases. These have traditionally been managed using an open technique. We herein describe a laparoscopic extended right hemicolectomy in a 64 year old lady with an intussusception secondary to a transverse colonic tumour.

Methods: The patient presented with a 6 week of crampy, colicky, abdominal pain. Her CT scan reported intussusception of the proximal large bowel. She underwent an extended laparoscopic right hemicolectomy with primary anastomosis.

Results: Her post-operative was uneventful and the histology reported a large bowel adenocarcinoma with none out of 25 nodes involved.

Conclusion: When operative intervention is required, intussusception may be managed using a minimally invasive technique. However large bowel intussusception in adults may have a malignant cause thus laparoscopic resection should only be performed by surgeons experienced in laparoscopic resections for colorectal malignancies as oncological safety must be the primary concern. This laparoscopic approach facilitates rapid recovery and earlier time to chemotherapy if required.

Colorectal/Intestinal Surgery – P180

THE EFFECT OF ROTATABLE LAPAROSCOPIC VIDEO MONITOR ON THE CAPABILITY OF LAPAROSCOPIC PROCEDURE, Jae Hwang Kim MD, Tae Hwan Ghil MD, Sang Hun Jung MD, College of Medicine, Yeungnam Univ, Daegu, Korea

Background: The main difficulty with laparoscopic colorectal surgery, a difficulty is that assistants perform the procedures are performed with an uncomfortable image that is rotated up to 180 degrees left or either right or left sides from their own normal view. This is one of major reasons why surgeons need require more training and experience to overcome this difficult view.

Aim: To evaluate the improvement of in the laparoscopic performance with using the normalized video image as compared with the previous rotated upside down image.

Methods: Surgical residents (inexperienced group; $n=8$) and surgeons (experienced group; $n=8$) who have experience treating more than 50 cases of with laparoscopic surgery experience performed a simple laparoscopic procedure using the a laparoscopic training kit with a newly developed rotatable laparoscopic video monitor (patent pending) that could be controlled by pushing a button on the floor. The monitor rotates 180 degrees on both the right and left side on a central axis of the image. We the named the 'Normalized view' as refers to the best image for performing the procedure and it can be made by rotating the image with the performer's by foot control. The study procedure was to hook a rubber band onto 2 standing bars in 3 minutes each with a 180 degree 'rotated view' and 'normalized view' in a cross-over design. We compared the number of successfully hooked rubber bands in both situations was compared.

Results: The number of successful results in the inexperienced group with the 'rotated image' and the 'normalized

image' was 0.4 ± 0.49 and 6.4 ± 0.51 , respectively ($p < 0.001$), and the number of successful results in the experienced group was 1.4 ± 1.01 and 9.4 ± 1.99 , respectively ($P < 0.001$). In comparison with the experienced group, the success rate with the 'normalized image' in the inexperienced group was low ($p < 0.05$). However, the success rate of the inexperienced group with the 'normalized image' was significantly higher than the success rate of the experienced group with the 'rotated image' ($p < 0.001$).

Conclusion: Compared with We confirmed that changing the 'rotated' laparoscopic video image, to the an easy 'normalized' image (the normal eye view) allows a dramatic improvement for in the laparoscopic performance. Using the use of a rotating laparoscopic video monitor could can maximize the capability of the assistants for to performing major laparoscopic surgery at any location of the body.

Colorectal/Intestinal Surgery – P181

INFLAMMATORY BOWEL DISEASE :OPEN VERSUS LAPAROSCOPIC SUBTOTAL COLECTOMY., Dr.Rachel E Kirby MD, Mr. Colman K Byrnes MD, Mr. Myles Joyce MD, Keane B Professor Frank, Mr. Paul Neary, Department of Surgery, Adelaide and Meath Hospital Dublin, Tallaght, Dublin 24.

Introduction: Failure of medical treatment for ulcerative or Crohn's colitis necessitates surgical intervention, typically a subtotal colectomy. Laparoscopic surgical techniques to treat colonic disease are increasingly recognised as an alternative to open surgery. We compare a minimally invasive with an open approach to subtotal colonic resection in severe IBD.

Methods: Consecutive patients having required a subtotal colectomy for IBD over a 5 year period were identified retrospectively. Charts were retrieved and analysed for demographics, clinical presentation, operative details, complications rates and clinical course.

Results: Nine patients underwent an open and nine a laparoscopic subtotal colectomy. There were no significant differences between age, sex, nutritional and ASA status. Mean time from diagnosis was seven years. Urgent or emergency surgery was required in 3 of the laparoscopic and 4 of the open group. Mean time from diagnosis was 7 years. Laparoscopic mean operating time tended to be longer (3 hrs 40min) than open (2hrs 50min; $p=0.16$): but there were no conversions. Early complications in the laparoscopic group were one ileostomy prolapse, one extraction site wound infection, one lateral space hernia requiring surgery. There was one intra abdominal collection in the open group requiring a second laparotomy. Average time to IV analgesia discontinuation (1.4 days laparoscopic vs 3.3 days open $p < 0.01$) and full diet (2.4 vs 5.3: $p < 0.05$) were significantly shorter in the laparoscopic group. Median lengths of stay (10 vs 14) tended to be less in the laparoscopic group $p=0.13$.

Conclusion: A minimally invasive surgical approach to both the elective and emergency surgical management of severe colitis is feasible with no conversion in this series. Complication rates are similar, with a more rapid early recovery but post operative lengths of stay are similar possibly due to stomal care issues.

Colorectal/Intestinal Surgery – P182

PERFORATED DIVERTICULAR DISEASE: LAPAROSCOPIC HARTMANN'S PROCEDURE AND SUBSEQUENT LAPAROSCOPIC REVERSAL., Rachel E Kirby MD, Lucy M Soden MD, Colman K Byrnes MD, Prof. Frank B Keane, Mr. Paul Neary, Department of Surgery, Adelaide and Meath Hospital, Tallaght, Dublin 24, Ireland.

Introduction: Surgical treatment for perforated diverticular disease classically involves a sigmoid resection with primary anastomosis or Hartmann's procedure, depending on the degree of faecal contamination. Previous laparoscopic approaches described in this acute context describe the use of peritoneal washout, without resection.

Methods: We report a case of perforated diverticular disease, requiring a Hartmann's procedure, performed and subsequently reversed laparoscopically.



Results: A 59-year old female presented with left sided abdominal pain, sepsis and left iliac fossa peritonitis. Investigations were consistent with perforated diverticular disease. Laparoscopy confirmed the diagnosis. The perforation and degree of local contamination necessitated a resection, but precluded a primary anastomosis. A laparoscopic sigmoid resection was performed to the upper rectum with the perforated segment removed via the end colostomy site. Intestinal continuity was re-established laparoscopically five months later using a trans-anal stapling device. She remains well on routine follow up.

Conclusion: Laparoscopic Hartmann's procedure and reversal is feasible in carefully selected patients with perforated diverticular disease requiring surgery.

Colorectal/Intestinal Surgery – P183

ASSESSMENT OF A LAPAROSCOPIC APPROACH IN THE MODERN MANAGEMENT OF PERFORATED PEPTIC ULCER DISEASE., Dr. Rachel E Kirby MD, Mr. Colman K Byrnes MD, Ms. Helen O'Grady, Mr. Musallam Al Akash, Prof. Frank B Keane, Mr. Paul Neary, Department of Surgery, Adelaide and Meath Hospital Tallaght Dublin 24 Ireland.

Introduction: Open exploration and repair is the gold standard for the treatment of perforated peptic ulcer disease. More recently a minimally invasive approach has been described. We retrospectively analysed consecutive patients presenting to our unit during an evolution to a laparoscopic approach.

Methods: Patients presenting with a perforated peptic ulcer were identified over a 2 year period. Charts were retrieved and analysed.

Results: A total of 13 patients, 6 female and 7 male patients presented with a perforated peptic ulcer. 6 patients proceeded directly to a traditional laparotomy and open repair of the perforation. This was based on surgeons' preference. 7 patients underwent an initial diagnostic laparoscopy. Based on this evaluation, a formal laparoscopic omental patch repair was performed in 4 cases and an open approach performed on 3 cases. All patients underwent a formal repair with omentoplasty and commenced on empirical triple therapy post operatively.

There was no significant difference between the laparoscopically assessed and open cases (age $p=0.89$; and nutritional status $p=0.70$). Laparoscopically assessed patients had an increased incidence of smoking, alcohol and NSAID consumption. The cases assessed laparoscopically and performed in an open fashion had a significantly delayed emergency presentation compared to those repaired laparoscopically (22 hours vs. 52 hours; $p = 0.04$). There was no additional morbidity associated with initial laparoscopic evaluation and subsequent open repair. These patients had a similar postoperative course to those that proceeded to open surgery directly. Patients assessed and repaired laparoscopically tended to have a shorter length of stay (7 vs. 14 days), a shorter operative time (1.3hrs vs 1.4hrs), earlier nasogastric tube removal ($p = 0.07$) and shorter time to resume oral intake. Complications occurred only in cases completed by open procedure. These included a relaparotomy and washout in one instance, three cases by acute renal failure, 2 CVAs, an abdominal collection requiring drainage and these resulted in mortality in 2 cases.

Conclusion: Cases with prolonged duration of symptoms prior to surgical intervention are more likely to necessitate an open approach due to excessive peritoneal contamination. An initial laparoscopic assessment however adds no additional morbidity, and when a laparoscopic repair is performed may lead to a quicker recovery with fewer post operative complications.

Colorectal/Intestinal Surgery – P184

THE PROBLEMS OF LAPAROSCOPIC LOW ANTERIOR RESECTION FOR RECTAL CANCER, Yukihito Kokuba MD, Takeo Satou MD, Heita Ozawa MD, Kazuhiko Hatate MD, Takatosi Nakamura MD, Wataru Onozato MD, Atushi Ihara MD, Masahiko Watanabe MD, Kitasato University East Hospital

Results: Magnified views of the operative field are highly useful in cases involving laparoscopic surgery for rectal cancer, permitting detailed observation of dissected tissue and nerve alignment. Combined with appropriate knowledge of the intrapelvic anatomy, magnified views make it possible to dividing the rectum and preserving nerves without bleeding. The dissection and resection associated with low anterior resection require skill. Due to the difficulty of handling the tumor with the required delicacy, the risk of disseminating tumor cells is high. While the procedures are similar for upper rectal cancers and cancers of the sigmoid colon, laparoscopic low anterior resection can be performed even in cases of advanced cancer. But with lower rectal cancers, this procedure should be restricted to patients in the early stages, unless the surgeon has considerable experience. T2 is the limit even for highly skilled surgeons. The major technical issue associated with the present technique is safe cleaning and resection of the rectum while protecting the tissue from excessive strain. Magnified views of the operative field create favorable conditions for dissection up to the lower rectum, even better than open surgery. However, with the current laparoscopic intestinal forceps, it is difficult to properly hold the part of the intestinal tract that is between the tumor and the anus in the lower rectum. The development of removable intestinal forceps addressed this issue to some degree, but fell short of providing satisfactory results. A recently developed laparoscopic clamp forceps permits adjustment of the angle of the section holding the intestinal tract and provides more reliable gripping. This forceps allows relatively safe cleaning and resection. We anticipate further improvements in surgical forceps for better adaptability to ultralow low anterior resection. In DST anastomosis, it is difficult to sever the rectum perpendicular to the long axis in one motion using any of the currently available staplers. Thick rectal walls make stapling unreliable, and misfires can occur. If these device shortcomings can be resolved to ensure safe rectal resection, we can expect laparoscopic surgery and the magnified views it offers of the operative field to become essential in the treatment of rectal cancer.

Colorectal/Intestinal Surgery – P185

PLASMA TIMP-1 LEVELS ARE TRANSIENTLY INCREASED AFTER LAPAROSCOPIC-ASSISTED COLORECTAL RESECTION FOR BENIGN INDICATIONS, Shantha Kumara MD, Hoffman A MD, Nasar A MD, Belizon A MD, Baxter R MD, Jain S MD, Feingold D MD, Arnell T MD, Moradi D MD, Whelan R L MD, Columbia University

Introduction: TIMP-1 (Tissue Inhibitor of Metalloproteinases-1) is an enzyme that degrades metalloproteinases yet also promotes proliferation of a broad range of cell types and also has anti-apoptotic effects as well. It has been demonstrated that early after both laparoscopic-assisted and open colorectal resection for malignancy that plasma TIMP-1 levels are significantly increased. It is not known if the postoperative TIMP-1 elevation is related to the surgery itself or the removal of the cancer. The purpose of the present study was to determine the impact of colorectal resection for benign disease on TIMP-1 levels.

Methods: A total of 51 patients undergoing minimally invasive colorectal resection for benign indications were studied. The operations performed were: sigmoid resection/ left colectomy ($n= 31$; 61%), right colectomy ($n=18$; 35%); and lap subtotal colectomy ($n=2$; 4 %). Mean incision length was 5.33 (cm). Plasma samples were obtained from blood taken preoperatively, on postoperative day (POD) 1 and POD3. Plasma TIMP-1 levels were determined in duplicate via ELISA. Wilcoxon's signed ranks test was used to determine statistical differences and a p value of less than 0.05 was considered significant. Data is reported as the median (M), and 95% Confidence Intervals (CI).

Results: A total of 50 of the cases were successfully completed laparoscopically (98 %). There were no mortalities. The median preoperative TIMP-1 level for the group was 158.0; CI (121.0-178.2). The POD1 median result was 216.0; CI (179.0-261.0, $n= 35$) whereas the POD 3 result was 191.0; CI (154.0-225.0, $n=30$). When compared to the Preop baseline

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value, the POD1 was significantly greater ($P=0.0001$) however no significance relationship was found with POD3 ($p=0.057$).

Conclusions: Similar to the situation for patients with colorectal cancer, minimally invasive colorectal resection for benign indications is associated with a significant elevation of plasma TIMP-1 level on POD1 and non-significantly on POD3. Although unproven, it is likely that this increase is related to the surgical trauma. A similar study of colorectal resection patients with benign disease undergoing a traditional open procedure would help determine the contribution of the abdominal wound(s) to the TIMP-1 increase found after major abdominal surgery.

Colorectal/Intestinal Surgery – P186

COLORECTAL RESECTION, OPEN MORE SO THAN MINIMALLY INVASIVE, IN PATIENTS WITH BENIGN INDICATIONS IS ASSOCIATED WITH PROANGIOGENIC CHANGES IN THE PLASMA LEVELS OF ANGIOPOIETIN 1 AND 2, Shantha Kumara MD, Hoffman A MD, Nasar A MD, Belizon A MD, Baxter R MD, Jain S MD, Feingold D MD, Arnell T MD, Moradi D MD, Whelan R L MD, Columbia University

INTRODUCTION: Angiopoietin 1 (Ang1) is a protein that stabilizes mature blood vessels and is thought to inhibit the angiogenic response to VEGF. Angiopoietin 2 (Ang 2), in contrast, blocks Ang-1 thereby enhancing VEGF response. The ratio of Ang 1/Ang2 reflects the net effect of these proteins on new blood vessel formation. The purpose of this study was to determine the impact of open and minimally invasive (MIS) colorectal resection on the plasma levels of these 2 proteins. To assess only surgery's effects on these factors, patients with malignancies were excluded from this study as tumors produce pro-angiogenic factors.

METHODS: 31 MIS and 19 open surgery patients undergoing colorectal resection were studied. Plasma samples were obtained preoperatively (PO) and on postoperative day(s) (POD) 1 and/or 3. Ang 1 and Ang 2 levels were measured in duplicate via ELISA. Wilcoxon's matched pairs test and the Mann Whitney U Test were used where appropriate to determine statistical differences. A p value of less than 0.05 was considered significant.

RESULTS: In the MIS group the Ang1/Ang2 ratio was significantly lower on POD1 ($M=3.4$, CI 2.2-4.4, $n=29$, $p=0.001$) and POD 3 ($M=2.3$, CI 1.3-3.2, $n=29$, $p=0.0001$) compared to the Preop result ($M=7.0$, CI 4.3-8.5, $n=31$). Similarly, in the Open group the Ang1/Ang2 ratio was significantly lower on POD1 ($M=1.7$, CI 1.2-3.3, $n=17$, $p=0.001$) and POD 3 ($M=0.8$, CI 0.5-1.8, $n=11$, $p=0.003$) when compared to the Preop result ($M=4.9$, CI 2.9-9.1, $n=19$). Of note, the MIS Ang1/Ang2 ratios on POD1 and POD3 were significantly higher than the Open groups? Ang1/Ang2 ratios on POD1 ($p=0.044$) and POD3 ($p=0.015$). Furthermore, in both the MIS and open groups on POD 1 and 3 the Ang 1 plasma levels were significantly lower than Preop values. The open group Ang 2 values on POD 1 and 3 were significantly greater than the corresponding MIS groups? (POD1, $p=0.01$; POD3, $p=0.003$).

CONCLUSION: Colorectal resection for benign indications, both open and MIS, results in decreases in plasma Ang 1 and increases in Ang 2 levels, the net effect of which is proangiogenic as reflected by the lower postoperative Ang1/Ang2 ratios seen in both groups. The Ang 2 alterations are significantly more profound in the Open group as are the changes in the Ang1/Ang2 ratio. These plasma protein changes are most likely secondary to surgical trauma. It remains to be seen if similar alterations will be found in the cancer setting.

Colorectal/Intestinal Surgery – P187

USE OF TRANSANAL ENDOSCOPIC MICROSURGERY FOR EXCISION OF RECTAL LESIONS, Alex J Ky BA, Erin K Ly BA, Mount Sinai Hospital NY, NY

Introduction: Transanal endoscopic microsurgery (TEM) was developed by Buess in 1983 as a minimally invasive surgery for the removal of anorectal lesions that cannot be excised by conventional transanal instruments. We present our experience from a single surgeon from an institution using this

technique.

Method: A retrospective chart review was performed on all patients who underwent the TEM between November 2002 to July 2006. The indication for using this technique were any benign lesions located between 6-18cm from the anal verge. All patients were followed up flexible sigmoidoscopies at 1 month, 6 months and 1 year postoperatively. **Results** Ninety five patients were felt to be appropriate for this TEMS technique between this time period. The diagnosis for these cases were 67 benign adenomas, 23 carcinoids, 4 were T1 rectal cancers. One cannot be completed due to inability to advance the TEMS instrument through a narrow and tortuous rectum. All patients underwent a preoperative enema before the procedure. The average operative time was 68 minutes. The average length of stay was less than 24 hours. 84 of these patient went home the same day. The longest length of stay was 2 days for a patient who had a long segment of carpet of adenomas at 16cm where the peritoneum was entered and subsequently closed. Perioperative pain was managed with only oral narcotics. Average intraoperative blood loss was 50cc. Two patient had postoperative bleeding that stopped without intervention or transfusions.

Colorectal/Intestinal Surgery – P188

LAPAROSCOPIC RESECTION FOR STAGE IV COLORECTAL CANCER, Wai Lun Law MD, Hok Kwok Choi MD, Yee Man Lee DO, Judy Ho MD, Department of Surgery, University of Hong Kong Medical Centre

Background: Up to 20% of patients with colorectal cancer presented with stage IV disease. Data on the outcome of patients with laparoscopic resection for disseminated colorectal cancer are limited. This study aimed to review the outcome of laparoscopic resection for stage IV colorectal cancer.

Methods: From the prospectively collected database for patients with colorectal cancer, those with stage IV disease who underwent elective resection of tumor during the period from Jan 2000 to Jun 2006 were included. The outcomes of those with laparoscopic resection were reviewed and comparison was made between patients with laparoscopic and open resection.

Results: Two hundred patients (127 men) with the median age of 69 years (range: 25-91 years) were included. Seventy-seven underwent laparoscopic resection. Conversion was required in 10 patients (13.0%) and all except one conversion were due to fixed or bulky tumors. There was no operative mortality (30-day mortality) in the laparoscopic group. The complication rate was 14% and the median postoperative hospital stay was 7 days. When patients with laparoscopic resection were compared with those with open operations, there was no difference in age, gender, comorbidity or tumor size between the two groups. However, the complication rate was significantly lower in those with laparoscopic resection (14% vs. 32.0%, $p=0.007$) and the median hospital stay was significantly shorter (7 days vs. 8 days, $p=0.005$). The operative mortalities and the survivals were similar in the two groups.

Conclusions: Palliative resection can be performed safely in patients with stage IV colorectal cancer. The operative outcomes in terms of complication rate and hospital compare favorably with patients with open resection.

Colorectal/Intestinal Surgery – P189

LAPAROSCOPIC SURGERY FOR SPLENIC FLEXURE COLON CANCER, YS Lee MD, YJ Heo MD, IK Lee MD, HM Jo MD, WK Kang MD, JK Park MD, ST Oh MD, JG Kim MD, YH Kim MD, The Catholic University of Korea

Purpose: While carcinoma of the splenic flexure colon is uncommon, and is associated with high risk of obstruction, and has dual lymphatic drainage system, COST study excluded transverse colon cancer including splenic flexure colon cancer. This study reviews our experiences of splenic flexure colon cancer which were treated laparoscopically, and discusses the appropriate and safe laparoscopic surgical procedure.



Methods: Authors reviewed the medical records of patients who underwent laparoscopic surgery for splenic flexure colon cancer from January 1995, to June 2006, retrospectively. Splenic flexure colon was defined as 5cm from the splenic flexure proximally and distally by radiologic studies. Curative surgery for splenic flexure colon cancer was defined like this: primary cancer removal, safe resected margin, no metastasis, complete lymphadenectomy including high ligation of left colic and left branch of mid colic artery. **Results:** Total 407 patients underwent laparoscopic surgery for colon cancer, among them 17 patients underwent laparoscopic surgery for splenic flexure colon cancer. The mean age of the patients was 62.7 years, and ratio of male-to-female was 10:7. Laparoscopic left colectomy was done in 15 cases, laparoscopic left colectomy with distal pancreatectomy and splenectomy was in 1 case, laparoscopic total proctocolectomy with ileal pouch anal anastomosis was in 1 case. Mean operation time was 349 minutes and average hospital stay was 15.8 days. 1 case of chyle discharge and 2 cases of ileus were developed, but treated conservatively. There was no surgical mortality.

Conclusions: Laparoscopic surgery for splenic flexure colon cancer is technically feasible and safe procedure.

Colorectal/Intestinal Surgery – P190

NUCLEOTIDE-GUIDED MESORECTAL EXCISION IN LOCAL TREATMENT OF NON ADVANCED LOW RECTAL CANCER (NALRC) BY TEM, Giovanni Lezoche MD, Giancarlo

D'Ambrosio BA, Rita Massa MD, Luigi Solinas MD, Pietro Ursi MD, Stefania Rebonato MD, Adriana Rotundo MD, Emanuele Lezoche, Il Clinica Chirurgica & Service of Nuclear Medicine-Policlinico Umberto I - University of Rome "la sapienza"

Introduction: In despite of the recent progresses of open as well as of laparoscopic rectal surgery LAR or APR with TME still have significative morbidity (7-15%) and mortality (2-5%), that in high risk patients is 10%. Furthermore functional sequelae are more frequent (20-70%) and several authors use routinary ostomy to protect the anastomosis. Local excision of NALRC utilizing transanal technique led to an unacceptable high percentage of local recurrence. Transanal Endoscopic Microsurgery has multiple technical advantages when compared to transanal procedures and recently has been proposed, combined with neoadjuvant treatment, in order to reduce the risk of local recurrence. During TEM procedure in the last year we employed a modified sentinel node technique in order to improve both local exeresis of the tumoral lymphatic drainage and intraoperative hystological staging.

Methods: Only patients with imaging stage of T1,T2-N0 were treated with TEM local excision, T2 N0 pts underwent to neoadjuvant treatment. 99mTc nanocol (37-74 MBq), diluted in 1 ml of saline solution were injected submucosally around and inside the tumor 45 min before the dissection. Only in the first cases we combined nucleotide with blue-dye, because the blue-dye reduce the endoscopic vision and make more difficult the procedure. The excision of rectal wall was 5-10 mm external to injected area, then a wide ablation of perirectal fat was performed according to the technique previously described (Surg Endosc, 1996). Once the specimen was excised, TEM strumentation was removed and all the residual cavity was searched for nuclear activity introducing the probe transanally. All the areas with high residual activity were marked with metallic clips and subsequently excised by TEM This procedure was repeated until no radioactivity spots were detected in the residual cavity. All the specimen were examined intraoperatively and no positive tissue for metastases was found. Those results were confirmed to the definitive histology. Micrometastases were searched immunohistochemically by monoclonal antibodies specific for cytokeratine while blood and lymphatic vessels were assayed using monoclonal antibodies specific for CD31 and Podoplanina.

Conclusion: The decribed modify sentinel node technique is feasible and represent a useful guide for ablation of all lymphatic areas surrounding the cancer at risk for local metastases.

Colorectal/Intestinal Surgery – P191

GI RECOVERY RESPONDER ANALYSIS: RESULTS OF PHASE III TRIALS OF ALVIMOPAN (ALV) 12 MG VERSUS PLACEBO (PLA) IN PTS UNDERGOING BR, K. Ludwig MD, E. Viscusi MD, B. Wolff MD, C. Delaney MD, W. Du PhD, L. Techner, Duke U Med Ctr, Jefferson Med Coll, Mayo Clinic, U Hospitals of Clev, Adolor Corp

INTRO: A responder analysis was performed to examine alv, a peripherally acting mu-opioid receptor (PAM-OR) antagonist, in the management of postoperative ileus (POI). The proportion of patients who achieved GI recovery and hospital discharge after BR was analyzed in multicenter, randomized, double-blind NA trials.

METHODS: Adult pts undergoing laparotomy for BR scheduled for postoperative IV patient-controlled opioid analgesia received oral alv 12 mg or pla preoperatively and twice-daily postoperatively until hospital discharge or for 7 postoperative days (PODs). This pooled post hoc analysis examined the proportion of responders (pts who achieved the event without developing complications of POI) on POD5 and 7 for efficacy endpoints of GI-2 recovery (composite of time to first bowel movement [BM] and toleration of solid food) and time to hospital discharge order (DCO) written. Treatment effects on time to events were analyzed using the Cox proportional hazards model. P values were calculated using Fishers exact tests.

RESULTS: Alvimopan significantly accelerated GI-2 recovery and DCO written (hazard ratio=1.5 and 1.4, respectively; P<0.001). More pts in the alv group achieved GI recovery and DCO written. For ex, 80% of pts in the alv group achieved GI-2 recovery by POD5 compared with 66% of pts in the pla group.

CONC: In this responder analysis, a significantly greater proportion of pts who received alv 12 mg achieved GI-2 recovery and DCO written by POD7 compared with pts who received pla. This pooled analysis suggests that by accelerating GI recovery, alv also reduces the proportion of pts with a prolonged hospital stay.

	Pla n=695	Alv 12 mg n=714	
GI-2, PODs 5, 7	66.3%, 74.7%	80.1%, 84.5%	p<0.001
DCO, PODs 5, 7	61.0%, 80.0%	77.0%, 90.2%	p<0.001

Colorectal/Intestinal Surgery – P192

LAPAROSCOPIC TREATMENT OF INTRAABDOMINAL FISTULAS: SINGLE SURGEON EXPERIENCE, Nitin G Malhotra MD, Edward C Lee MD, Kelly Garrett MD, Department of Surgery, Albany Medical Center, Albany, NY

Background: Laparoscopic surgery (LS) has enabled us to reach new frontiers in abdominal surgery. This study is aimed at the feasibility and clinical outcomes of using laparoscopic surgery in repair of complicated intraabdominal fistulas.

Methods: Between February 1998 and August 2006, 24 patients underwent LS for complicated intraabdominal processes and were found to have associated fistulas. Clinical data was retrieved in a retrospective chart review of a single colorectal surgeon's cases at our institution.

Results: The average patient age in the study population was 45 years (range 18 to 82). Twenty-four patients underwent LS for complications of diverticular disease (42%) and Crohn's disease (CD) (58%). This encompassed colovesicular and colovaginal fistulas with diverticulitis and colenteric, colcutaneous and enteroenteric fistulas for CD. Conversion to an open procedure was 25% and was required for six patients secondary to adhesions (33%), bleeding (17%) and phlegmons (50%). Four of the six had active CD leading to conversion ratios of 28% for CD and 20% for diverticulitis. The average estimated blood loss (EBL) with laparoscopic versus (vs) conversion to open cases was 136.7 vs. 325 ml (range of 30 to 400ml). Median length of procedure per OR records was 162.3 vs 141.5 minutes (range of 118 to 285 minutes). Return of bowel function occurred on average of 3.3 vs. 6 post-operative days (range 2 to 6 days). The length of stay post-operatively was 4.9 vs. 4.3 days (range 3 to 10



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days). Perioperative mortality and morbidity was 0% and 8% respectively. No further surgery was required in a 60-day follow-up period. During this time, one readmission occurred for a wound infection (4%). **Conclusions:** With new technology and operative techniques, LS has enabled us to attempt complicated abdominal surgery. This study shows that LS for complicated CD and diverticulitis is feasible with promising clinical outcomes and low morbidity. In addition, we propose that the decision to convert to an open procedure be made early as our data shows that these patients have a shorter length of procedure and post-operative stay. As surgeons become more experienced in complex laparoscopic cases, we anticipate that LS will become the standard of care for treatment of intraabdominal fistulas.

Colorectal/Intestinal Surgery – P193

CONVERSION RATES IN LAPAROSCOPIC COLORECTAL SURGERY SINCE THE COST TRIAL, Nell Maloney MD, John J Park MD, Leela M Prasad MD, John H Stroger Jr Hospital of Cook County and Advocate Lutheran General Hospital

Introduction: Since the publication of the COST trial, the role of laparoscopy in colorectal surgery has expanded. The present study was performed to assess differences between patients requiring conversion based on the diagnosis of benign versus malignant disease. **Methods:** Retrospective review was performed for all laparoscopic cases from 5/2004 through 6/2006. Cases that were converted to open procedures were identified. Data collected included patient factors such as age at time of surgery and body mass index (BMI), tumor factors such as location and size of tumor, reason for conversion and hospital length of stay. Data was analyzed using Student T Test. **Results:** Two hundred and seventy-four laparoscopic colon resections were performed during the study period. One hundred and thirty-nine cases were done for cancer diagnoses and 136 for benign disease. Twelve conversions were identified, five in the cancer cohort and seven in the benign cohort, indicating a 3.6% conversion rate in the cancer cases compared to 5.2% with benign disease (p=NS). The most common reason for conversion was obesity (three patients), other reasons included bleeding, disease process, inability to visualize important structures, adhesions, presence of a mesh and bradycardia.

	Benign	Malignant	P-Value
Age	67 yrs	77 yrs	0.157
BMI	27.4	34.5	0.013
Operative Time	208 min	232 min	0.5
Hospital Stay	6.1 days	10.6	0.07
Blood Loss	242cc	490cc	0.02

Characteristics of patients requiring conversion

Conclusions: Rates and reasons for conversion are similar for patients with benign and malignant diagnoses of colon pathology. Patients with cancer diagnoses may have both an increased blood loss and a longer hospital stay, although this may be related to the greater BMI in the cancer group.

Colorectal/Intestinal Surgery – P194

LAPAROSCOPIC ADHESIOLYSIS FOR BOWEL OBSTRUCTION: PREOPERATIVE USEFULNESS OF CINE MAGNETIC RESONANCE IMAGING, H Matsuoka PhD, T Mori PhD, T Masaki PhD, K Takei MD, M Sugiyama PhD, Y Atomi PhD, H Haradome PhD, Department of Surgery and Radiology, Kyorin University, Tokyo, Japan

AIM Since there were higher morbidity rates reported in previous literatures, case selection for surgery by laparoscopic approach has been stressed. The aim of this study was to clarify the usefulness of cine magnetic resonance imaging (cine MRI) for case selection of laparoscopic adhesiolysis.

Patients and Methods Among 45 patients with bowel obstruction who underwent preoperative cine MRI, laparoscopic adhesiolysis could be performed in 7 cases. Device we used for dynamic cine MRI was a Gyroscan Intera 1.5 Tesla (Phillips Inc.). Examination was obtained with one breath hold with a supine position. Laparoscopic adhesiolysis was applied under following criteria by cine MRI (location of obstruction was detected, relatively favorable bowel

decompression followed by long tube treatment).

Results Laparoscopic adhesiolysis was performed successfully in all cases without morbidity. Although three of seven cases had bowel resection due to persistent adhesive scar on the small bowel, mean time of operation was 113 min. 7:189~146, resuming oral intake at 5:13?7?jPOD, and length of postoperative hospital stay was 12 days?i10? 19?j. Preoperative diagnostic accuracies by cine MRI are as follows. The adhesive site was located in all cases (100%: 7/7). Cause of obstruction was also clarified in 6 cases by cine MRI as to whether the cause was tumor or adhesion (80%: 6/7). All patients were also negative for any strangulation. **Conclusion** Cine MRI was an useful tool for clarifying preoperative status of bowel obstruction in whom laparoscopic adhesiolysis is performed.

Colorectal/Intestinal Surgery – P195

LAPAROSCOPIC AND OPEN REVERSAL OF HARTMAN'S PROCEDURE - A COMPARATIVE RETROSPECTIVE ANALYSIS, Haggi Mazeh MD, Alexander Greenstein MD, Kristin Swedish BA, Scott Nguyen MD, Aaron Lipskar MD, Kaare Weber MD, Edward Chin MD, Celia M Divino MD, Department of Surgery, The Mount Sinai Hospital, New York, NY

Introduction: Restoration of intestinal continuity in patients with colostomy after Hartman's procedure traditionally has required a laparotomy. The aim of this study is to present our institution's experience with laparoscopic reversal of Hartman's procedure and to compare short term outcomes with those of open reversal.

Methods: After institutional review board approval, we conducted a retrospective chart review of all laparoscopic and open Hartman's reversal procedures performed between January 1998 and June 2006. Specifically, we focused on those patients who had reversal of a left or sigmoid end colostomy, and excluded those with loop or transverse colostomies. These patients were then matched by age, BMI and indication for the initial Hartman's procedure to an equivalent number of open Hartman's reversals. In addition to demographic data, information was collected regarding operative course, perioperative complications, and indication for the initial Hartman's procedure.

Results: In total, 41 patients were identified who underwent laparoscopic reversal of Hartman's procedure and were matched to 41 patients with open reversal. The mean average time to closure was 190 days. The groups had similar average age and BMI, and the predominant indication in both groups was diverticular disease. Laparoscopic reversal of Hartman's procedure was attempted in 41 patients and was converted to open in 8 patients (19.5%) due to dense adhesions (6 patients) and difficulty with the anatomy or anastomosis. The most common short term complications were ileus and surgical site infection. There were no anastomotic leaks and no mortalities. The mean operative time in the laparoscopic and open groups was 193 and 209 minutes respectively, but this difference was not statistically significant. The laparoscopic group had a significantly lower (p<0.0005) estimated blood loss of 166ml versus 326ml, a shorter time to bowel function return - 4.1 versus 5.2 days (p<0.05), and a shorter hospital stay - 6.4 versus 8.0 days (p<0.05). The major complication rate was also significantly lower (p<0.05) in the laparoscopic group (4.8%) than in the open group (12.1%).

Conclusions: Laparoscopic reversal of Hartman's procedure is a safe and practical alternative to open reversal. It can be performed in a similar operative time with fewer complications and a faster recovery time.

Colorectal/Intestinal Surgery – P196

USE OF OXIMETRY-CAPABLE INSTRUMENTS TO ENHANCE IDENTIFICATION OF ISCHEMIC BOWEL DURING SURGERY., Ozanan R Meireles MD, Lia R Assumpcao MD, Takintope Akinbiyi MS, Eric J Hanly MD, Marcin Balicki BS, Gregory S Fischer PhD, Sunipa Saha MS, Samuel Shih MD, Russell H Taylor MD, Mark A Talamini MD, Michael R Marohn DO, Department of Surgery - Johns Hopkins University School of Medicine, Baltimore, MD

Introduction: Ischemic bowel can be a life threatening con-



dition for which diagnostic accuracy and prompt treatment are paramount. After restoring reversible ischemia to the gut, the primary goal in surgical treatment of ischemic bowel is to preserve as much viable bowel as possible while avoiding leaving non-viable tissue in situ. We hypothesize that the use of an oximetry-capable sensing surgical grasper could distinguish between well-vascularized versus 'at-risk' bowel.

Methods: A laparoscopic grasper was fitted with oximetry capability. A pilot study was performed in adult swine in which three 10 cm segments of well-vascularized small bowel were bowel clamped proximally and distally followed by segmental vascular-clamp interruption of the mesenteric blood supply for 90 seconds, followed by subsequent release and revascularization. During these procedures, serosal surface oxygenation was measured using the grasper's sensing blades before clamping, 60 seconds after clamping, and 60 seconds after unclamping. Using Infrared/Red light ratios, the smart tool software depicted oximetry readings in real time on the monitor.

Results: The readings showed differences in oxygenation when the bowel was clamped and unclamped, demonstrating low oxygen levels at 60 seconds of clamping, correlating with the acute decrease in blood supply. After 60 seconds of unclamping the oxygenation levels returned to baseline levels correlating with the restoration of blood flow.

Conclusions: Oximetry-capable sensing 'smart' instruments have the potential to distinguish ischemic from well-perfused small bowel in real time during surgical cases. This technology may enhance the accuracy with which non-viable bowel is identified, decreasing the need for immediate 'second look' re-operation, as well as reducing unnecessary resection of viable bowel based on misleading visual characteristics.

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JEJUNAL DIVERTICULA - A SOURCE OF MASSIVE GASTROINTESTINAL BLEEDING, Subhasis Misra MD, Prasanta Raj MD, Shannon Tarr BS, Richard Treat MD, Fairview Hospital, Cleveland Clinic Health System

INTRODUCTION: Massive gastrointestinal bleeding of unknown etiology is one of the challenging cases encountered by the general surgeon. We present an interesting case study of a 75-year-old male admitted with symptoms of lower abdominal pain and rectal bleeding.

METHODS: A retrospective review of the patient's history revealed that the patient had two similar episodes of gastrointestinal bleeding five and seven years ago requiring transfusion of four and five units of packed red blood cells (PRBC) respectively. Past medical history was significant for diverticulosis of the sigmoid colon. Upon this admission, the patient was on plavix and aspirin therapy for coronary artery disease. Initial evaluation with upper endoscopy and lower endoscopy, showed the colon to have fresh as well as old blood. Tagged red cell scan and angiogram did not show a definite source of the bleeding. Bleeding parameters were normalized but the patient continued to have rectal bleeding requiring 12 units of PRBC transfusion.

RESULTS: Total colectomy with ileorectal anastomosis was performed, as no exact source of the bleeding was known. An incidental finding of multiple jejunal diverticula were noted during this operation. After surgery, the patient continued to bleed requiring six units of PRBC transfusions. On postoperative day four, the patient was taken back to the operating room where a moderate amount of intraluminal blood was found in the small bowel region containing the jejunal diverticula. The entire segment of jejunum containing diverticula was resected. The patient had no further episodes of gastrointestinal bleeding.

CONCLUSION: Jejunal diverticula are known to cause several complications including lower gastrointestinal bleeding. This case illustrates that jejunal diverticula can be a source of massive gastrointestinal bleed. We therefore recommend that in patients with jejunal diverticula, consideration should be given to resect the affected area, in cases of massive gastrointestinal bleed, where no definite source is identified.

Colorectal/Intestinal Surgery – P198

SPECTACULAR COLOSTOMY - A NEW TECHNIQUE, Prasanta Raj MD, Subhasis Misra MD, Michael Cho MD, Shannon Tarr BS, Richard Treat MD, FAIRVIEW HOSPITAL, CLEVELAND CLINIC HEALTH SYSTEM

OBJECTIVE: Colostomies are necessary in multiple surgical conditions where diversion of colon contents is essential to the surgical management. Complete diversion usually involves two abdominal wall stomas or an end stoma with the distal closed end of the bowel placed inside the abdomen. Complete diversion with two lumens exposed outside, mandates two separate areas of bowel opening. We designed a new technique for complete fecal diversion by separating both ends of bowel, which are exposed outside of the abdomen, while the patient has only one fascial opening and uses only one normal colostomy appliance.

METHODS: Skin is marked for an incision, which is shaped like a pair of half-spectacle or reading glasses. A transverse incision is done and the straight upper rim of the spectacle is made. Fascia is incised directly underneath this incision in a transverse fashion. The transverse colon is then mobilized and brought outside the abdominal wall while preserving the blood supply. A rod is used to stabilize the loop of transverse colon outside the abdomen. Multiple absorbable sutures are then placed from the fascia to the bowel serosa. Similar approximation is done on either side of colon. The skin inferior to the transverse part of the spectacle is removed allowing better fascia visualization. Then the skin in between the divided ends is approximated with interrupted deep dermal vicryl sutures; this forms a "skin bridge" between either sides of the transverse colon. Transverse colon is divided and a few sutures are placed on the medial portion of the stoma to the fascia. Transverse colon is then matured. Patencies of the stomas are checked. A single large stoma appliance is applied over both the stomal openings.

RESULTS: In a few days the distal stoma opening gets very small and becomes a mucus fistula. Ten cases have been done so far over the last two years. In all the cases the colostomy functioned well, there were no issues with the mucous fistula and a normal sized appliance was attached easily and with good seal.

CONCLUSION: The "Spectacular Colostomy" technique offers many advantages and can be used in selected patients with added benefits. This technique is simple, makes one fascial opening, uses one stoma appliance, provides complete diversion, is easy to reverse as a mucus fistula is too close, needs less wound care and is good for use in patients with carcinomatosis and inoperable rectal and other pelvic tumors.

Colorectal/Intestinal Surgery – P199

THE ADOPTION OF LAPAROSCOPIC COLORECTAL SURGERY: A NATIONAL SURVEY OF GENERAL SURGEONS, H Mooloo MD, F Haggart BS, F Balaa MD, E Poulin MD, J Mamazza MD, E Sabri MSc, H Stern MD, I Graham PhD, J Grimshaw PhD, R Boushey MD, The Ottawa Hospital

Introduction: National cross-sectional study focusing on general surgeons' attitudes and opinions regarding the current practice of laparoscopic colorectal surgery. The aim is to determine the percentage of surgeons performing laparoscopic colorectal procedures, regional variations, limiting factors and identify strategies for adopting the laparoscopic approach (LR).

Materials and Methods: A 28-item questionnaire jointly designed by the Departments of Surgery and Epidemiology was sent to all members of the Royal College of Physicians and Surgeons of Canada (RCPSC). Surgeon and practice demographics, subspecialty training and information on their attitudes regarding laparoscopic colorectal surgery were assessed by the questionnaire. Responses from surveys were digitally scanned into a database and descriptive and correlative information was derived using chi-squared, Wilcoxon rank sum, Student's t-test, and multivariate logistic regression.



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Results: The response rate was 54.8% (694/1266) with 66.6% [95% CI: 63.0%-70.2%] of respondents performing colorectal surgery. Of these, 53.6% [95% CI: 48.8%-58.4%] perform laparoscopic colorectal surgery (LC group) with 46.4% only offering open colorectal surgery (OC group). Members in LC group were significantly younger (45.7 vs 49.7 p<0.001), had fewer years of experience (14.1 vs 17.3 p=0.005) and more practiced in academic centers (59.9% vs 50.3% p=0.03) compared to OC group. In addition, members in the LC group were more likely to have MIS (p=0.010) or Colorectal (p=0.014) subspecialty training. The median number of laparoscopic colorectal cases per year in the LC group was 9.33 (IQR; 6-20); most LC surgeons performed right hemicolectomy (86.6%) and sigmoid colectomy (78.0%); few (24.1%) surgeons performed APR. 76% offer curative cancer resections increasing to 95% for benign diseases. Multivariate logistic regression analyses identified four significant factors related to performing LCS: fewer years of experience (p<0.0001), being male (p=0.0023), practicing in a populous region (p=0.0009), and having MIS fellowship training (p=0.004)

Conclusion: A large percentage of general surgeons are offering the LR. Recent graduation, male gender, practice location in a populous region and formal MIS training appear to be significant independent predictors for offering LR.

Colorectal/Intestinal Surgery – P200

ENTERIC FISTULAS FROM CROHN'S DISEASE CAN BE TREATED SAFELY AND EFFECTIVELY WITH LAPAROSCOPIC SURGERY, Alfred Trang MD, Murali Naidu MD, Daniel Herron MD, Barry Salky MD, The Mount Sinai Medical Center

Introduction: Laparoscopic surgery for Crohn's disease, while technically complex, has been demonstrated to be safe and beneficial for many patients. However, few data exist regarding the laparoscopic management of Crohn's disease complicated by fistula.

Methods: We performed a retrospective chart review of all patients who underwent laparoscopic treatment of Crohn's disease associated with fistulas. All patients were treated by a single surgeon at a high volume referral center during a 3 year period (2003-2006).

Results: We identified 35 patients who underwent laparoscopically assisted bowel resections for enteric fistulas due to Crohn's disease during the study period. Many different types of fistulas were identified, with the three most common being ileosigmoid, ileoileal and ileovesical. Sixteen patients presented with multiple fistulas. The average age of patients was 39 and the male to female ratio was 24:11. Ten patients had prior abdominal surgery. Only one patient had to be converted to an open procedure due to dense adhesions and the inflammatory process. Average length of stay was 5.7 days. There were no mortalities. Postoperative complications included two small bowel obstructions (6%), one abscess (3%), two bleeding complications (6%), and two anastomotic leaks (6%). Five patients (14%) required a second operation.

Conclusions: Laparoscopic treatment of Crohn's disease fistulas, while technically demanding, may be safe and effective in a high volume referral center. Our series demonstrated acceptable low morbidity rates and short lengths of stay. Minimally invasive surgery can be safely performed on patients with prior abdominal surgeries and those requiring multiple resections.

Colorectal/Intestinal Surgery – P201

MINIMALLY INVASIVE APPROACHES TO COMPLEX CROHN'S DISEASE: THE CURRENT ROLE OF HALS IN EXTENSIVE COLECTOMY, Kiyokazu Nakajima MD, Riichiro Nezu MD, Yasuyuki Kai MD, Keigo Yasumasa MD, Masaya Nomura MD, Toshinori Ito MD, Toshirou Nishida MD, Department of Surgery, Osaka University Graduate School of Medicine

Background: Hand-assisted laparoscopic surgery (HALS) has been considered as a practical alternative to laparoscopic-

assisted surgery (LAP) in the surgical treatment of complex colorectal diseases. However, its role in complex operation for Crohn's disease (CD), especially extensive colectomy, has yet to be established. The objectives of this study were, 1) to compare operative and early postoperative outcomes of conventional open (OPEN), LAP, and HALS extensive colectomy, and 2) to determine benefits of HALS in complex and multi-quadrant operations for CD.

Methods: We reviewed 38 consecutive patients that underwent extensive colectomy (resection of >3 segments of large intestine) as their initial abdominal surgery for CD between 1992 and 2006. The patients were divided into three groups: OPEN, LAP, and HALS, and their background/postoperative data were prospectively registered and retrospectively analyzed.

Results: Fourteen OPEN, 6 LAP and 18 HALS cases were reviewed. The groups were comparable in age at surgery, gender, body mass index, medical comorbidity, extent and type of CD, indications and procedures. Median operative time was significantly longer in LAP (330 min; range 154-540) compared to HALS (251; 165-340) and OPEN (200; 172-315) groups, respectively. Blood loss was significantly less in LAP (170 ml; 115-257) and HALS (225; 35-890) compared to OPEN (438; 280-780) group. HALS was effective to accomplish technically-demanding components in extensive colectomy e.g. retraction of friable bowel, division of thickened mesentery, and takedown of internal fistulas. No difference was seen in postoperative complications and length of hospital stay among these groups. There was no mortality in the series.

Conclusions: 1) HALS significantly reduces operative time compared to LAP, while retaining acceptable morbidity rate and recovery benefits of minimal access surgery e.g. less blood loss compared to OPEN. 2) HALS currently seems preferable for technically-demanding and multi-quadrant colorectal procedures such as extensive colectomy for CD.

Colorectal/Intestinal Surgery – P202

RETROGRADE APPROACH TO LAPAROSCOPIC SIGMOID COLECTOMY FOR DIVERTICULITIS: A 6 YEAR SINGLE INSTITUTION SINGLE SURGEON EXPERIENCE OF A NOVEL TECHNIQUE, Jennifer I Linn MD, Biswanath Gouda MD, Thomas J Nelson MD, Sunil Bhojru MD, Scripps Clinic, Torrey Pines, CA 92037

Background: Laparoscopic sigmoid colectomy is typically performed similar to traditional open techniques. We have been performing retrograde laparoscopic sigmoid colectomy for diverticulitis at our institution since October 2000. This involves beginning with the pelvic dissection and transection of the rectum at the outset of the operation. Next the mesocolon is divided and descending colon mobilized to the level of the proximal resection margin. After removal of the diseased colon and placement of the anvil an intracorporeal end to end stapled anastomosis is completed. We conducted a retrospective study to review our experience in the context of this surgery being performed using an innovative technique that runs counter to established norms.

Methods: From October 2000 to May 2006, 53 laparoscopic sigmoid colectomies were performed at the Scripps Clinic. All patients' charts were retrospectively reviewed for operative time, blood loss, conversion to open surgery and hospital stay.

Results: There were 5 conversions to open (9.4%) Median operative time was 129 minutes for laparoscopically completed cases and 152 minutes for converted cases. Median estimated blood loss was 87.5 ml and 159 ml respectively. The median length of hospital stay was 3 days for laparoscopic cases and 5 days for converted cases.

Conclusion: This retrospective series demonstrates favorable results for the retrograde approach to sigmoid colectomy. We suggest that this technique makes the operation more facile, and provides superior exposure of the sigmoid mesentery



Colorectal/Intestinal Surgery – P203

NEW PORTS DESIGN IN LAPAROSCOPIC CENTRAL LYMPH NODES DISSECTION WITH LEFT COLIC ARTERY PRESERVATION FOR COLON CANCER, Masanori Nishioka MD, Hidenori Miyamoto MD, Nobuhiro Kurita MD, Kouzou Yoshikawa MD, Mitsuo Shimada MD, Department of Surgery, The University of Tokushima, Japan

[Background] Lymph nodes dissection is necessary for advanced colorectal cancer. Overall survival and disease-free survival after laparoscopic colectomy for invasive colon cancer with lymph nodes metastasis is no worse than the previously reported rates for the same procedure done by an open technique (Surg Endosc. 2005). However, lymph nodes dissection around inferior mesenteric artery with left colic artery preservation using basic five ports design is difficult for anatomical feature inferior mesenteric artery. We report about the new ports design that a port is inserted from a suprapubic region.

[Purpose] Purpose of this study was to evaluate the new ports design in laparoscopic central lymph nodes dissection with left colic artery preservation for colon cancer.

[Methods] This study included 10 consecutive patients who performed laparoscopic central lymph nodes dissection with left colic artery preservation for sigmoid colon cancer. The new ports design (n=5) was compared with basic ports design (n=5). Tumor stages, average number of lymph nodes harvested, operation time, intraoperative blood loss were examined.

[Results] Tumor size of new ports design group was 4.6cm (basic ports design: 5.1cm). Stage II, III was 1, 4 patients, respectively (3, 2). Average number of lymph nodes harvested was 15.8 (11.4). The mean of operation time was 281 minutes (313 minutes). The mean of intraoperative blood loss was 58ml (58ml).

[Conclusions] The new ports design that a port is inserted from a suprapubic region reduces operation time and is effective in laparoscopic central lymph nodes dissection with left colic artery preservation for sigmoid colon cancer.

Colorectal/Intestinal Surgery – P204

HAND-ASSISTED LAPAROSCOPIC COLECTOMY: IS THERE AN ADVANTAGE OVER OPEN RESECTIONS? Yuri W Novitsky MD, H. James Norton PhD, Kent W Kerher MD, B. Todd Heniford MD, Carolinas Medical Center

Introduction: Hand-assisted laparoscopic colectomy has been introduced as an alternative to the standard laparoscopic technique. However, it has not yet been established whether intrabdominal placement of a hand abrogates the benefits of minimally invasive techniques. We hypothesized that the hand-assisted approach confers the advantages of minimal access surgery over traditional open colectomy.

Methods: We performed a retrospective review of consecutive patients undergoing elective open (O) and hand-assisted (HA) colon resections at a tertiary care hospital. Open colectomies performed by the laparoscopic surgeons were excluded. Outcome measures included demographics, operative time, perioperative complications, operative and total hospital charges, and length of stay. Statistical analysis was performed using Wilcoxon Rank Sum, Fisher's Exact, and Student's t-test with $p < 0.05$ considered significant.

Results: Three hundred-three O and 56 HA consecutive elective colectomies were identified and reviewed. Of these, 161 (53.1%) O and 30 (53.8%) HA were left-sided. The two groups were similar in age (60.3 vs 59.3 years), sex (62.6% vs 67.1% females), and body mass index (28.9 vs 29.1 kg/m²). The mean operative time was longer in the HA group (165 vs 199 minutes, $p = 0.002$). There were no major intraoperative complications in either group and no conversions from HA to O colectomy. Postoperatively, no patient in the HA group and 13 (4.3%) patients in the O group required blood transfusion. Anastomotic leak was discovered in 6 (2%) patients in the O and none in the HA groups. There was no difference in wound infection rates [5 (1.3%) in the O and 2 (3.6%) in the HA groups, $p = 0.1$]. All 7 (2.3%) mortalities occurred in the O group. The length of stay was significantly shorter in the HA group (5.4 vs 11.6 days, $p < 0.001$).

Both operative and total charges were significantly lower in the HA group (\$3,310 vs \$4,174, $p < 0.002$; \$25,032 vs \$32,301, $p < 0.001$)

Conclusion: Hand-assisted laparoscopic colectomy is a safe alternative to open resections. It may be associated with a decreased postoperative morbidity and mortality. Despite longer operative times, the use of hand-assisted techniques resulted in a significant reduction of the duration of hospitalization and decreased operative and total charges. Overall, in the elective setting, hand-assisted laparoscopic colectomies appear to maintain the advantages of minimally invasive techniques over open colonic resections

Colorectal/Intestinal Surgery – P205

IMPACT OF AN EXPERIENCED LAPAROSCOPIC COLORECTAL SURGEON TO AN EXISTING TRADITIONAL COLORECTAL PRACTICE IN AN ACADEMIC MEDICAL CENTER.,

Vincent J Obias MD, Farhad Zeinali MD, Harry L Reynolds MD, Brad Champagne MD, Conor P Delaney MD, University Hospitals of Cleveland, Case Medical Center

Introduction: Laparoscopic colectomy (LAC) is steadily gaining acceptance. The potential benefits of LAC have been reported by high volume institutions with established laparoscopic programs, however, introduction of LAC has often been associated with prolonged operative times, increased costs and no reduction in hospital stay over that seen with open surgery. There are no published data looking at the impact of introducing an experienced laparoscopic colorectal surgeon using fast-track post-operative care pathways on an established and experienced colorectal practice.

Method: A consecutive group of 73 patients who underwent LAC performed during the first 11 months of a new practice were compared to a case-matched group of patients who underwent open colectomy (OC). Patients were identified from a prospective database and matched for age, gender, DRG and operation. Open complication data were obtained from electronic medical record review. Patients were compared for outcome and direct costs. Hospital information was collated using integrated hospital cost management system and decision software (Transition Systems Inc. Boston, MA; TSI). Statistics were performed with Paired t test and Fishers exact test.

Results: Median age was 66.5 for the LAC group and 63.0 for the OC group ($p = 0.1935$). Surgical procedures were: right colectomy (n=63), left/sigmoid colectomy (n=26), subtotal colectomy (n=18), total proctocolectomy (n=8), anterior resection (n=27), and abdominoperineal resection (n=4). Laparoscopic operative times were a median of 142 minutes. Overall morbidity for LAC was 19.2% and for OC was 16.4% ($p = 0.829$). There was no mortality. Median length of stay was: LAC=3.0 days; OC= 7.0 ($p = 0.0001$). Median direct cost per LAC was \$4396 versus \$6500 for OC ($p = 0.0013$). Bundled anesthesia and surgical costs were \$2438 for LAC and \$2612 for OC, while bundled post-operative care expenses (ICU, nursing, pharmacy, laboratory, radiology, and rehabilitation) were \$1315 for LAC and \$3010 for OC.

Conclusion: The results demonstrate the benefit of an experienced laparoscopic colorectal surgeon to an already established colorectal practice. LAC significantly reduced direct costs and resource utilization, with similar morbidity to OC. Hospital stay was also significantly reduced. Although surgical costs were similar, post-operative care costs were reduced yielding a significant overall net financial benefit to the institution.

Colorectal/Intestinal Surgery – P206

A CASE OF COLONIC INTUSSUSCEPTION RESULTING FROM LIPOMATOUS TUMOR TREATED BY LAPAROSCOPIC-ASSISTED SURGERY, Junya Oguma MD, Hikaru Tamura MD, Masahiko Aoki MD, Kei Hosoda MD, Hiromu Kido MD, Kingen Natsu MD, Tetsu Amemiya MD, Department of Surgery, Ohtawara Red Cross Hospital, JAPAN

INTRODUCTION: There is no report until now about a case of colonic intussusception resulting from lipomatous tumor treated by laparoscopic-assisted surgery.

CASE REPORT: A 46-year-old woman was admitted to our



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hospital complaining of prolapse of a tumor from the anus after evacuation and left lower abdominal pain. The tumor about 5 cm from the anus was reduced with my hand, and an abdominal computed tomography revealed intussusception in the sigmoid colon. A reduction of the intussusception was performed using a barium enema. After careful examination, we diagnosed this case as colonic intussusception resulting from a lipoma. We performed a segmental sigmoid colectomy assisted by laparoscopy. Pathological examination revealed an atypical lipomatous tumor growing from submucosal layer. The postoperative course was uneventful. **CONCLUSION:** Laparoscopic-assisted surgery is a preferable treatment for repeated colonic intussusception, such as this case.

Colorectal/Intestinal Surgery – P207

HAND-ASSISTED LAPAROSCOPIC RIGHT HEMICOLECTOMY OFFERS ADVANTAGES OVER OPEN RIGHT HEMICOLECTOMY AND STANDARD LAPAROSCOPIC HEMICOLECTOMY IN PATIENTS WITH COLONIC NEOPLASIA, Jason A Petrowski MD, Zachary Hollis BA, Christopher R Mantyh MD, Sandyha Lagoo MD, Kirk A Ludwig MD, Duke University Medical Center

Introduction: Randomized trials demonstrate that laparoscopic assisted colectomy for neoplasia offers short-term advantages over open colectomy while providing equivalent oncologic outcomes. However, operative times are significantly longer and adoption of laparoscopic techniques for colectomy have been hampered by a long learning curve. Hand-assisted laparoscopic colectomy is an alternative approach that may address these issues. This study compares the outcomes of patients with right sided colonic neoplasia undergoing hand-assisted laparoscopic right hemicolectomy (HAL) to those undergoing standard laparoscopic right hemicolectomy (LRC) and standard open right hemicolectomy (ORC).

Methods: A retrospective analysis was performed of 120 consecutive patients undergoing HAL (n=40), LRC (n=40), and ORC (n=40) for right-sided colonic neoplasia utilizing electronic chart review and a prospectively-maintained anesthesia database. Groups were compared by analysis of variance (ANOVA) and chi-square tests, where appropriate.

Results: The groups were well matched for age, BMI, previous laparotomies, and co-morbidities. Specimen review showed no between group differences in oncologic parameters (margin status and number of lymph nodes harvested). However, operative times were significantly lower in the HAL and ORC groups (108.4 ± 31.7 and 97.2 ± 37.8) compared to the LRC group (143.6 ± 41.8; p<0.05). In addition, there were no conversions to laparotomy in the HAL group (n=0) compared to four in the LRC group. There were fewer post-operative complications in the HAL and LRC groups (11% & 13%) compared to the ORC group (40%; p<0.05), and length of stay (LOS) in days was less in the HAL and LRC groups (4.7 ± 1.9; 5.1 ± 2.3) when compared to the ORC group (8.2; p<0.05).

Conclusion: Both LRC and HAL for neoplasia were associated with a lower complication rate and shorter length of stay than open right colectomy, while maintaining equivalent oncologic clearance as measured by margin length and lymph node harvest. The hand-assisted technique had advantages over the standard laparoscopic technique, however, with a lower conversion rate and shorter operative time and than standard laparoscopic resection, but with a similar LOS.

Colorectal/Intestinal Surgery – P208

PREVENTION OF STOMAL COMPLICATIONS, Madhav V Phadke MD, Lewis H Stocks MD, Yeshwant G Phadke MD, WakeMed, Raleigh. Affiliated with UNC Chapel Hill, NC

Abstract

INTRODUCTION Objectives: 1. Block the source (open lumen) of infection by leaving the ileostomy/colostomy stoma obstructed with staples. 2. Prevent infection responsible for complications. 3. Use well established principle of delayed-primary wound healing. 4. Observe the Nature. Does not like putting serosa against serosa when bowel is

everted. 5. Abolish effect of peristalsis on lumen of stoma to keep it concentric. 6. Reward of helping the Nature is an automatic "self-maturation" of stoma. This secret to keep stoma obstructed was discovered during an ileostomy in 1986 by serendipity.

METHODS & PROCEDURES Following its discovery during a Brooke Ileostomy, the procedure was used for both, Ileostomy and Colostomy. Staple obstructed stoma was brought out in a conical fashion to abolish effect of peristalsis on lumen. Stoma was fixed to a round opening in rectus sheath. Paracolic gutter was closed using cut edge of mesentery instead of bowel serosa to prevent mucosal prolapse. Stoma was covered using an appliance with a transparent pouch for daily inspection. During postoperative ileus, there is angiogenesis on surface of a single layer of serosa, making the stomal wound refractory to infection. After 72-96 hours post-op, stoma begins to bulge with peristalsis. Stoma was opened at its apex near the anti-mesenteric corner with electrocautery as a bedside procedure. Mucosal tube separates from serosal tube and only the mucosal cuff protrudes, everts, advances with peristalsis, and "autografts" on angiogenesis on surface of a single layer of serosa. Advancing margin of the mucosal cuff fuses with circumference of opening in dermis. The maturation of the stoma is natural and automatic. Absence of sutures reduce tissue trauma and eliminate foreign body reaction resulting in a better wound healing. This scientific procedure was named

?DELAYED-PRIMARY SELF-MATURATION? (DPSM).

RESULTS 37 colostomies and 9 ileostomies were performed using DPSM. Infection in the stomal and/or main wound and subsequent complications were prevented in all.

CONCLUSIONS

DPSM is technically easier, faster and more scientific than a conventional Ileostomy or Colostomy. It prevents infection which in turn prevents complications. It is recommended for all types of intestinal stomata when indicated.

Colorectal/Intestinal Surgery – P209

NECROSIS INTESTINAL IN A 14-MONTH-OLD INFANT WITH AN INTESTINAL OBSTRUCTION BY ASCARIS, Alexander Ramirez Valderrama MD, Hospital Francisco Valderrama, Turbo (Ant) - Colombia

The ascariasis is a very frequent intestinal parasitism, it is considered that affects around 1000 million people all over the world, being the children the most vulnerable, especially in the Third World Countries. Within the abdominal complications of the ascariasis we found the biliar obstruction, partial intestinal obstructions, being the main one the intestinal obstruction, which is accompanied by an important morbidity and mortality.

We presented the case of 14 - month - old girl infant with an intestinal obstruction by ascaris that required surgical treatment, it was found massive infestation of ascaris, with more than one hundred worms, ischemia at level of ileum distal and generalized intestinal peritonitis, handled with wide intestinal resection and peritoneal washing, presenting a good clinical evolution.



Colorectal/Intestinal Surgery – P210

BIOABSORBABLE GLYCOLIDE COPOLYMER STAPLE LINE REINFORCEMENT FOR LAPAROSCOPIC APPENDECTOMY, Alan A Saber MD, Michael Boros MD, Arun Rao MD, Michigan State University, Kalamazoo Center for Medical Studies



Introduction: Laparoscopic appendectomy is gaining acceptance as the preferred method for treatment of acute appendicitis. The aim of this study was to evaluate the efficacy and safety of the use of bioabsorbable glycolide copolymer (Bioabsorbable SeamGuard; W. L. Gore & Associates, Inc, Flagstaff, Ariz) for reinforcement of endoscopic linear stapler in laparoscopic appendectomy.

Material and Methods: Forty six patients with a clinical diagnosis of acute appendicitis underwent laparoscopic appendectomies using bioabsorbable glycolide copolymer sleeves applied onto 3.5 mm endoscopic linear stapler for simultaneous transection of appendicular base and mesoappendix. Demographic data, BMI, operative time, estimated blood loss, complications including staple line disruption, leak or bleeding, number of staple line reinforcements used and length of hospital stay were recorded.

Results: Thirty two females and 14 males were included in the study. The mean operative time was 47 minutes (range, 22-110 minutes). No conversion to open appendectomy was needed. Apart of 3 patients that had intraoperative oozing from mesoappendix staple line, there was no staple line bleeding, disruption, or leak. Thirty two patients (69.6 %) required single application of endoscopic linear staple with bioabsorbable reinforcements to transect both the appendix and the mesoappendix at the same time. Two applications were necessary in twelve patients while two patients required 3 applications. Thirty six patients (78.3%) were discharged 24 hours postoperatively.

Conclusion: Laparoscopic appendectomy using endoscopic linear stapler with bioabsorbable glycolide copolymer reinforcement is a safe and efficient procedure for acute appendicitis. This technique may simplify the operative procedure and reduce the operative time. In the majority of cases a single application of endoscopic linear staple with Seam Guard reinforcements is required to transect the appendix and the mesoappendix simultaneously.

Colorectal/Intestinal Surgery – P211

LAPAROSCOPIC COLON SURGERY: AN EIGHT YEAR EXPERIENCE, Arthur Rawlings MD, Danuta I Dynda MD, Melanie Sloffer MS, Jay Woodland MD, David L Crawford MD, University of Illinois College of Medicine at Peoria, Methodist Medical Center of Illinois

INTRODUCTION: Laparoscopic colon surgery (LCS) has grown in popularity since its first description in 1991. This study assesses the eight-year experience of one surgeon.

METHOD: A review on prospectively collected data on 113 consecutive patients that underwent LCS between January 1999 and August 2006. All procedures were performed by the same minimally-invasive surgical specialist at three hospitals (university and private). Demographic data, such as age, gender, and body mass index (BMI) was collected along with pre- and post-operative diagnosis, operative time, complications, conversions, and length of hospital stay. Relationships between collected variables and procedure were assessed.

RESULTS: The population consisted of 58 females and 55 males with mean age of 64 years (range: 24-94) and mean BMI of 27.9 (range: 17-45). The distribution of diagnosis was fairly even: 24% benign neoplasm, 35% malignant neoplasm, 26% diverticular disease, and 16% other pathologies. In the first 4 years, 44 LCS were performed. The second half had 69 cases with double the amount of patients with greater than 30 BMI and more attempts at complex cases like restorative proctocolectomy. Overall, 32 complications occurred including 6 wound infections, 6 anastomotic leaks, 5 abscesses, 4 respiratory difficulties, and 3 ileus. The conversion rate was 12% (13/113); 54% of these conversions were due to severe adhesions. Post-operative mortality was 2.7%.

CONCLUSION: During this eight-year period, case volume, complexity, and patient BMI have all increased. Complication and mortality rates are comparable to those reported in literature.

LCS Type	R colon (42%)	L colon (39%)	Other
OR time (mean)	135 minutes	199 minutes	226 minutes
LOS (mean)	5.3 days	6.0 days	6.8 days
Complication*	13/48 (27%)	12/46 (26%)	7/19 (37%)
Conversion	5/48 (10%)	7/46 (15%)	1/19 (5%)

Colorectal/Intestinal Surgery – P212

?PEEK PORT?: A NOVEL APPROACH TO AVOID CONVERSION UTILIZING HAND-ASSIST TECHNOLOGY, Javier

Salgado MD, Thomas E Read MD, David Ferraro MD, Richard Fortunato DO, Lea O'Keefe BS, James T McCormick DO, Robert P Akbari MD, Philip F Caushaj MD, Division of Colon and Rectal Surgery, Western Pennsylvania Hospital, Cincinal Campus of Temple University School of Medicine. Pittsburgh, PA, USA.

Purpose: To assess the efficacy of a method to avoid conversion to laparotomy in patients considered for laparoscopic colectomy. Patients deemed high risk for conversion had an 8cm midline incision (?peek port?) made with the laparoscopic equipment unopened. If intraperitoneal conditions were favorable, a hand-assist device was placed through this incision and the procedure performed laparoscopically; if unfavorable, the midline incision was extended. Patients deemed low risk for conversion were approached laparoscopically from the outset.

Methods: Data from a single surgeon's consecutive series of 189 patients brought to the operating room with the intention of proceeding with laparoscopic colectomy were retrieved from a prospective database, supplemented by chart review.

Results: Study population: 103 men and 86 women, mean age 62 years (17-94), mean BMI 28 (18-53). Operative procedures were right colectomy (n=85), left colectomy/restorative proctectomy (n=73), APR (n=6), subtotal/total colectomy/proctocolectomy (n=25). Of the 19 patients who underwent initial "peek port", 7(37%) underwent immediate extension to formal laparotomy. 12/19(63%) underwent hand-assisted laparoscopic colectomy, with one subsequent conversion to formal laparotomy secondary to severe diverticulitis with enterocolic fistula. Of the 170 patients initially approached laparoscopically, 87(51%) were attempted with standard laparoscopic techniques and 83(49%) with a hand-assisted technique. 4/170(2%) required conversion to laparotomy because of dense adhesions (n=1), enterocolic fistula (1), ureteral injury (1), morbid obesity (1). Overall, 5/182 patients (3%) in whom laparoscopic access was established by either method underwent conversion to laparotomy using this paradigm. In addition, we were able to preoperatively identify those patients at high risk for conversion to laparotomy (7/19 in the "peek port" group vs. 4/170 in those approached laparoscopically from the outset, p<0.0001, Chi square).

Conclusions: This approach to the patient with a potentially hostile abdomen allows for rapid assessment of intraperitoneal conditions that would preclude successful laparoscopic colectomy, and is associated with a low rate of conversion from laparoscopy to laparotomy. Adoption of this technique should reduce cost by avoiding the utilization of laparoscopic equipment in patients who will ultimately require formal laparotomy.

Colorectal/Intestinal Surgery – P213

ALVIMOPAN, A PERIPHERALLY ACTING MU-OPIOID RECEPTOR (PAM-OR) ANTAGONIST, SIGNIFICANTLY ACCELERATED GASTROINTESTINAL RECOVERY AND HOSPITAL DISCHARGE IN PATIENTS RECEIVING INTRAVENOUS PATIENT-CONTROLLED OPIOIDS AFTER SMALL BOWEL RESECTION (SBR), B. Wolff BA, H. Reynolds, Jr. BA, I. Lavery BA, W. Du PhD, L. Techner, Mayo Clinic, Case U, Clev Clinic Found, Adolor Corp

INTRO: Time to GI recovery and hospital discharge order (DCO) written were examined after sBR in trials of alv for the management of postoperative ileus.

METHODS: This was a pooled subset analysis of adult pts scheduled for postop IV opioid-based pt-controlled analgesia who underwent sBR in phase III trials. Pts received alv 12 mg or placebo (pla) preop then twice-daily postop until hos-



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pital discharge or for 7 PODs. Treatment effects were analyzed using the Cox proportional hazards model (HR) and Kaplan-Meier means (hours). Efficacy endpoints included GI-2 recovery (time to first BM & toleration of solid food), and DCO written. Nausea and vomiting (N/V) were reported as adverse-events.

RESULTS:Efficacy and safety results are presented in the table. CONC:Alv 12 mg significantly accelerated GI recovery and hospital discharge compared with pla in this subset analysis of phase III trials. Alv was well tolerated with a lower incidence of nausea and vomiting compared with pla. Moreover, this analysis is consistent with results from the larger population of all BRs in alv phase III trials.

	Pla n=50	Alv n=65	
GI-2, HR	—	2.5	p<0.001
GI-2, mean hrs	115.6	78.0	-37.6 (33%)
DCO, HR	—	2.0	p<0.001
DCO, mean hrs	131.7	98.0	-33.7 (26%)
N/V	57%/25%	44%/20%	—

Colorectal/Intestinal Surgery – P214

LAPAROSCOPIC PROCTOCOLECTOMY USING COMPLETE INTRACORPOREAL DISSECTION, Nicolas Rotholtz MD, Laura Aued MD, Sandra Lencinas MD, Gerardo Zanoni MD, Mariano Laporte MD, Norberto Mezzadri MD, Colorectal Surgery Section. General Surgery Department. Hospital Alemán de Buenos Aires. Argentina.

Introduction: Although many studies have demonstrated good results with laparoscopic proctocolectomy in patients with ulcerative colitis (UC), most surgical procedure require at least one additional incision bigger than 5 cm to complete the surgery. The aim of this study was to evaluate the use of laparoscopic proctocolectomy with ileoanal J pouch with complete intracorporeal dissection using 4 cm right lower quadrant (RLQ) incision.

Methods and Procedures: Data were prospectively collected on all patients with UC who required proctocolectomy with ileoanal J pouch between August 2003 and July 2006. The dissection was completely performed by laparoscopy using the medial to lateral approach for the colon and total mesorectal excision for the rectum. Once the rectum was resected laparoscopically, a 4 cm incision in the RLQ was performed to resect the specimen; either an end or loop ileostomy was then implanted at the RQL wound. The surgery was performed in two (proctocolectomy with ileoanal J pouch and loop ileostomy) or three steps (subtotal colectomy, end ileostomy with sigmoid fistula; proctectomy with ileoanal J pouch and loop ileostomy).

Results: 40 surgical procedures were performed in 28 patients. 57.2% were male and 42.8% female, with a mean age of 35.4±16.6 years. Mean body mass index was 21±4. 14 patients (50%) had surgery in two steps and the other 14 in three. In 4 (10%) cases, surgery was converted due to megacolon in one case, narrow pelvis in 1, and difficult rectal dissection in 2. The overall morbidity rate was 15%. Two patients required reoperation and there was no mortality. The mean operative time was 250±65.5 minutes; proctocolectomy: 298.2±63.5 minutes; subtotal colectomy: 205±45.7 minutes and proctectomy 249±49.5 minutes. The mean hospital stay was 4.9±1.9 days.

Conclusion: A complete laparoscopic proctocolectomy dissection is feasible and safe for surgical treatment of UC.

Colorectal/Intestinal Surgery – P215

IS HAND ASSISTED SURGERY FOR DIVERTICULITIS BETTER THAN OPEN OR STANDARD LAPAROSCOPIC SURGERY?, Dan Ruiz MD, Marat Khaikin MD, Guilherme Kapaz MD, Dana R Sands MD, Steven D Wexner MD, Juan J Noguera MD, Eric G Weiss MD, Cleveland Clinic Florida, Weston, FL

Introduction: Surgery for diverticulitis can be challenging even with an open procedure. In this study we compared hand assisted laparoscopic surgery (HALS) to laparoscopic (LS) and open surgery (OS) for recurrent diverticulitis.

Methods: Between July 2003 and January 2006, 20 cases of elective HALS for recurrent diverticulitis were matched by age, gender, ASA, BMI, type of surgery, and diagnosis to 20 patients who underwent LS and 20 who underwent OS. Data were evaluated and compared for age, diagnosis, procedure, operative time, estimated blood loss (EBL), resumption of liquid diet, postoperative hospital stay, and morbidity. Conversion was defined as any unplanned extension of the specimen extraction site or creation of a separate or longer incision for the purpose of tissue dissection.

Results: There were no statistical differences among the 3 groups regarding age, gender, BMI, and ASA. Compared with LS, HALS resulted in a significantly reduced operative time and blood loss. Compared with OS, shorter operative time, fewer complications and better clinical outcome were reached.

	HALS (n=20)	LS (n=20)	OS (n=20)
Op Time(min)	145.5(30-220)	189.1(148-270)	126.2(30-210)
Blood loss(ml)	75 (50-300)	125 (50-300)	225 (50-600)
LOS (d)	5.4 (2-13)	5.5 (3-15)	6.5 (2-12)
Liquid diet (d)	1.5 (1-9)	1.1 (1-3)	3.4 (2-8)
Morbidity (n)	2	6	10

P <= 0.05 for all parameters; LOS=length of stay

Conclusions: HALS is an applicable technique in all laparoscopic cases and leads to a lower operative time with no detriment to the advantages of the standard laparoscopic surgery.

Colorectal/Intestinal Surgery – P216

A COMPARISON OF ABDOMINAL CAVITY BACTERIAL CONTAMINATION IN LAPAROSCOPY AND LAPAROTOMY FOR COLORECTAL CANCER, Y Saida MD, Y Nakamura MD, J Nagao MD, T Enomoto MD, R Kanai MD, M Katagiri MD, S Kusachi MD, M Watanabe MD, Y Sumiyama MD, Third Department of Surgery, Toho University School of Medicine, Tokyo, Japan

Purpose: We compare intra-abdominal bacteria after lavage between laparotomy and laparoscopic surgery for the treatment of colorectal cancer.

Methods: Seventy-two patients with non-obstructive colorectal cancer, except those undergoing low anterior resection, abdomino-perineal resection, Hartmann's operation and total colectomy, were divided into two groups, laparotomy group (47 cases) and laparoscopic surgery group (25 cases). Cefotiam or Cefmetazole were administered to the patients just prior to surgery. At the beginning of the operation, just after laparotomy was made or trocars were inserted, 10ml saline was irrigated into the cul-de-sac and collected through a 10 F catheter. Just before closing the wound, 10ml saline was collected in the same way as initial lavage in both groups. The collected saline was used to determine the number of the surviving bacteria.

Results: At the beginning of both operations, no bacterial growth was observed. Bacteria were detected in the lavage fluid collected just before closing the wound in 23 of 47 cases (49%) in laparotomy group, and 7 of 25 cases (28%) in laparoscopic surgery group. The mean bacteria cell count after lavage was 4.6x10⁶ CFU/ml aerobic bacteria and 1.9x10³CFU/ml anaerobic bacteria in the laparotomy group, and 1.8x10⁴CFU/ml aerobic bacteria and 1.6x10² CFU/ml anaerobic bacteria in laparoscopic surgery group.

Conclusion: Laparoscopic colorectal surgery demonstrated a lower incidence of bacterial intra-abdominal contamination than laparotomy, indicating that laparoscopy is less invasive than laparotomy from a microbiological perspective.

Conclusion: Laparoscopic colorectal surgery demonstrated a lower incidence of bacterial intra-abdominal contamination than laparotomy, indicating that laparoscopy is less invasive than laparotomy from a microbiological perspective.

Colorectal/Intestinal Surgery – P217

CHEMOPREVENTION AFTER SURGERY FOR CROHN'S DISEASE: IS IT NEEDED?, Molly Sebastian MD, David Chang MPH, Howard Kaufman MD, Susan Gearhart MD, Johns Hopkins University, University of Southern California

Introduction: The benefits of postoperative chemoprevention in Crohn's disease (CD) remain controversial. Therefore, we sought to determine the risk of early recurrence in two



populations from differing time periods treated surgically for CD.

Methods: Records of patients undergoing surgery for CD between 1995-1997 and 2001-2003 were reviewed. Questionnaires were sent to obtain complete information. Data between groups were compared using Stata.

Results: 185 patients were identified; 109 from 1995-1997 and 76 from 2001-2003. Complete follow-up was obtained on 71%. Overall, mean age was 37 +/-14 yrs with a mean duration of disease of 11.5 +/-9 yrs, 58% were female, 23% had a history of smoking, and 13% had a family history of CD. 35% of patients were on preoperative medical therapy for CD and 44% were placed on therapy within one month of surgery. The most common CD type was stenotic (54%) and most common surgery was ileocecal (46%) and laparoscopic (29%) resection. The 2- year recurrence rate was 27% (n=35); 96% (n=33) was radiographically or endoscopically proven requiring a change in medical therapy and 4% (n=2) required surgery. On bivariate analysis, there was no difference between the groups with regards to recurrence rate, age, sex, smoking or family history, surgery type (site), disease type, or medication compliance. However, significantly more patients were on perioperative medication for CD in the latter time period (table). On multivariate analysis independent of age, sex, smoking or family history, surgery type, disease type, postoperative medication use was associated with an increased risk for early recurrence (OR 3.63, p= 0.013) while preoperative use trended towards a decreased risk for early recurrence (OR=0.39, p=0.081). **Conclusion:** Postoperative chemoprevention did not decrease the likelihood of early recurrence. Evaluation into the effect of postoperative chemoprevention on long term recurrence is needed.

	Perioperative Medical Therapy for CD		
	N of patients 1995-1997 (%)	N of patients 2001-2003 (%)	p value
Preoperative Medications			
Azethioprine/6-MP	20 (18)	25 (33)	0.023
Remicade	0	8 (10.5)	0.001
Overall	29 (26.6)	35 (46)	0.006
Postoperative Medications			
Azethioprine/6-MP	28 (24)	31 (40.8)	0.014
Remicade	12 (11)	12 (15.8)	0.341
Overall	39 (35.8)	43 (56.6)	0.005

Colorectal/Intestinal Surgery – P218

LAPAROSCOPIC RIGHT COLON RESECTION IN THE LEARNING CURVE, C Sheridan MD, R J Metz, Jr., D Selzer MD, Indiana University School of Medicine, Indianapolis, Indiana, U.S.A.

Introduction: Lap-assisted right hemicolectomy (LARH) is considered an appropriate procedure for surgeons within the learning curve. Evidence supports a minimum number of resections for benign disease before embarking on oncologic procedures. Although endoscopically unresectable polyps are a common indication for LARH, recent literature cautions against approaching these as “learning” cases due to significant risk of occult malignancy. We propose that for the surgeon in the learning curve, LARH for neoplastic disease can be done as safely as for benign disease provided a standard oncologic approach is used.

Methods: The first 58 laparoscopic colectomies performed by a single surgeon at an academic center were retrospectively reviewed. Demographic data, operative details, pathology, hospital stay, and complications were collected. 34 were right sided resections (28 LARH, 2 extended LARH, 4 lap ileocectomy). 23 LARH were performed for neoplastic disease (e.g. polyps or cancer), all as oncologic resections. Outcomes of resections for benign disease (e.g. inflammatory bowel disease) were compared to resections for neoplastic disease. In addition, outcomes of resections for cancer were compared to resections for preoperatively presumed benign polyps.

Results: The 23 LARHs performed for neoplasms included 15 adenomatous polyps and 8 adenocarcinomas. 11 right colon resections were for benign disease. Statistical analysis with independent sample t-test showed no difference between resections for benign vs. neoplastic disease based

on operative time (OT) (229 vs. 245 min, p=.494) or EBL (108 vs. 71 ml, p=.181). However, there were fewer complications in the neoplastic vs. benign group (2 vs. 5, p=.012).

Similarly, there was no statistically significant difference between LARH for polyps vs. adenocarcinoma based on OT (250 vs. 236, p=.643), EBL (77 vs. 61 ml, p=.597), complications (1 each, p=.654), lymph nodes (14.5 vs. 17.6, p=.481), or margins (6.6 vs. 7.6 cm, p=.339). Finally, 4 of 15 (27%) polyps proved to have adenocarcinoma on final pathology. **Conclusion:** Due to our observed high rate of malignancy, oncologic principles should always be followed in resection of neoplastic disease. Given this approach, LARH can be performed for polyp disease as safely as for benign disease and can still be considered a safe “learning” case for surgeons.

Colorectal/Intestinal Surgery – P219

LAPAROSCOPIC-ASSISTED ENDOSCOPIC REMOVAL OF A COLONIC MASS, Andrea Silver MD, Ranjan Sudan, Karl M Francis, Creighton University Medical Center

Introduction: Endoscopic removal of large polyps or broad-based colonic masses can be technically challenging and carry a risk of perforation. Simultaneous laparoscopy may allow endoscopic resection avoiding laparotomy.

Methods: During screening colonoscopy a benign-appearing lesion was identified in the sigmoid colon 30 cm from the anal verge. It was broad-based leading to concern about perforation with endoscopic resection. Laparoscopic mobilization of the sigmoid colon was performed to aid in snaring the lesion, the proximal colon was occluded, and the lesion was resected piecemeal with a hot snare. The peritoneal surface of the colon was directly inspected with the laparoscope and tested for leaks.

Results: The lesion was successfully resected in a piecemeal fashion. The serosal surface of the colon appeared healthy with no evidence for air extravasation when immersed in water and insufflated.

Conclusions: Laparoscopy can assist in endoscopic removal of large colonic lesions. The bowel can be mobilized to aid in snare positioning, atraumatic occlusion of proximal bowel minimizes cecal distention, and the colonic wall can be directly visualized and tested for leakage of air. This provides a safe, effective alternative to laparotomy and colectomy. With the advent of better instrumentation for natural orifice transluminal endoscopic surgery (NOTES) this type of resection may be able to be completed safely endoscopically.

Colorectal/Intestinal Surgery – P220

CAN COMMUNITY SURGEONS PERFORM LAPAROSCOPIC COLO-RECTAL SURGERY WITH OUTCOMES EQUIVALENT TO TERTIARY CARE CENTERS?, Ravinder Singh MD, Alex Omiccioli, Susan G Hegge MD, Craig A McKinley MD, The Centre for Minimal Access Surgery (CMAS-McMaster University and CMASnorth-North Bay District Hospital)

Introduction: Laparoscopic Colo-rectal Surgery (LCS) performed in tertiary care centers has been well studied in the literature. It has been shown to provide improved short term outcomes and comparable long term outcomes to the conventional open approach. However, LCS performed in a community hospital setting has not been well studied. In a previous paper, we presented the short term outcomes of 100 LCS performed by two community surgeons. In this follow-up study, we present both short and longer term outcomes for 239 patients who underwent LCS by the same two community surgeons.

Methods: This is a prospective study of 239 patients who underwent a LCS at the North Bay District Hospital (a 200 bed community hospital located 350 km away from the nearest tertiary care center). All cases were performed by two community surgeons with no formal training in LCS who transitioned themselves from an open to a laparoscopic approach.

Results: Between October 2000 and May 2006, 239 consecutive patients (126 women and 113 men, mean age of 64.3 + 13.8 years) underwent LCS for benign (N=123) and malignant (N=116) disease. Median operating time was 215.0 min-



SAGES POSTER ABSTRACTS

utes (15.0 to 475.0) and the conversion rate was 7.5%. The intra-operative complication rate was 2.1%. There were 18 (7.5%) major post-operative complications and 35 (14.6%) minor post-operative complications. There was no intra-operative mortality, and six 30-day mortalities occurred secondary to ischemic bowel, stroke, 3 myocardial infarctions, and pneumonia. The median length of stay was 4.0 days (2.0 to 55.0). Twenty-nine patients underwent LCS for stage I Colorectal Cancer (CRC) with a mean follow-up of 20.9 months, and all (100%) patients remained disease free. Thirty-nine patients underwent LCS for stage II CRC with a mean follow-up of 17.2 months, and 37 (94.9%) patients remained disease free. Twenty-three patients underwent LCS for stage III CRC with a mean follow-up of 16.2 months, and 14 (60.9%) patients remained disease free. Finally, mean survival for the 13 patients who underwent LCS for stage IV CRC was 16.8 months. The mean number of resected lymph nodes was 11.2 ± 8.3 .

Conclusion: We note that both our short and longer term outcomes are similar to tertiary care centers. We therefore conclude that LCS can be performed in a community hospital setting with both short and longer term outcomes equivalent to tertiary care centers.

Colorectal/Intestinal Surgery – P221

LAPAROSCOPIC COLORECTAL SURGERY FOR STAGE IV ENDOMETRIOSIS, Angela J Skull MD, Henry M Dowson MD, Timothy A Rockall MS, Minimal Access Therapy Training Unit, Royal Surrey County Hospital, Guildford, UK

Introduction and Objective: Endometriosis is a debilitating condition of young women, causing pain and infertility. When severe it may involve the recto-vaginal pouch with nodular infiltration of the rectum and obliteration of tissue planes. Laparoscopic surgery offers an acceptable treatment and is increasingly being undertaken for those with severe disease. The aim of this study is to examine the short-term surgical results of laparoscopic excision of deep pelvic endometriosis with rectal involvement.

Methods: A prospective database (SPSS) was established for all patients undergoing laparoscopic excision of recto-vaginal endometriosis. Outcomes analysed include operation performed, operating time, conversion and complication rates, and length of hospital stay.

Results: There were 50 patients with a median age of 34 years (IQR 32-41). 50% of patients had a rectal wall shave, 18% had a disc excision of the rectal wall with primary closure, and 32% had an anterior resection. The median duration of surgery was 150 (140-210) minutes, and there was a conversion rate of 6%. 12% had a complication including 2 ureteric injuries that were recognised at the time of surgery and repaired primarily, and 1 pelvic abscess treated radiologically. There were no anastomotic leaks, and the median post-operative stay was 3 days (2.5-6).

Conclusion: Laparoscopic excision of severe pelvic endometriosis with rectal involvement is challenging, but feasible with low morbidity and short hospital stay. Ureteric involvement is common and pre-operative stenting is often helpful.

Colorectal/Intestinal Surgery – P222

LAPAROSCOPIC SURGERY FOR COLORECTAL CANCER- 150 CONSECUTIVE CASES, Henry M Dowson MD, Angela J Skull MD, Andrew Huang MD, Timothy A Rockall MS, Minimal Access Therapy Training Unit, Royal Surrey County Hospital, Guildford, Surrey, UK

Introduction: In the United Kingdom, the National Institute of Clinical Excellence (NICE) guidance, has recommended laparoscopic resection as an alternative to open surgery for patients with colorectal cancer; however it is still performed in less than 5% of cases. We present the short term outcomes of a consecutive cohort of patients who have been treated laparoscopically.

Methods: All patients who electively present to our unit and are suitable for surgery are entered into a prospective database. Data collected includes patient demographics, type and length of operation, complications, postoperative stay, and pathological details including nodal harvest.

Results: 150 patients are included, 51% female, median age 72 years. Operations performed include Anterior resection 36%, right hemicolectomy 40%, left sided resection 9%, APR 5%. 93% of patients had a laparoscopic procedure, 7% required conversion, and 7% were excluded from laparoscopy due to morbid obesity or tumour size. The complication rate was 8.6%, including 2 leaks (2% of 126 anastomoses), and 3 wound infections. 9 patients were readmitted. 21% of tumours were Dukes A, 31% Dukes B and 40% Dukes C. There were no positive resection margins and the median number of nodes harvested was 22 (IQR 16-30). The median post operative stay was 4 days.

Conclusion: This consecutive series of 150 patients demonstrates that colorectal cancer can be treated successfully laparoscopically. Clear histological margins and adequate lymph node yield confirm an oncologically sound resection can be performed, with low morbidity and mortality.

Colorectal/Intestinal Surgery – P223

QUALITY OF LIFE FOLLOWING LAPAROSCOPIC AND OPEN COLORECTAL SURGERY, Henry M Dowson MD, Angela J Skull MD, Karen Ballard PhD, Timothy A Rockall MS, Minimal Access Therapy Training Unit, Royal Surrey County Hospital, Guildford, UK

Introduction: Laparoscopic surgery is increasingly being used for colorectal procedures. However, studies comparing laparoscopic and open colorectal surgery, have thus far failed to show significant differences between the 2 techniques with regards to the quality of life (QoL) of patients during their recovery.

Methods: 200 patients are being prospectively recruited into a trial comparing the outcomes between laparoscopic and open colorectal surgery. QoL is being assessed using the validated EQ5D (on alternate days) and SF36-acute (weekly) questionnaires, during the first 6 post-operative weeks. We present interim results on QoL differences between the 2 groups.

Results: 50 patients (58% female, median age 68) have thus far completed the trial, of whom 55% had cancer. EQ5D scores are higher (representing better health) in the laparoscopic group at all times, although these results have not yet reached statistical significance (day 14 $p=0.097$, day 28 $p=0.074$). SF36 shows an advantage for laparoscopic surgery at 1 week and 4 weeks post-operatively, mainly as a result of differences in physical functioning (physical dimension difference at day 28, $p=0.056$). However at 2 weeks post-operatively, QoL as measured by SF36, was similar in both the groups.

Conclusion: With a limited sample size at this stage, preliminary results from this large study demonstrate a strong trend in favour of laparoscopy, with regards to quality of life following laparoscopic and open colorectal surgery.

Colorectal/Intestinal Surgery – P224

OUTCOMES ANALYSIS OF LAPAROSCOPIC RESECTION FOR ISOLATED PATHOLOGY OF THE SMALL INTESTINE, Jennifer A Spittle, Richard A Pierce MD, Valerie J Halpin, Christopher Eagon MD, William J Hawkins, Michael Brunt MD, Margaret M Frisella, Brent D Matthews, Department of Surgery, Washington University, St. Louis, Missouri

Introduction: The purpose of this study is to evaluate peri-operative clinical outcomes and pathology in patients undergoing laparoscopic resection for tumors and pathology isolated to the small intestine.

Methods: The medical records of all patients >18 years undergoing laparoscopic segmental small intestine resection from 5/97-8/06 were reviewed. Patients with inflammatory bowel disease or those undergoing laparoscopic ileocollectomy were excluded. Data are given as mean \pm SD. Statistical significance ($p<0.05$) was determined using two-tailed t-test and Fisher's exact test.

Results: Laparoscopic segmental small intestine resection was performed in 39 patients (M:F; 23:16) with a mean age of 49 years \pm 15.5. The most common presentation was a SBO ($n=14$), an UGI bleed/anemia ($n=10$) and/or abdominal pain ($n=7$). There were no conversions to open. An intracor-



poreal anastomosis was performed in 22 patients and extracorporeal anastomosis in 17 patients. Mean operative time was 104 ± 39 minutes and mean EBL was $46 \text{ ml} \pm 40 \text{ ml}$. There were no intraoperative complications. Final pathology was a Meckel's diverticulum (n=6), GIST (n=5), carcinoid tumor (n=4), diverticulum (n=4), post-transplant lymphoproliferative disorder (PTLD)/lymphoma (n=4), misc benign tumors (n=4), adenocarcinoma/polyp (n=3), ulcer/stricture (n=3), no abnormality (n=2), leiomyosarcoma (n=1), metastatic lung cancer (n=1), metastatic melanoma (n=1), and enteritis (n=1). Nine patients experienced postoperative complications (Grade I, n=4; Grade IIa, n=2, Grade IIb, n=2, Grade IV, n=1) including an anastomotic leak (n=1) requiring exploratory laparotomy, GI bleed (n=1) requiring 3 unit PRBC transfusion and SBO (n=1) requiring re-exploration and adhesiolysis. There was one death due to respiratory failure. The mean postoperative LOS was $5.0 \text{ days} \pm 2.8$. In long-term follow-up, one patient (PTLD) developed an anastomotic recurrence necessitating open small intestine resection. In comparing laparoscopic intracorporeal and extracorporeal anastomosis, there was no significant difference ($p > 0.05$) in mean EBL, OR time, perioperative complication rate or LOS.

Conclusions: Laparoscopic segmental small bowel resection utilizing either intracorporeal or extracorporeal anastomotic techniques is an effective strategy for a variety of tumors and pathology isolated to the small intestine. Further studies are needed to compare outcomes to patients undergoing open resection for similar pathology.

Colorectal/Intestinal Surgery – P225

MANAGEMENT OF OBSTRUCTIVE COLORECTAL CANCER WITH ENDOSCOPIC STENTING FOLLOWED BY SINGLE STAGE SURGERY: OPEN OR LAPAROSCOPIC RESECTION?, Francesco Stipa PhD, Andrea Cimitan MD, Giuseppe Villotti MD, Alessio Pigazzi PhD, Antonio Burza MD, Mario A Vitale MD, Departments of Surgery and Gastroenterology, San Giovanni Hospital, Rome, Italy

Background. About a third of patients with colorectal carcinoma have acute colonic obstruction requiring emergency surgery. Current surgical options are: intraoperative lavage and resection of the colonic segment involved with primary anastomosis; resection of the colonic segment involved with end colostomy (Hartmann's procedure), subtotal colectomy with primary anastomosis; colostomy followed by resection. All these procedures present risks and a poor quality of life. Endoscopic stenting of malignant colonic obstructions provides instant relief of symptoms and allows optimal bowel preparation, tumor staging and elective resection. This study was designed to compare open and laparoscopic resections following emergency colorectal stenting.

Methods. During a 3 years period, 31 patients with obstructing colorectal cancer underwent endoscopic colonic decompression with self expanding metallic stents (Precision, Boston Scientific, USA). Fifteen patients were treated with open resection, and 6 underwent a laparoscopic resection. The remaining 9 were managed with endoscopic palliation and adjuvant therapy.

Results. Hospital mortality was 3% (1 patient in the palliation group who died of respiratory complications). Mean time interval between stenting and surgery was 11 days (range 1-21). All lesions were located in the left colon. Mean hospital stay was 13 days in the open surgery group, and 7 days in the laparoscopic group ($P=0.003$). Follow up was completed in 96% of patients. Median follow up was 14 months. Seventeen patients were treated with postoperative chemotherapy. All patients in the palliative group died of disease with a median survival of 3 months. Of the 22 surgically treated patients 82% are alive. The remaining 4 patients died with diffuse metastases.

Conclusion. Following successful endoscopic stenting of malignant colorectal obstruction, elective surgical resection can be performed safely. The presence of the endoluminal stent does not prevent a laparoscopic approach. The combined endoscopic and laparoscopic procedures are a less invasive alternative to the multi-stage open operations and offer a faster recovery.

Colorectal/Intestinal Surgery – P226

IS LADG TRULY MINIMALLY INVASIVE?-SINGLE BLIND RANDOMIZED TRIAL, S Takiguch MD, Y Doki MPA, Y Fujiwara, K Okada MD, M Yamazaki MD, H Miyata MD, K Nakajima MD, T Nishida MD, M Sekimoto MD, M Monden, Osaka University Graduate School of Medicine Dept. of Surgery

LADG has been generally considered to be superior to open distal gastrectomy about post operative QOL. On the contrary there may be small difference about post operative pain between them because of pain control technique included epidural anesthesia. There was small number of evidence about this point. In this paper we report the results of our randomized single blind study in LADG vs. open DG. **Method:** 40 patients of gastric cancer (Stage IA and IB) were registered in this randomized study. To investigate the difference of post operative recovery, post operative QOL was objectively evaluated by Active Tracer that was 24 hour action (the rate of acceleration) recorder. Questionnaire and VAS scale related to post operative pain was also investigated. For strict evaluation, patients in this study were not noticed method of operation in either way until post operative 7 days. Result: As to the post operative recovery, LADG was significantly superior to open surgery for 4 days. However, there was no difference after then. Conclusion: LADG offer a good early postoperative recovery.

Colorectal/Intestinal Surgery – P227

TOTALLY LAPAROSCOPIC RIGHT COLECTOMY: DESCRIPTION OF TECHNIQUE AND REVIEW OF OUR FIRST FIVE PATIENTS., Janos Taller MD, Gordon Wisbach MD, Jay Grove MD, Department of Surgery, Naval Medical Center, San Diego

Most case series on laparoscopic right colectomy reported describe a "lap-assisted" technique requiring exteriorization of the colon for resection or anastomosis, usually through a small midline or RUQ incision. To confer the maximum benefit, we believe that all facets of this operation should be done intracorporeally. Specimen removal is accomplished through a modified Pfannenstiel incision increasing recovery and cosmetic benefits. We present our technique of totally laparoscopic right colectomy (TLRC) and review our first five patients.

All patients referred to our MIS service were considered for laparoscopic surgery. No exclusions were given for age, disease process or previous abdominal surgery. Patients were positioned supine with arms extended. Peritoneal access was gained with Hasson technique via an infraumbilical incision. Three 10mm & two 5mm ports were used. Dissection was undertaken using a medial to lateral approach. After division of the distal ileum, the right colon mesentery was bluntly freed from the retroperitoneum. The mesentery was divided, including the ileocolic artery, up through the right branch of the middle colic artery using an Enseal? device. The omentum was freed off of the right transverse colon medially to the mesenteric division and the colon divided with an endoscopic stapler. The lateral peritoneal attachments were divided by cautery. An ileocolic anastomosis was completed by endoscopic stapling of the distal ileum and transverse colon opposed in bayonet fashion. The mesenteric defect was sewn closed. The specimen was removed in a large endobag via the suprapubic trocar site enlarged as a Pfannenstiel incision.

From Dec 2005 to May 2006, 5 patients underwent TLRC. Indications were varied: symptomatic Crohn's Dz (1), large adenomatous polyps (2), and adenocarcinoma (2). Pertinent perioperative averages were: age 59.8 years, OR time 181 minutes, EBL 75 mls, liquid diet at POD#1, regular diet at POD#3, LOS - 3 days. There were no complications. At the 2 week post-op visit, all patients resumed normal activity. The maximum benefit of laparoscopic surgery is realized when there is minimal disturbance to the peritoneal surface and abdominal contents. Our technique demonstrates that true TLRC can be performed safely across a wide age spectrum & variety of disease processes. Further prospective studies are needed to confirm these results in a larger series of patients and compare them against the established literature.



Colorectal/Intestinal Surgery – P228

CLINICAL, ANATOMIC AND PATHOLOGIC PREDICTIVE FACTORS FOR IMMEDIATE SURGICAL OUTCOME AFTER LAPAROSCOPIC APPROACH TO THE RECTUM, EM

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Laparoscopic approach has been widely accepted for colon resection, but some controversies exist about its definitive role in case of rectal tumors in spite of optimistic reports. Factors that may impact immediate outcome are of anatomic and pathological nature due to the size and volume of the tumor and prostate, as well as the dimensions of the pelvis that may impair deep pelvic dissection. The aim of this study has been to evaluate the predictive value of pathological and anatomic factors on immediate outcome after laparoscopic rectal resection. Material and methods. We included in the study a prospective series of 54 patients submitted to laparoscopic rectal resection for rectal tumors, in which a preoperative CT was performed. 3D reconstruction of the pelvis was performed, and tumor and prostate volume and diameters were calculated, as well as main pelvic diameters (Ant Post (promontorium and sacrum), Lat-lat) (3D Doctor software package). Age, sex, BMI, type of procedure (anterior resection (AR), low anterior resection (LAR), abdominoperineal, (APR)) were also recorded. Dependent variables were operative time, conversion, postop complications and stay. Univariate and multivariate analysis were performed (SPSS package). Results. This series included 33 m and 20 f, of 70y (38-87), Surgical procedures: 9 AR, 28 LAR and 16 APR, Conversion 8/53 (15%), op time: 172 (90-360), Morbidity: 31%, Stay: 9 (6-43). Multivariate analysis showed that factors predictive for conversion were the crano-caudal tumor length as well as the promontorium-pubic axis. Predictors of postop morbidity were: BMI and sacro pubic axis; For operative time were sex, sacro-pubic axis and LAR. Conclusion: Local anatomy directly affects surgical outcome in laparoscopic approach to the rectum. Sex, BMI, ant-post pelvic diameters and tumoral length are independent predictors on conversion and op. time. This data should be taken in account when planning this kind of procedures

Colorectal/Intestinal Surgery – P229

LAPAROSCOPIC EXTRA-PERITONEAL REPAIR OF INGUINAL HERNIA COMBINED WITH ELECTIVE RESECTION OF SIGMOID COLON, Michael B Tempel MD, Vafa Shayani MD, Sharfi Sarker MD, Loyola University Medical Center

Previous studies have demonstrated the safety of utilizing synthetic mesh for repair of abdominal wall hernias during clean-contaminated procedures involving the intestinal tract. Hereafter, we report an unusual complication encountered during a combined laparoscopic inguinal hernia repair via the totally extra-peritoneal approach (TEP) and elective resection of sigmoid colon for treatment of chronic diverticulitis. The patient is a 39 year-old male with multiple episodes of diverticulitis over a 12-month period. On physical examination, he was noted to have a left inguinal hernia. The patient underwent a combined operative procedure which started with laparoscopic TEP repair of his left inguinal hernia using polypropylene mesh. Upon completion of the hernia repair, additional trocars were inserted through the full thickness of the abdominal wall for the purpose of the sigmoid colectomy. The posterior dissection of the peritoneum resulted in a difficult insertion of the suprapubic trocar, ultimately leading to a through and through bladder injury which was recognized and repaired at the conclusion of the procedure. Repair of the bladder injury did result in exposure of the polypropylene mesh to outside elements; however, the patient did not suffer any infectious complications involving the mesh. Based on this experience, we believe that while combining a synthetic mesh repair of a hernia with intestinal surgery is acceptable, the initial extra-peritoneal approach to an inguinal hernia may result in anatomic alterations that would lead to subsequent morbidity, including possible mesh complications.

Colorectal/Intestinal Surgery – P230

FUNCTIONAL OUTCOME OF LAPAROSCOPIC MESH SACROCOLPORECTOPEXY FOR COMBINED RECTAL AND VAGINAL PROLAPSE, Dinesh K Thekkinkattil MD, Mike Lim MD, Simon Gonsalves MD, C Landon MD, Peter M Sagar MD, Leeds General Infirmary, Leeds United Kingdom

Aim: To evaluate the functional outcome and feasibility of laparoscopic mesh sacrocolporectomy for patients with combined vaginal and rectal prolapse.

Methods: Suitable patients from October 2004 to June 2006 with combined vaginal and rectal prolapse underwent a novel procedure, with repair of both conditions using a single piece of mesh laparoscopically. Patient demographics, operative time and in-patient stay in the laparoscopic group was compared with a previously reported group of 29 patients who had excellent functional outcome from open mesh sacrocolporectomy surgery. The Cleveland Clinic Short Form-20 Pelvic Floor Distress Inventory (PFDI) questionnaire with Urinary Distress Inventory (UDI), Pelvic Organ Prolapse Distress Inventory (POPDI) and Colorectal-anal Distress Inventory (CRADI) sub-scales was completed by patients pre-operatively and at 3 months post-operatively. The PFDI is a validated questionnaire that assesses both global and individual pelvic floor function, according to compartments. Higher score signifies greater symptoms and distress.

Results: There were 6 patients. Median period of follow up was 8 (IQR 5-15) months. Patients in the laparoscopic group were significantly younger (47 (IQR 42-52) vs. 66 (IQR 59-73) years). Duration of operation was similar in the laparoscopic group compared with the open group (95 (IQR 89 - 116.2) vs. 82 (74 - 105) minutes, p-value 0.432). However, in-patient stay was significantly shorter in the laparoscopic group compared with the open group (3 (4-5) vs. 5 (4-7) days, p-value 0.018)

Global and subscale PFDI scores were significantly lower post-operatively compared with pre-operatively in laparoscopic patients.

PFDI & subscales, Prpeop score(range), Post op score(range), p-value

PFDI,(global,0-300), 128.1 (99.1 - 163.3), 32.8 (10.9 - 44.5), 0.028*

UDI (anterior, 0 - 100),39.6 (29.1 - 46.9), 2.1 (0.0 - 13.5), 0.028*

POPDI(middle, 0 - 100),27.1 (14.5 - 55.2), 4.2 (0.0 - 12.8), 0.042*

CRADI(posterior,0 - 100),60.9 (48.4 - 78.9), 18.3 (10.9 - 24.2), 0.028*

* Wilcoxon's test; p-value of < 0.05 is considered significant.

Conclusion: Selected patients with concurrent vaginal and rectal prolapse have significant improvement of symptoms after laparoscopic mesh sacrocolporectomy. Duration of operation between 2 groups is comparable whilst the inpatient stay is significantly shorter in laparoscopic group.

Colorectal/Intestinal Surgery – P231

LAPAROSCOPIC SURGERY IN CROHN'S DISEASE: MANAGEMENT OF BOWEL FISTULAS., Mari Tsubamoto MD, Hitoshi Inagaki MD, Tadashi Yokoyama MD, Tsuyoshi Kurokawa MD, Yasuhisa Yokoyama MD, Toshiaki Nonami MD, Department of Surgery, Aichi Medical University, Aichi, Japan.

Laparoscopic surgery has been applied to the management of Crohn's disease, with shorter recovery periods than reported for open surgery. We performed laparoscopic surgery for six patients with Crohn's disease from Jan. 2005 to July 2006. Three of these patients had fistulas. A 37-year-old man and 35-year-old man had ileo-rectal fistula and stenosis of the ileum. We performed a fistulectomy and partial ileectomy. A 20-year-old man had ileo-vesical fistula and stenosis of the ascending colon. We performed a fistulectomy and right hemicolectomy. The mean operative time was 141 min, and the mean blood loss was 122 g. None required conversion. There were no operative complications. Postoperative complications were two surgical site infections.

Conclusions: Laparoscopic management of enteric fistulas is



safe and effective. Laparoscopic surgery is feasible for selected patients with Crohn's disease even with fistula.

Colorectal/Intestinal Surgery – P232

LYMPH NODE DISSECTION USING THE ELECTROTHERMAL BIPOLAR SEALER (LIGASURE V) IN THE LAPAROSCOPIC SURGERY FOR COLON CANCER, Fumihito Uchikoshi MD, Shigeyuki Ueshima MD, Shin Mizutani MD, Katsuhide Yoshidome MD, Tsukasa Oyama MD, Masayuki Tori MD, Yuko Yamagami MD, Kazuya Hiraoka MD, Hidekazu Takahashi MD, Yu Yamada MD, Ryou Tunashima MD, Chie Irikawa MD, Masaaki Nakahara MD, Department of Surgery, Osaka Police Hospital

[Background] D3 lymph node dissection at the root of inferior mesenteric artery, division of superior rectal artery, total mesenteric excision (TME) procedure and division of distal mesorectum determine the quality of operation in the laparoscopic surgery for left side colon cancer. These procedures directly influence long-term result as well as postoperative motility. We previously used harmonic scalpel in these procedures. In this study, we applied the electrothermal bipolar sealer (LigaSure V, Valleylab, Boulder, CO), and evaluated the efficacy of this device.

[Operative procedure] We always operate using 4 ports including camera port under the view of flexible laparoscope. All procedures, namely D3 lymph node dissection, division of vessels, TME procedure and division of distal mesorectum were performed by LigaSure V.

[Results] In consecutive 50 cases from January 2006, no case encountered intra operative complication and converted to open surgery. Operative time was shortened because there was no disturbance by the mist. However, it was difficult a little to dissect mesorectum at the bottom of the pelvis because the tip of LigaSure V had no angle.

[Conclusion] This device is useful and feasible in the laparoscopic surgery for colon cancer.

Colorectal/Intestinal Surgery – P233

TRANSANAL ENDOSCOPIC MICROSURGERY FOR RECTAL TUMORS. THE ST MARY'S EXPERIENCE., Emmanouil Zacharakis, Paul Ziprin MD, Simon Freilich, Paraskeva Paraskeva PhD, Ara Darzi PhD, Academic Surgical Unit, St Mary's Hospital, London, UK.

Introduction: Local excision of rectal tumors is indicated in patients with benign lesions and those with carcinomas who are unfit for radical surgery. However, the traditional transanal approach is often cumbersome allowing access to distal tumors only and associated with higher incomplete excision and local recurrence rates. Transanal endoscopic microsurgery (TEM) has emerged as it permits more precise surgery, allowing access to mid and upper rectal tumors with lower local recurrence rates. The aim of this study is to describe a single Institution's experience in the use of TEM in both benign and malignant disease.

Methods: Between 1996 and 2005, TEM was performed in 76 patients for rectal tumors. The mean age of the patients was 66.3 (37-91) years. All patients underwent preoperative endoscopic biopsy and radiological staging by MRI and/or endoscopic ultrasound. The histological diagnosis was benign adenoma in 48 and adenocarcinoma in the remaining 28 patients. The mean distance (\pm SD) of the tumor from the anal verge was 10.9 \pm 3cm and the mean size of the tumor was 3.4 \pm 1.5cm. The mean follow-up was 37 (9-96) months.

Results: The mean operating time was 80.6 (38-180) min. In 2 cases (2.6%) the procedure was converted to low anterior resection. Clear resection margins were achieved in 71 out of 74 patients (95.9%), while the mean resection margin was 4.6 \pm 3mm. The histological grading of malignant tumors was T1 in 14, T2 in 11 and T3 in 3 patients. The mortality among the patients of our study was 0%. The overall morbidity was 18.4% as 14 patients developed minor or major complications. Intraoperative perforation of the rectum occurred in 4 patients and was treated by conversion to anterior resection in two of them and loop stoma formation in the remaining two. Complications also consisted of urinary retention in 6,

bleeding in 5, transient incontinence in 2 and pyrexia in 2 patients. The mean hospital stay was 3.2 (1-51) days. During the follow up, benign tumor recurrence was detected in 3 patients (6.2%). The recurrence rates among patients with T1 and T2 malignant tumors were 0% and 45.5% respectively. **Conclusions:** TEM is a safe and feasible technique with low incomplete excision rates and should be the preferred method in patients with benign tumors of mid and upper rectum. Its role in the management of malignant rectal tumors should be limited to T1 tumors as it is accompanied by high recurrence rates when used for more invasive lesions.

Colorectal/Intestinal Surgery – P234

LAPAROSCOPIC HARTMANN'S PROCEDURE: A VIABLE OPTION IN TREATING ACUTELY PERFORATED DIVERTICULITIS., Raza M Zaidi MD, Eugene Rubach MD, George DeNoto MD, North Shore University Hospital, North Shore-LIJ Health System

Introduction: A laparoscopic technique for acutely perforated diverticulitis (i.e. Laparoscopic Hartmann's procedure) has not been described. We present our technique for laparoscopic sigmoid resection, end colostomy, and subsequent laparoscopic takedown of colostomy.

Methods: A retrospective review of patients with Hinchey III/IV diverticulitis who underwent a laparoscopic Hartmann's procedure were included in this study. Laparoscopic takedown of sigmoid colostomy was performed 2 - 3 months later. Data from these procedures including estimated blood loss (EBL), length of operative procedure, patient outcomes, and demographics are evaluated.

Results: Three patients underwent laparoscopic sigmoid colectomy with end colostomy. Mean age was 49.7. None of the patients had prior history of diverticulitis. Mean EBL was 150 mL, with a mean operative time of 2 hrs and 43 min. None of the procedures required conversion to use of a hand port, or conversion to open. Average return to bowel function was 4.7 days, with one patient developing a postoperative ileus. Mean postoperative stay was 7.3 days. There were no complications.

Laparoscopic Hartmann's takedown was performed in all patients approximately 2 - 3 months later. Mean EBL was 95 mL, with an average operative time of 3 hrs 31 min. One patient did have an intraoperative anastomotic leak successfully repaired and retested. Again, none of the procedures required use of a hand port, nor laparotomy. Return to bowel function averaged 2.3 days. Average length of stay was 5.3 days, with one patient developing a wound infection.

Conclusions: Laparoscopic Hartmann's procedure and laparoscopic takedown are technically feasible procedures with reasonable outcomes.

Colorectal/Intestinal Surgery – P235

LAPAROSCOPIC SIGMOID COLECTOMY AFTER DIVERTICULITIS: THE THREE TROCAR TECHNIQUE., Marty Zdichavsky MD, Michael Kramer MD, Alfred Königsrainer MD, Frank Granderrath MD, University Hospital Tübingen, Dept. Surgery, Tübingen, Germany

BACKGROUND: Laparoscopic sigmoid colectomy has become a feasible and effective surgical treatment of diverticulitis. We approach a three trocar technique to preserve the advantages of a minimal surgical procedure with reduced wound incisions.

METHODS: A minimum of three trocars was used in 21 consecutive patients (8 male, 13 female; mean age 48.6 and 59.8 years, respectively) who underwent a laparoscopic sigmoid colectomy after diverticulitis. The trocar of the right-lower quadrant of the abdomen was extended for exteriorization of the sigmoid colon. This technique was performed as a single center and single surgeon procedure on patients who had diagnosed diverticular disease as repeated attacks of symptoms.

RESULTS: None of the 21 patients had conversion to laparotomy. Wound infection was observed in 2/21 and urinary tract infection in 1/21 patients. Average operating time was



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121 minutes (67-182 minutes).

CONCLUSIONS: This technique is feasible and preserves optimal cosmetic results for the patient of a minimal invasive procedure.

Colorectal/Intestinal Surgery – P236

PRELIMINARY RESULTS OF LAPAROSCOPIC SURGERY FOR ACUTE DIVERTICULITIS., Marty Zdichavsky MD, Stephan Coerper MD, Kramer Michael MD, Alfred Königsrainer MD, Frank Granderrath MD, University Hospital Tübingen, Dept. Surgery, Tübingen, Germany

BACKGROUND: Laparoscopic sigmoid resection for diverticulitis has become an acceptable technique of surgical treatment for diverticulitis. To date, the optimal waiting period after acute symptoms of diverticular disease has not been established. Laparoscopic sigmoid colectomy of acute diverticulitis may challenge the technical feasibility of the laparoscopic approach and reduce the overall time of hospitalization for these patients.

METHODS: 13 patients underwent laparoscopic sigmoid resection within 10 days after acute symptoms. Patients were treated immediately with antibiotics and fasting. Operating time point was determined when clinical symptoms and inflammation signs in blood samples were significantly reduced.

RESULTS: An end-to-end anastomosis was performed in all 13 patients (7 male, 6 female; mean age 50.0 and 65.3 years, respectively; ASA I: 4/13, ASA II: 8/13, ASA III: 1/13). Average operation time was 113 minutes (60-168 minutes). One patient suffered an uncomplicated wound seroma, another an incisional hernia. No leakage of the anastomosis was detected. None of the patients had conversion to laparotomy or increased rate of recovery period compared to elective resections in the literature.

CONCLUSIONS: Our preliminary data show the feasibility of the laparoscopic sigmoid resection procedure in acute diverticulitis. Waiting period after acute symptoms of diverticulitis can be reduced to a short period of time decreasing the length of hospitalization and hospital expense.

Complications of Surgery – P237

PROCEDURE FOR USE THE SEPRAFILM ADHESION BARRIER IN LAPAROSCOPIC SURGERY, Hideaki Andoh MD, Yoshio Kobayashi MD, Tatsuru Akashi MD, Manabu Onuki MD, Kouji Fukuda MD, Yuichi Tanaka MD, Takao Hanaoka MD, Division of Surgery, Nakadori General Hospital

[Introduction] Seprafilm adhesion barrier is indicated for use in patients undergoing abdominal laparotomy as an adjunct intended to reduce the incidence, extent and severity of postoperative adhesions between the abdominal wall and underlying viscera. Even in the laparoscopic surgery, Seprafilm is useful to prevent the adhesion between viscera and viscera. However, insertion technique under laparoscopic surgery is difficult. In this report, present the easy method to insert the Seprafilm under laparoscopic surgery.

[Patients] Fourteen patient undergoing the laparoscopic surgery such as cholecystectomy, colectomy were applied insertion of Splafilm in our hospital.

[Method] 1. Use of the applicator which is exclusively for laparoscopic surgery; Applicator method. 2. Direct insertion of the Seprafilm holded with the Tyvek holdr; Tyvek holder method. 3. Direct insertion of the Seprafilm holded with Vinyl Sheet; Vinyl sheet method.

[Result] Cost: applicator cost \$80 in each cases and which is disposable device, but Tyvek holder and vinyl sheet took no cost because these were contained the package of the Splafilm. Time during laying the Seprafilm: Applicator method took 325 seconds Direct methods holded with Tyvek or Vinyl sheet took 132 seconds. Vinyl method was more easy than Tyvek method because vinyl sheet could be pulled out easy, and handling easy because clearness of the surgical field.

[Conclusion] The vinyl sheet method was easy and useful for the insertion of Seprafilm undergoing laparoscopic surgery.

Complications of Surgery – P238

LAPAROSCOPIC REPAIR OF DUCT OF LUSHKA INJURY, Justin Boccardo MD, Gerardo Kahane MD, Patrick Gatmaitan MD, Celine Gisbert MD, Bruce E Duke III MD, Conemaugh Memorial Medical Center

More than 500,000 laparoscopic cholecystectomies are performed annually in the USA (1 in every 500 persons). The rate of major bile leaks after this procedure is around 1%, and less than a third of those are from injuries to the accessory ducts (aka duct of Lushka). It is an uncommon complication, but in such a frequent procedure around 15000 leaks from accessory ducts occur every year, and there is very little information reported on how to diagnose, treat and follow up this type of injuries.

We present a 67yo woman who had an uneventful laparoscopic cholecystectomy and post operatively continued with upper abdominal pain. She was noted to have increased LFTs and underwent an MRCP that showed an intact biliary tree. A HIDA scan showed evidence of a bile leak coming from the right lobe of the liver. An ultrasound failed to show a biloma in the right upper quadrant. An ERCP was attempted but the common bile duct could not be selectively cannulated. The patient was taken to the operating room for an exploratory laparoscopy. The bile leak was noted to originate from the liver bed. An accessory, solitary, bile leaking duct was identified. The duct was suture ligated and the leak controlled. The patient was discharged home and on her follow up visit she was free of symptoms and fully recovered from her surgery.

Injury to a duct of Lushka is an uncommon event, but with enough number of laparoscopic cholecystectomies performed, it is bound to happen at some point in a surgeon's career. Interestingly, there is no set of guidelines or recommendations on how to approach this complication. The role of HIDA scan and cholangiography is well established in the initial evaluation of a suspected bile leak. However the differentiation between a leak originating from an accessory duct or the common or hepatic ducts is extremely challenging. The few reports in the English literature found about duct of Lushka injuries recommended exploratory laparotomy with repair or suture-ligation of the leak. We performed an exploratory laparoscopy with excellent results. We believe that the laparoscopic approach provides a good exposure of the anatomy to identify the injury and properly repair these types of injuries.

Complications of Surgery – P239

ENDOSCOPIC PERFORATION OF DUODENAL DIVERTICULUM: A REPORT OF TWO CLINICAL CASES, Steven P Bowers MD, Steven M Abbate MD, Steven P Larsen MD, Wilford Hall Medical Center

BACKGROUND: Duodenal diverticula are common but spontaneous clinical sequelae are rare. Endoscopic perforation into the retroperitoneum can usually be managed non-operatively, thus current reports of surgical management of perforated duodenal diverticula are scarce. Historically, diverticulectomy is complicated by a 20% risk of duodenal fistula.

METHODS: We report two cases of endoscopic perforation of duodenal diverticulum requiring surgical intervention. Case one is a 65 year-old woman who underwent ERCP and was found to have periampullary diverticula- one small proximal diverticulum with a retained enterolith, and a larger diverticulum containing the papilla. The retained enterolith was extracted, and during cholangiography, the patient became hypoxic and manifested massive subcutaneous emphysema. She was intubated and tube thoracostomy placed on the right for pneumothorax. CT scan and surgical consultation were obtained. Case two is a 59 year-old man who underwent EGD and was found to have a large duodenal diverticulum, without enterolith or inflammation. After the procedure, the patient was noted to have severe right-sided pain and massive subcutaneous emphysema from the chest to the right scrotum. CT scan and surgical consultation were obtained. During both cases, endoscopic insufflation was set to high (20 - 35 L/min).

RESULTS: Both patients were found to have focal peri-



toniteal irritation and CT showing retroperitoneal air tracking back to the duodenal diverticulum. Both were similarly treated with midline laparotomy and extensive Kocher maneuver. The perforations were identified and closed primarily, and closure was buttressed with pedicled omentum. Closed suction drains were placed in the retroperitoneum. Diverticulectomy was not performed because of involvement of the ampulla or bile duct. Both patients had uneventful post-operative recoveries.

DISCUSSION: Primary closure of diverticular perforation with omental buttress and drainage is sufficient for treatment of iatrogenic endoscopic perforation of duodenal diverticulum. During endoscopic procedures involving duodenal diverticula, the lowest tolerable insufflator setting should be used.

Complications of Surgery – P240

COMPLICATIONS OF ENDOSCOPIC IMPLANTATION OF PERITONEAL DIALYSIS CATHETER, Zoran Cala PhD, Ivo Soldo PhD, Visnja Nesek-Adam MSc, Aleksandra Smiljanic MD, University Department of Surgery GH Sveti Duh Zagreb

Introduction: We analyze the complications of endoscopic implantation of the catheter for peritoneal dialysis using trocar especially constructed for this purpose.

Method: Operation is performed under general anesthesia. After pneumoperitoneum is obtained and laparoscope introduced, the catheter trocar is passed obliquely through the abdominal wall and directed into the pelvis with the laparoscopic monitoring of the trocar tip. This trocar consists of two essential parts. The outer cannula can be separated longitudinally in two symmetric parts. The inner metal part has a pyramid shaped tip. The catheter is introduced through trocar cannula. The cannula is dismantled longitudinally and removed while the catheter tip is kept into the pelvis by the forceps. During these procedures some complications as during any other laparoscopic operation and some typically for these procedure are possible. Between December 1993 and September 2006 catheter for peritoneal dialysis was placed endoscopically in 192 patients using our trocar.

Results: There were only several minor complications - bleeding from abdominal wall vessels in 5 cases, wound infections in 3 cases, umbilical hernia in 2 cases, and dialysis solution leakage in 2 cases. There were not severe complications like intraabdominal bleeding, visceral injury or retroperitoneal vascular injury.

Conclusion: Laparoscopic placement of catheter for peritoneal dialysis using our specially constructed trocar is a safe, simple, quick, efficient and patient convenient technique.

Complications of Surgery – P241

LAPAROSCOPIC TRANSMEDIASTINAL DRAINAGE - A SIMPLE AND EFFECTIVE PROCEDURE FOR THE TREATMENT OF ACCIDENTAL PNEUMOTHORAX IN LAPAROSCOPIC ANTI-REFLUX SURGERY, Gustavo L Carvalho PhD, Alexandre W Dantas, Ana Beatriz T Ramos, Daniel G Araújo, Pedro P Albuquerque, Carlos H Ramos MD, Gilvan Loureiro MD, Frederico W Silva MD, Pernambuco State University, School of Medicine, Recife, Brazil

Introduction: The pleural lesion is an uncommon accident in laparoscopic anti-reflux surgery (LARS) and its frequency range from 0.9 to 2.7%. In a major lesion, the difference between the pressure in the pleural and the abdominal cavities during the pneumoperitoneum may cause the development of a pneumothorax (PTX). This situation, when serious, raises the diaphragm dome, hindering the execution of the surgery. The current therapy for transoperative PTX is the thoracic intercostal drainage, which is not without complications, and may alter the patient's progression and the desirability of minimum invasive surgery. The aim was to evaluate the treatment of accidental transoperative PTX through a new procedure - laparoscopic transmediastinal drainage (LTD).

Method: From January 2000 to August 2006, 256 patients underwent LARS. Six patients presented a transoperative left pleural lesion that hindered or prevented the completion of the surgical procedure. The therapeutic option used in all cases was LTD. LTD was performed through the insertion of

a 8F silicon drain between the diaphragmatic pillars in such a way as to leave all the holes of the drain in the pleural cavity. The exit of the drain was made by the abdominal route using a 3-mm minilaparoscopic trocar in all patients, preserving the characteristic of a minimally invasive procedure. The patients were maintained on mechanical ventilation with PEEP by the anesthetist. The drains were removed on average of 15 minutes after the end of the operation, and a chest radiograph was taken to confirm the absence of PTX.

Results: No significant complications were observed in this therapy used for the treatment of PTX. Radiography confirmed the absence of PTX in all patients. Conclusion: The treatment of pneumothorax by laparoscopic transmediastinal drainage was shown to be a safe, simple and effective method. Laparoscopic transmediastinal drainage should be considered the procedure of choice during a LARS as it is a minimally invasive technique and produces a good esthetic quality.

Complications of Surgery – P242

SAFETY AND EFFICACY OF PERCUTANEOUS ENDOSCOPIC GASTROSTOMY IN PATIENTS WITH PRIOR UPPER ABDOMINAL SURGERY, David Cox MD, Bhargav Mistry MD, Robert P Sticca MD, University of North Dakota, MeritCare Health System

Background: Percutaneous Endoscopic Gastrostomy (PEG) placement is the preferred access route for enteral nutrition in most patients who are unable to take oral feedings for any of a variety of causes. Reasons for this preference include ease of placement, avoidance of laparotomy, a low overall complication rate and cost effectiveness. Prior upper abdominal surgery has been considered a relative contraindication to PEG placement due to concerns surrounding altered anatomy, adhesions and increased risk of complications. There is a lack of objective evidence for these concerns. This study examined the outcomes of PEG placement in a large cohort of patients with comparisons between groups who had prior upper abdominal surgery, prior lower abdominal surgery and no prior abdominal surgery in order to determine if prior upper abdominal surgery is associated with increased morbidity or mortality.

Methods: A retrospective chart review of all consecutive patients who underwent PEG placement by multiple surgeons and a gastroenterologist between 12/1/2000 and 2/28/2005. Data was collected on patient age, sex, reason for need of enteral nutrition, history of prior abdominal surgery, type of prior surgery, and outcome including morbidity and mortality. All PEGs were placed using the Ponsky pull through technique. Data was analyzed using Fisher's exact tests.

Results: The total study group consisted of 266 patients. Twenty-four patients (9%) had prior upper abdominal surgery. Patients in this group had undergone a diverse array of procedures to the esophagus, diaphragm, stomach, spleen, duodenum, pancreas, biliary tract, liver, and transverse colon. Fifty-seven (21%) patients had prior lower abdominal surgery while 185 (70%) patients had no prior abdominal surgery. Morbidity analysis demonstrated one (4.2%) complication in the upper abdominal surgery group, seven (3.8%) complications in the no prior surgery group and one (1.8%) complications in the lower abdominal surgery group. Fisher's exact test did not reveal any statistically significant differences in complication rates between the prior upper abdominal surgery group and the other groups ($p = 0.77, 0.51$). There was no mortality directly attributable to PEG placement.

Conclusions: PEG may be performed safely in patients with prior upper abdominal surgery.

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PERFORATED DUODENAL ULCER FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Christopher W Finnell MD, Atul K Madan MD, David S Tichansky MD, Kenneth Sellers MD, The University of Tennessee at Memphis

Perforated duodenal ulcers that result in massive intra-abdominal contamination are generally thought to present with abdominal pain, signs of sepsis and the hallmark sub-



diaphragmatic free air.

We present a case of a 54 year old female who presented to the emergency room with a 3 day history of abdominal pain that had become worse and unrelenting. She admitted to alcohol use and was taking aspirin for her abdominal pain. Her past medical history was significant for a laparoscopic roux-en-y gastric bypass 2 years prior at an outside institution for morbid obesity from which she had lost over 100 pounds. Physical examination found her to be mildly febrile with a diffusely tender abdomen, laboratory analysis showed slightly elevated amylase level. A CT demonstrated perihepatic fluid with no evidence of free air.

Surgery was consulted after her pain was noted to have increased in the right lower quadrant and appendicitis was suspected. At this time, she was tachycardic, febrile, hypotensive, with a rigid abdomen. Following fluid resuscitation she underwent emergent laparotomy, where a massive volume of biliary acites was discovered along with a 1 cm perforated ulcer in the first portion of the duodenum. She was requiring high doses of vasopressors intraoperatively so a Graham patch was preformed rapidly followed by copious irrigation of the abdominal cavity and facial closure. She had a stormy postoperative course but was ultimately discharged home.

The initial lack of free air had led her initial physicians down an erroneous diagnostic path. Patients who have undergone bariatric procedures that present with abdominal pain should have surgical consultation preferably by surgeons experienced in bariatric surgery

Complications of Surgery – P244

INTESTINAL FAILURE: A RARE ERCP COMPLICATION,

Patrick Gatmaitan MD, Celine Gisbert MD, Bruce Duke MD, Guilherme Costa MD, Kareem Abu-Elmagd MD, Conemaugh Memorial Medical Center; UPMC Montefiore Hospital

Endoscopic retrograde cholangiopancreatography (ERCP) is a relatively common procedure performed for both diagnostic and therapeutic purposes. Complications include pancreatitis, hemorrhage, perforation, and death among others. This case study illustrates a rare and unreported ERCP complication. Review of the MEDLINE literature from 1966 to August 2006 regarding ERCP did not yield any complication of extensive bowel ischemia and necrosis leading to intestinal failure. Our patient is a 63-year old female who presented with right upper abdominal pain, elevated LFTs, and dilated common bile duct. She was diagnosed with sphincter of Oddi dysfunction and ERCP with sphincterotomy had been performed. This was followed by a protracted, complicated and disabling post-operative course. She initially developed a severe necrotizing pancreatitis, then both retroperitoneal and intra-peritoneal abscesses, portal and superior vein thrombosis, small and large bowel necrosis leading to eventual enterectomy and colectomy. Almost a year after her ERCP, she remains on total parenteral nutrition awaiting bowel transplantation. This report demonstrates a unique case of intestinal failure as a complication of ERCP.

Complications of Surgery – P245

THE PERFORATION OF THE GALLBLADDER IN CASES OF INCIDENTAL GALLBLADDER CANCER- AND THE DOUBTFUL PROTECTIVE EFFECT OF ISOLATION BAGS., Thorsten

Goetze PhD, Vittorio Paolucci PhD, Clinic for general, abdominal- and minimally invasive surgery of the Ketteler-Krankenhaus

Introduction: The accidental intraoperative perforation of the gallbladder is a problem of the laparoscopic surgery, if an incidental gallbladder carcinoma exists at the time of operation.

According to the literature this complication comes up to 30% of the laparoscopic operations. In order to prevent the dissemination of tumour cells the use of an isolation bag is proclaimed.

The question is if the intraoperative perforation of gallbladder carcinoma really leads to a prognostic deterioration and

if the patients which have been treated with an isolation bag have a prognostic advantage.

Material and method: To obtain data we are using the Register of the German Society of Surgery for incidental gallbladder cancer. We are collecting our data with a standardized questionnaire, which has been sent to all German and now to all Austrian surgical clinics as well.

Results: 441 cases of incidental gallbladder carcinomas are registered.

239 were operated laparoscopically, 81(34%) of them get a relapse of the tumour.

110 patients were treated with the support of an isolation bag, the rate of a relapse was 41% (n= 41).

129 of the laparoscopic group have treated without an isolation bag, the rate of a relapse was 28% (n= 36).

In 50 of 239 laparoscopic treated patients there was an intraoperative accidental opening of the organ, the rate of a relapse was 46% (n= 23).

In 33 of 50 cases an isolation bag was used, the rate of a relapse was 48% (n= 16).

The other 17 of 50 patients who were operated without an isolation bag have a rate of relapse of 41% (n=7).

The group without an intraoperative perforation (n= 189) have 31% (n=58) of tumour recurrence.

77 of this 189 were treated with the use of an isolation bag, 29 (38%) of them had a tumour recurrence, the other 112 of the 189 patients treated without a bag had a recurrence rate of 29% (n= 26).

Discussion: In our register, the intraoperative perforation leads to a significant prognostic disadvantage (p=0.046 Fisher's exact test).

The patients treated with an isolation bag have a tendency of a higher rate of tumour recurrences (p= 0,055 Fisher's exact test).

The isolation bag seems not to have a protective effect.

Complications of Surgery – P246

INTRABDOMINAL ABSCESS AS A COMPLICATION OF LAPAROSCOPIC APPENDECTOMY: REPORT OF A CASE,

Hiroimitsu Hoshino MD, Hiroshi Yano MD, Takushi Monden MD, NTT west osaka hospital

Many reports of laparoscopic appendectomy(LA) have been published since it was first performed in Germany in 1982. Because it is generally associated with a low complication rate, the risk of an intraabdominal abscess occurring as an early complication of LA has not been emphasized. We report a case of an intraabdominal abscess after performing LA that was cured conservatively. A 28-year-old woman was admitted to our department with right lower abdominal pain. After computed tomography(CT) and laboratory examination, a diagnosis of appendicitis was made and LA was performed. The mesoappendix was divided using a Laparoscopic coagulation shears(LCS). A simple ligation of the root of the appendix with an Endo-loop was performed and it was divided using a LCS. The appendiceal stump was not invaginated. A retrieval bag was introduced into the abdominal cavity to remove the resected appendix. After removing the appendix, the peritoneal cavity was irrigated with 1000ml of warm saline, and the Douglas pouch was drained with a Penrose drain. The appendiceal inflammation was macroscopically classified as phlegmonous. The patient was discharged on the 7th postoperative day in excellent condition with no wound infection and no intraabdominal abscess. The patient's body temperature increased to 38.1?? on 16th postoperative day and CT revealed a water-density pericecal mass, 3cm in diameter. We diagnosed it as a postoperative intraabdominal abscess. Because her abdominal pain didn't become severe, we managed with intravenous antibiotics. It subsided by 10 days. This case shows that intraabdominal abscess after LA occurred in spite of the use of a retrieval bag for extraction and irrigation of peritoneum with much saline. Although the cause of this complication was unknown, it may be necessary to invaginate the appendiceal stump or to divide the root of the appendix using laparoscopic linear stapler.



Complications of Surgery – P247

EARLY RE-LAPAROSCOPY FOR MANAGEMENT OF SUSPECTED POSTOPERATIVE COMPLICATIONS, Boris Kirshtein MD, Aviel Roy-Shapira MD, Sergey Domchik MD, Solly Mizrahi MD, Leonid Lantsberg MD, Department of Surgery A Soroka Medical Center, Faculty of Health Sciences Ben Gurion University of the Negev

AIM: To evaluate the role of early re-laparoscopy for diagnosis and treatment of patients who are progressing as expected following laparoscopic surgery.

PATIENTS AND METHODS: We performed a retrospective review of the patients underwent re-laparoscopy for suspected complications of laparoscopic surgery between January 2000 and July 2006.

RESULTS: During the study period, 7726 patients underwent laparoscopic surgery in our service. Of these 57(0.7%) patients underwent re-laparoscopy for suspected complications. 15 male and 42 female patients with mean age 51.9 years old underwent initial laparoscopic surgery for cholelithiasis (27), morbid obesity (11), incisional hernia (9), perforated viscus (4), acute appendicitis (3), end stage renal failure (1), infected urachal (1) and ruptured ovarian cysts (1). The primary operation was elective in 43 patients.

Indications for re-laparoscopy were excessive postoperative pain in 21(37%), peritoneal signs in 18(32%), SIRS 8(14%), intestinal obstruction in 4(7%), bile leak in 3(5%), overt shock in 2(4%), and bleeding in 1(2%) patient. Median delay between operations was 2 days. Re-laparoscopy was negative in 18(32%) patients. In other patients, a firm diagnosis could be established. The identified pathology was treated laparoscopically in 50 patients, the rest were converted. 7 patients underwent more than one re-laparoscopies. Three patients in this series died of their complications. Re-laparoscopy was not associated with additional morbidity.

CONCLUSIONS: A policy of early re-laparoscopy in patients with suspected complications enables timely management of identified complications, with expedient resolution.

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RETROPERITONEAL TROCAR INJURY IN LAPAROSCOPIC CHOLECYSTECTOMY, Subhasis Misra MD, Prasanta Raj MD, Fairview Hospital, Cleveland Clinic Health System

OBJECTIVE: Bowel injuries can be a major complication during abdominal laparoscopic procedures. Unfortunately, trocar injuries still happen in laparoscopic cholecystectomy. We present an unusual case of retroperitoneal right colon injury from trocar placement.

METHODS: 40-year-old female, with recent history of laparoscopic cholecystectomy two months back presented with intermittent right-sided abdominal pain since her surgery. Patient had right flank tenderness but had no peritoneal signs. CT scan showed asymmetric thickening of wall of the ascending colon with surrounding fat reaction suggestive of localized perforation possibly from colonic carcinoma. No history of ulcerative colitis, crohns disease, colon cancer in family. Gastroenterologist deferred colonoscopic exam due to localized perforation. Of note, bladeless trocars were used during the initial laparoscopic cholecystectomy surgery.

RESULTS: Patient underwent exploratory laparotomy and right hemicolectomy. Frozen section of mass showed fibrous serositis with fat necrosis and granulation tissue, with no malignant changes and an intact bowel mucosa. This finding was consistent with injury of the ascending colon bowel wall due to trocar insertion as it was involving the trocar entry site.

CONCLUSION: As a part of ascending colon is retroperitoneal, injury can go unnoticed and stay in the retroperitoneal location and can have delayed presentation of perforated colon injury with continued symptoms. We believe that bladeless trocar can cause traction injury during insertion, which may go unnoticed as the trocar travels in the retroperitoneal space and this injury may not be visible in the laparoscopic view. Hence, careful trocar placement under direct visualization and with minimal shearing is recommended.

Complications of Surgery – P249

BILE DUCT INJURIES AFTER OPEN AND LAPAROSCOPIC CHOLECYSTECTOMIES AT DEPARTMENT FOR ABDOMINAL SURGERY, MARIBOR, SLOVENIA, andromako nika, Department of abdominal surgery, Teaching hospital Maribor, Slovenia

Results In 5 year period at Department for abdominal surgery in Maribor, 2799 cholecystectomies were performed. There were 15 bile duct injuries in this period what represents. Four injuries occurred after conventional operation and 11 after laparoscopic technique. Eight bile duct injuries were detected immediately and repaired immediately. Other were found up to 11*day postoperatively. Major signs were biliary leakage through abdominal drain, obstructive jaundice or acute abdomen which all demand operative treatment.

Our patients in Strasberg classification: Type A / 5 patients ; Type B / 1 patients; Type C / 3 patients; Type D / 5 patients; Type E / 1 patients.

Treatment

A type- In two cases we only ligated cystic duct and in three cases ligated superficial aberrant duct together with T-tube. B type- injury was recognized intraoperatively and managed with bile duct ligature

C type- injures were immediately detected and repaired with bile duct ligatures.

D type- injures were repaired in four cases with direct sutures of bile duct with T-tube and in one case bilio-digestive anastomosis was performed.

E type- injury was immediate treated by biliodigestive anastomosis.

Conclusion

?Laparoscopic cholecystectomy has become the standard method for the elective treatment of patients with symptomatic cholelithiasis

?It is a method of choice for patients in hands of experienced surgeon

?Conversion do not mean "bad surgeon" but on the contrary wised experienced and rational

?There is no easy cholecystectomy; all are identical and must be save for all patients

?It is of major importance to be absolutely sure of anatomic situation before cutting any structures in triangle Callot

?The highest aim is not harm any biliovascular structure

?All reparation of this structures are inherently connected to high risk of secondary stenosis, liver chirrosis and shorter survival

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INTRAOPERATIVE COMPLICATIONS IN THE LAPAROSCOPIC TREATMENT OF ESOPHAGEAL DISEASES, Pablo E Omelanczuk MD, Jorge A Nefa MD, Sergio E Bustos MD, Walther Minatti MD, Department of General Surgery, Hospital Italiano de Mendoza. Argentina. Lateral Este 1015 Guaymallén, Mendoza. Argentina

Objective: Laparoscopic surgery is the approach of choice for the surgical treatment of benign esophageal disease. However, it is not free of operative complications. To show how different lesions are produced and how they are resolved.

Materials and method: Videos of laparoscopic surgeries of benign esophageal disease were assessed retrospectively over the period January 2001-April 2006, including 45 Heller procedures and 148 antireflux procedures using Nissen fundoplication laparoscopically.

Results: Intraoperative complications were the following: 1 pneumothorax, 2 liver lesions, 4 esophageal perforations (during myotomy for achalasia), 4 hemorrhagic lesions (1 lesion of the diaphragmatic vein, and three lesions of gastric short vessels). There was no morbidity or mortality. None required conversion.

Conclusions: Intraoperative complications of laparoscopic esophageal surgery are not frequent. In trained groups, they can be resolved laparoscopically without altering the final outcome of the surgery.



SAGES POSTER ABSTRACTS

Complications of Surgery – P251

LAPAROSCOPIC REMOVAL OF SEVERED, PARTIALLY RETAINED JACKSON-PRATT DRAIN FOLLOWING OPEN SURGERY. Megan Palsa MS, Arthur Stanten MD, George Kazantsev MD, Ajay Upadhyay MD, Department of Surgery, Alta Bates Summit Medical Center, Oakland, California.

Introduction: Retained intra-abdominal Jackson-Pratt (JP) drain secondary to fracture during attempted removal is a rare complication. The management of this occurrence in the immediate post operative period has traditionally involved a return to the operating room and retrieval either by wound exploration or formal repeat laparotomy. A computed tomography guided wire localization and retrieval has been reported as another option, provided the drain end is still in the abdominal wall. We describe the use of laparoscopy in the immediate post operative period following open surgery as an alternative approach to this annoying problem.

Case Report: A 59 year old female underwent a distal gastrectomy with Roux-en-Y bypass for carcinoid tumor of the proximal duodenum and wedge resection of a solitary liver lesion. Ten days post operatively during Jackson Pratt drain removal, severance of the drain occurred leaving the perforated flat portion of the drain in the peritoneal cavity, beyond the reach for external probing and removal. An abdominal radiograph revealed the flat part of the drain lying in the right upper quadrant. Access to the abdomen was easily obtained by inserting a veress needle in the left sub costal region. The flat portion of the drain was deeply imbedded in omental adhesions over the right dome of the liver. There was no evidence of suture relating to drain severance or adherence. The adhesions were taken down and the retained portion of the drain was successfully removed via the 10 mm trocar. There were no adverse effects related to the laparoscopic removal.

Conclusion: A JP drain may fracture during removal if it is inadvertently sutured, pinched, over stretched, or wrapped by omental adhesions as in our patient. Severance of JP drain and partial retention is an unusual post-operative complication that can be successfully managed using different approaches if the drain is located in the subcutaneous tissue, these include exit site exploration, CT guided removal or a formal laparotomy. However, an intra-abdominal retention can be best approached using a laparoscopic technique before considering laparotomy. Laparoscopic approach in the immediate post operative period following open surgery is a feasible and safe option.

Complications of Surgery – P252

ASSESSMENT OF ADHESIONS AT LAPAROSCOPY FOLLOWING OPEN AND LAPAROSCOPIC COLORECTAL SURGERY. Henry m Dowson MD, Yuen Soon MD, Angela J Skull MD, Timothy A Rockall MS, Minimal Access Therapy Training Unit, Royal Surrey County Hospital, Guildford, UK

Introduction: Reports have suggested that laparoscopic surgery results in the formation of fewer adhesions than equivalent open surgery. This pilot study aimed to evaluate the inter- and intra-observer reliability of an adhesion scoring system adapted for use at laparoscopy following general surgical procedures.

Methods: All patients who had previously had a colorectal procedure (either laparoscopic or open), and were referred for subsequent laparoscopy, were eligible for the study. The laparoscopies were videoed and scored for adhesion formation by 5 experienced general surgeons on 3 separate occasions. Adhesions were assessed at laparoscopy using an 8 point scoring system, based on the severity of adhesion formation at three separate sites (access wound, site of pathology and surgical resection, and any distant sites), the overall extent of adhesion formation (0-25%, 25-50%, >50%), and involvement of small bowel. Inter-observer variation was calculated using the lambda coefficient.

Results: 10 laparoscopies (7 prior to liver resection) were recorded and analysed. 7 patients had previously had open colorectal surgery, and 3 laparoscopic surgery. Lambda coefficient showed good reliability, and there was no significant in intra-observer variability.

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Conclusion: This study has demonstrated that this adhesion scoring scale adapted for use in laparoscopic surgical procedures is both reliable and reproducible. We plan to use this in a study comparing the incidence of adhesions following laparoscopic and open colorectal surgery.

Complications of Surgery – P253

VISCERAL FAT AREA IS A USEFUL PREDICTOR OF SURGICAL OUTCOME FOLLOWING LAPAROSCOPIC COLECTOMY FOR COLON CANCER. Shingo Tsujinaka MD, Yutaka J Kawamura MD, Fumio Konishi MD, Ken Mizokami MD, Takafumi Maeda MD, Jichi Medical University Omiya Medical Center

Introduction: Obesity may compromise surgical outcome following laparoscopic surgeries. The body mass index (BMI) is widely used as a definition of obesity, though individuals with large volume of muscle and/or bone can be misinterpreted as obese. Visceral fat area is another parameter of obesity that correlates with metabolic diseases. To date, no study has investigated upon the impact of visceral fat area on surgical outcome following laparoscopic colorectal surgery. Therefore, the purpose of this study was to evaluate whether visceral fat area is a predictor of surgical outcome following laparoscopic colectomy for patients with colon cancer.

Patients and Method: With the approval of the Institutional Review Board, a total of 167 patients who underwent laparoscopic colectomy for any stage of colon cancer between April 2001 and April 2006 were included. All patients had abdominal computed tomography preoperatively. Visceral fat area was measured at the level of umbilicus and individuals with the amount of >130 cm² were classified into the obese patients (Definition I). Alternatively, the body mass index (BMI) was also calculated and the obese patients were defined as BMI >25 (Definition II), according to the criteria of the Japan Society for the Study of Obesity. For both of these definitions, patient characteristics, intraoperative variables, morbidity, and postoperative recovery were compared between the obese and the non-obese patients.

Results: There were 74 (44.3%) obese patients with Definition I and 33 (19.8%) with Definition II. Incidence of surgical site infection was significantly frequent in obese patients than non-obese patients in Definition I (16.2 vs. 4.3%, p=0.009), whereas not significant with those in Definition II (15.2 vs. 8.2%, P=0.317). Overall morbidity rate was significantly increased in obese patients than non-obese patients in Definition I (28.4% vs. 10.8%, P=0.004), while not significant with those in Definition II (24.2 vs. 17.2%, P=0.349). There was no significant difference in both definitions in days to flatus, stool, or ingestion of diet. The median postoperative hospital stay was significantly longer in obese patients than non-obese patients in Definition I (11 vs. 10 days, P=0.03).

Conclusion: Visceral fat area is more accurate than BMI in predicting surgical outcome following laparoscopic colectomy for colon cancer.

Complications of Surgery – P254

LAPAROSCOPIC MANAGEMENT OF RETAINED GALLSTONES PRESENTING AS A HEPATIC MASS. Brent C White MD, Thadeus Trus MD, Department of Surgery, Dartmouth-Hitchcock Medical Center

Introduction: Retained gallstones are associated with 2-4% of laparoscopic cholecystectomies. Most reports describing the complications of these stones have used open surgery in their management. The aims of this case report are to demonstrate an unusual presentation of retained gallstones and the feasibility of laparoscopic management.

Methods and Results: An 85 year-old woman who had undergone a laparoscopic cholecystectomy one year previously developed right upper quadrant pain and mild nausea. Upon thorough workup, a 3x2cm solid mass in the posterior right hepatic lobe was found on CT scan suspicious for malignancy. A CT-guided needle biopsy of this lesion unexpectedly obtained very scant, thick purulent material which was culture positive for Klebsiella. A repeat CT scan failed to reveal any resolution of this lesion after an extensive course



of antibiotics for presumed hepatic abscess. Given the culture results and prior laparoscopic cholecystectomy, diagnostic laparoscopy was pursued. This was performed with the patient in a left lateral decubitus position using three ports: one infraumbilical and two right subcostal. The liver was mobilized medially and an isolated abscess cavity containing numerous gallstones was found. All stones were carefully extracted and removed with a laparoscopic bag before marsupializing the abscess cavity. A Jackson-Pratt drain was left in the space adjacent to the cavity after thorough irrigation. The drain was removed several days after her operation. On follow-up office visit after a course of post-operative antibiotics, her symptoms had resolved.

Conclusion: Retained gallstones can resemble a solid hepatic mass on CT scan. Use of a laparoscopic approach in this case allowed diagnosis of suspected retained gallstones as well as definitive intervention. Such an approach could likely be used in other carefully selected cases where retained gallstones are suspected.

Complications of Surgery – P255

INTRAOPERATIVE DIAGNOSIS AND REPAIR OF TRANSECTED RADIAL NERVE DURING ENDOSCOPIC RADIAL ARTERY HARVEST FOR CABG, JOSEPH WOLF MD, NICK PATEL MD, LOUIS BRITTON MD, JEROME CHAO MD, ALBANY MEDICAL CENTER

Endoscopic radial artery harvesting for coronary artery bypass grafting was introduced by Terada et al. in 1988 following the success of endoscopic saphenous vein harvesting. It has since become the procedure of choice for many cardiac surgery groups as the structural integrity and vasoreactivity of the endoscopically harvested radial artery has been shown to be preserved.

As with all surgical procedures, there are morbidities associated. Several studies in the cardiac surgery literature have described the neurologic morbidities associated with the open and the endoscopic approach. The incidence of neurologic sequelae with the endoscopic technique ranges from one to twenty seven percent in the literature. Between eight and eighteen percent of patients reportedly develop dorsal hand numbness at the twelve month follow up evaluation, suggesting that there has been direct thermal or mechanical damage to the radial nerve. Yet, this injury has never been reported to be visualized and repaired intraoperatively. The authors present a case report of an inadvertent transection of the radial nerve that took place during the endoscopic harvest of a radial artery for coronary artery bypass grafting. The injury was visualized by the surgeon on the endoscopic monitor and a plastic surgeon immediately repaired the injured nerve with a NeuraGen nerve conduit. This is the only report in the literature in which a radial artery was harvested with the endoscopic technique and a peripheral nerve injury was diagnosed intraoperatively and immediately surgically repaired.

Education/Outcomes – P256

ACQUISITION OF LAPAROSCOPIC SKILLS: COMPARISON OF MEDICAL STUDENTS AND PA STUDENTS, J R Adkins MD, S G Barloco MD, V Sherman MD, N R Barshes MD, M Millie MD, S Kreml MD, J F Sweeney MD, Baylor College of Medicine, Michael E. DeBakey Department of Surgery

Introduction: In the era of the 80-hour workweek physician assistants (PA) are playing a more integral part in the operating room, especially assisting with laparoscopic cases. We sought to determine the baseline laparoscopic skills and trainability of PA students compared to medical students.

Methods: 81 second and third year medical students (MS) and 17 PA students (PAS) were timed at baseline and post training on laparoscopic trainers. Three commonly used laparoscopic skills tasks Slam Dunk (Bean), Cobra Rope (Rope) and Terrible Triangle (Triangle) were used for the study. Each student was timed initially on each task and then again after two 2-hour training sessions. The overall improvement on each task was compared between the two groups using student's t-tests.

Results: Both the medical students and PA students improved significantly on each task (* indicates $p < 0.01$). However, the amount of absolute improvement between the groups was not statistically significant. The table shows the time of each group on each task performed in seconds (mean (SD)). The standard deviation decreased in each group after training representing an improvement to a more consistent level of performance.

Task	Bean		Rope		Triangle	
	Pre Score	Post Score	Pre Score	Post Score	Pre Score	Post Score
MS	127.3 (70.2)	77.3 (40.6)*	187.9 (71.1)	104.3 (34.3)*	100.9 (44.4)	51.3 (26.6)*
PAS	160.2 (81.8)	74.3 (58.0)*	205.5 (120.3)	105.1 (46.1)*	95.3 (56.1)	47.8 (15.5)*

Conclusion: Laparoscopic skills of PA students have been shown to improve comparably to that of medical students, after only two 2-hour training sessions. PA students can be trained using the same curriculum as medical students, thereby enhancing the ability of PA students to assist with laparoscopic surgery.

Education/Outcomes – P257

THE DEVELOPMENT OF A PROFICIENCY-BASED TRAINING CURRICULUM ON THE LAPMENTOR VIRTUAL REALITY SIMULATOR, R Aggarwal MD, A Dias, I Balasundaram MD, A Darzi MD, Imperial College London

Introduction: The implementation of a competency-based laparoscopic surgical skills curriculum necessitates the development of tools to enable structured training, with in-built objective measures of assessment. Simulation in the form of virtual reality has been proposed for technical skills training at the early part of the learning curve. The aim of this study was to determine the construct validity and training potential of a commercially available laparoscopic VR simulator with force (haptic) feedback (Lapmentor, Symbionix, USA). A subsequent aim was to derive a competency-based laparoscopic training curriculum based upon this evidence.

Methods: 20 general surgeons of varying levels of experience were recruited: 10 inexperienced (performed <10 laparoscopic cholecystectomies (LCs)), 5 intermediate (20-50 LCs) and 5 experienced (>100 LCs). The basic skills module has nine tasks which were performed twice by all surgeons recruited to the study. The 10 surgeons inexperienced in laparoscopic procedures continued to train on the simulator for a further eight sessions, making a total of 10 sessions. Performance was recorded objectively and instantly by the VR simulator for the parameters of time taken, economy of movement (path length, number of movements) and error/accuracy scores.

Results: All nine tasks demonstrated construct validity for time taken (Kruskal-Wallis test, $p < 0.05$). The economy parameters were construct valid for six of nine tasks, though error scores did not validate, apart from for two of the tasks (cutting and object translocation). Analysis of the learning curves for novices revealed significant improvements in performance on the basis of quantitative metrics, i.e. time taken and economy scores ($p < 0.05$). The median results of experienced surgeons for each task for each validated parameter enabled definition of benchmark levels of performance to achieve.

Conclusion: All tasks have been proven to be construct valid, and learning curve analysis proves that novice surgeons improve their performance with repeated practice on the simulator. The derivation of benchmark criteria from the performance metrics of experienced surgeons ensures that it is acquisition of technical skill, and not the length of time spent on the simulator that determines progression onto real cases. This can serve to ensure that junior trainees have acquired pre-requisite levels of skill prior to entering the operating room, where they can be put into practice.



SAGES POSTER ABSTRACTS

Education/Outcomes – P258

THE EFFECT OF NATURAL DISASTER ON ROUTINE SURGERY, Jason A Breaux MD, Mark A French, Colleen I Kennedy MD, William S Richardson MD, Ochsner Medical Center

Introduction: We undertook this study so that we could learn about the effect of hurricane Katrina on routine surgery, laparoscopic cholecystectomy (LC), in order to understand what happens with a large natural disaster.

Methods: We used our prospectively collected database for all data. All inpatients with (LC) (DRG 493 & 494) and outpatients with principal procedure code 51.23 LC were included in the study. The time periods used were for the seven months prior to Katrina and compared it to seven months starting three months after the storm, when operating room volumes were close to status quo. Costs and revenues are all hospital based.

Results: Total cases were 196 pre and 167 post storm (preS and postS) for outpatient and 62 preS and 64 postS for inpatient.

Imp (\$)	preS	postS	Outpt	preS	postS
Cost	2020	1977		5313	4077
Revenue	3705	3830		8330	7487
Profit	1684	1853		3016	2779

Decreased costs were largely due to loss of veteran (higher paid) staff and therefore overall decrease in salary even though lower level staff incurred wage gains due to high demand for these wage earners postS. Our better payers decreased by 10.5% and Medicare, Medicaid and private pay non-insured increased by 1, 3.5, and 6% respectively. Overall reimbursement declined from 43.7% to 41.4%. Total outpatient profits were \$330,110 preS and \$309,391 postS and inpatient were \$186,990 and \$117,876.

Conclusions: Hurricane Katrina opened the door to cost efficiencies for LC. However, revenue is down due to increases in uninsured and fewer outpatient LCs. In planning for this type of disaster, be ready for large staff turnovers, potential changes in payor mix, a diminished employment pool, and decreases in outpatient surgery.

Education/Outcomes – P259

LONG TERM FOLLOW UP FOR LAPAROSCOPIC CHOLECYSTECTOMY IN THE ELDERLY POPULATION, CK Chang MD, RC Liu MD, JC Choi MD, SK Liu MD, T MacPherson, Department of Surgery, Kaiser Permanente, Walnut Creek CA

Background: The aim of this study was to review the long term outcome of the elderly population who underwent laparoscopic cholecystectomy (LC).

Methods: A retrospective review was undertaken to identify patients 80 years old or older who underwent LC at a Northern California Kaiser Permanente facility. All patients received their treatments between January 1996 and December 2005. Univariate and multivariate analyses of potential predictive factors were evaluated with the log-rank test and Cox regression.

Results: Of the 269 patients who underwent LC, 23% (61 patients) underwent an open cholecystectomy. Mean overall survival (OS) was 79±3 months. Mean age was 85 years (range 80-100), with 13% (34 patients) over the age of 89. Mean follow-up was 44 months (range 1-121 months). Mean length of stay 4.3 days with 28% undergoing outpatient surgery. The 30 days, 6 months and 1 year mortality were 4.5%, 10.1% and 17.9% respectively. During the study period the number of patients undergoing outpatient LC remained the same while the number of inpatient admissions tripled. Patients who were admitted for inpatient LC had a decrease survival when compared to outpatient LC, 73 months versus 88 months, respectively. None of the outpatient LC died within 6 months or was converted to an open cholecystectomy.

Conclusion: Laparoscopic cholecystectomy can be performed safely in the geriatric population. However earlier diagnosis and surgical referral may improve survival before acute presentations.

Education/Outcomes – P260

MENTORING SURGICAL RESIDENTS ON LIVE ANIMAL MODELS IMPROVES THE SAFETY AND EFFICACY OF EGD, Yoav Mintz MD, John P Cullen MD, Alana Chock MD, David W Easter MD, Mark A Talamini MD, Michelle K Savu MD, University of California at San Diego

Objective: Esophagogastroduodenoscopy (EGD) is a difficult task for surgical residents. Mentoring sessions using live animal models will significantly increase their expertise prior to performing EGD on human patients, thereby improving patient safety.

Methods: Following the approval of the UCSF IRB committee 12 surgical residents received an introductory lecture about endoscopy with an emphasis on operating the endoscope. Two 40 Kg pigs served as animal models. In order to simulate gastric lesions, one of the pigs was marked with methylene blue dye and mucosal clips in the fundus, body and antrum. The residents were randomly divided into a mentored group (n=7) and a non-mentored (NM) group (n=5). Each resident in the mentored group performed an EGD while being guided by an experienced surgeon.

Following this session the residents went on to perform an EGD on the marked pig. The NM group performed the EGD on the marked pig without prior mentoring. Performances were graded on time and accuracy. Statistical analysis was performed using the unpaired t test.

Results: In the marked pig the z-line was identified correctly in both groups +/- 2 cm. The mean time to successfully intubating the stomach was 2.1 min for the non-mentored group and only 1.2 min for the mentored one (p = 0.0289). The mean total time for the procedures were 12.2 min and 8.7 min respectively (p=0.0460). Once in the stomach, the mean time to identify one lesion was 4.6 min for the NM group but only 1.1 min for the mentored group (p = 0.0256). Only one resident from the mentored group failed to identify a second and third lesion. In the NM group two residents failed to identify a second lesion and all quit prior to identifying a third lesion due to frustration. The anatomic locations of 15 of 19 lesions (79%) in the mentored group were identified correctly. Only one lesion was correctly identified in the NM group. All NM residents pointed out that the orientation in the stomach was the most difficult and challenging part of the test.

Conclusions: Mentoring session on live animal models significantly improves the time performance, the spatial orientation and overall increases the expertise of surgical residents for this task. The input by the mentor increases the value of the hands on experience and could be adopted as a method for shortening the learning curve and improving patient safety for EGD.

Education/Outcomes – P261

THE EFFECTS OF PRACTICE ORGANIZATION ON VISUOMOTOR MISALIGNMENT ADAPTATION, A Kurahashi BS, K Leming BS, H Carnahan PhD, A Dubrowski PhD, Department of Surgery, University of Toronto

The objective of this study was to examine the impact of how the organization of a practice session (practice scheduling) influences adaptations to visuo-motor misalignments (VMM) in novices. During laparoscopic surgery, visuo-motor misalignments occur when displayed endoscopic images conflict with the visual orientation of the actual movements. However, adaptation processes can be facilitated by manipulating the way practice sessions are organized to compensate for this misalignment. Typically when practicing several related versions of the same task, random practice has been shown to interfere with practice performance compared to blocked or drill type practice, but has been shown to be superior to blocked practice in the long term retention of simple motor skills (retention or transfer performance). Borrowing from this concept, 24 novices performed a pick-up-and-replace task using laparoscopic instruments in a box trainer; there were three angles of visual field rotation (AVFR): 0°, 60° or 90°. Participants were assigned to either the Blocked or Random practice groups and all performed the pick-up-and-replace task for 30 practice trials (10 at each



AVFR). After 24 hours, retention tests were performed at each AVFR, followed by a transfer test to a new AVFR (45°). The acquisition, retention and transfer performance scores were analyzed using analyses of variance. Statistical analyses showed that as the AVFR increased, task performance decreased in both practice groups. While both groups improved performance during practice, performance in the 90° AVFR condition never achieved the same level as other AVFRs. As well, during practice, the random group performed worse than the blocked group only for the first half of practice. For the 0° AVFR retention test, the blocked group again performed better than the random group, indicating better learning for this group. However, for the more difficult AVFR conditions (60° or 90° AVFR), and for the transfer test, there were no group differences. It was concluded that the typical random learning advantage seen for simple tasks was absent due to the inherent complexity of laparoscopic skills. Thus, in terms of time-efficiency, blocked practice is preferred for VMM adaptation acquisition in novices since fewer camera manipulations are required during practice

Education/Outcomes – P262

STEREOSCOPIC VERSUS TRADITIONAL TWO-DIMENSIONAL VISUALIZATION FOR TRAINING MODULES., Ward J Dunnican MD, Carrie Jahraus MD, Randall Kimball BA, T. Paul Singh MD, Ashar Ata MPH, Suvranu De PhD, Albany Medical College, Albany, NY USA

The use of three-dimensional vision may benefit performance of surgical tasks. Our previous research has utilized a dual monitor based stereo vision system (Planar Systems, Inc.). This dual monitor based stereo vision system allows the observer to visualize three dimensional objects. We examined the benefits of stereoscopic vision among trained and untrained surgeons as to their performance of surgical training procedures.

We prospectively enrolled 20 participants into two groups: untrained (medical students, PGY1 residents) and trained (PGY4, PGY5 residents and attendings). Participants were asked to perform five repetitions of a peg transfer task first using 2D vision, then using 3D vision. After both the 2D and 3D task performance, all participants completed a questionnaire. Data analyzed included time to completion of task, errors, the development of visual strain, resolution and brightness of images, and preference for 2D versus 3D. Two-sample t-test was used to compare the means of average task completion times between trained versus untrained participants. Wilcoxon rank-sum test was used to compare the means of average times using 2D versus 3D task completion. Generalized Estimation Equations (GEE) were used to determine the effect of repetition on task completion for 2D, 3D, and transition from 2D to 3D.

When comparing 2D to 3D task performance, trained participants exhibited no overall improvement in task completion. Untrained participants exhibited a significant improvement in task completion using 3D ($p=0.04$). Trained participants performed better than untrained participants using 2D ($p=0.02$). There was no significant difference between trained and untrained participant performance using 3D ($p=0.37$). Most participants in each group preferred 3D visualization.

Stereoscopic visualization facilitates performance in untrained individuals. Trained individuals are able to adapt to non-stereoscopic monitors: this learned ability may be obviated by the use of stereoscopic visualization during surgical training. This is evident in the similar performance of both groups using 3D visualization. The use of stereoscopic visualization may promote accelerated adaptation to advanced minimally invasive procedures.

Education/Outcomes – P263

LAPAROSCOPIC APPENDECTOMY, SAGES OUTCOMES STUDY, D.S Edelman MD, Baptist Hospital of South Florida

Intro: The SAGES Outcomes Data base was queried for all Appendectomy (appy) data using CPT codes 44950, 44960 and 44970. The information was analyzed and outcomes reviewed.

Results: There were 644 patients entered into the data base.

Open appy were 210, open appy with perforation were 46 and laparoscopic appy were 388. There were 342 men, 299 women and 3 unlisted in the data base. Average age was 36 years (7 to 84). The majority of patients had general anesthesia but spinal anesthesia was used in 8 open appys and local only was used in 3 open patients. Hospital stay ranged from 0-10 days and averaged 1.5 days. One open appy stayed 10 days, one perforated open appy stayed 9 days and one lap appy stayed 7 days. Post-op abscess were documented in 14% of patients, 3 lap appy's and 1 open appy, non-perforated. Only 28 patients (4.3%) had post op outcome data entered.

Conclusions: There were many appendectomy patients entered into the data base. Post operative follow up data was sporadic and too few to draw any conclusions. It is suggested that by enhancing the Outcomes Data Base for Appendectomy useful outcomes data should be obtainable.

Education/Outcomes – P264

ON-Q PAIN MANAGEMENT SYSTEM DOES NOT REDUCE HOSPITAL LENGTH OF STAY IN VENTRAL HERNIA REPAIR, David A Edelman MD, Andre Nunn MD, Wayne State University

Background: Pain after ventral hernia repair can be significant, and result in increased hospital length of stay. There have been several recent publications evaluating the On-Q pain management system following inguinal and midline laparotomy operations. However, there is a paucity of data in regards to ventral hernia repair. The aim of this study was to evaluate the effectiveness of the On-Q system. It was our hypothesis that the On-Q system would decrease the length of stay in patients with ventral hernia repair.

Methods: This is a retrospective study of all patients that underwent ventral hernia repair by a single surgeon from January 2002 through June 2006. Only patients whose operation was primarily due to their ventral hernia were included. Patients with small hernias, or umbilical hernias were excluded.

Results: There were a total of 63 patients included in this study. Of the 63, 45 (71%) patients underwent operation, did not receive a pump, and were considered control. The average length of stay for the 18 patients with the On-Q pain system was 3.2 days and not significantly different (3.3 days) than the patients without the pain system ($p=0.9$). Of the 63 patients, 41 (65%) had their ventral hernia repaired laparoscopically. Within this sub-group, no difference in average length of stay was seen between those patients with the pump (2.5 days) and those patients without the pump (2.7 days) ($p=0.7$).

Conclusions: In this study, we found that our hypothesis was incorrect. The use of the On-Q pain management system did not result in a shorter hospital length of stay for our patients that underwent ventral hernia repair. A prospective, randomized clinical trial is necessary to validate our results.

Education/Outcomes – P265

PANTOPRAZOLE UTILIZATION ANALYSIS, David A Edelman MD, Krupa R Patel, Lisa G Hall, James G Tyburski MD, Robert F Wilson MD, Detroit Receiving Hospital, Wayne State University, Detroit, Michigan

Introduction: There has been a rapid increase in the use of proton pump inhibitors in recent years. Recently, our institution has had several shortages of IV pantoprazole lasting 7-10 days each time. The purpose of our study was to evaluate in-patient usage of IV pantoprazole. We hypothesized that hospitalized patients with upper GIB or risk for stress ulcers inappropriately received IV pantoprazole based on current literature.

Methods: This was a retrospective study of 165 consecutive in-patients identified as receiving pantoprazole from December 2004 to March 2005. Only patients receiving IV pantoprazole were included ($n=78$). Data collected included demographics, indication and dosing of pantoprazole, admitting team (surgery vs. medicine), risk factors for stress ulcers, length of stay, and mortality. Pantoprazole IV was deemed appropriate for stress ulcer prophylaxis (SUP) in



SAGES POSTER ABSTRACTS

the presence of mechanical ventilation > 48 hours or coagulopathy plus one of the following: refractory gastric pH despite being treated with histamine-2 blocker, if an adverse drug reaction to a histamine-2 blocker was known, or Helicobacter pylori suspected or documented. Pantoprazole was deemed appropriate for GIB if clear evidence was present (coffee ground emesis or guaiac positive stools). The dose of pantoprazole was considered correct if 80 mg IV q8 hours or 8 mg/hr infusion was given for SUP, or if 80 mg IV bolus followed by 8 mg/hr infusion was given for GIB.

Results: Our study population had a mean age of 54±17 years and 62% were males. Overall, 45% (35/78) of patients receiving IV pantoprazole had an appropriate indication, and 19% (15/78) received the correct dose. Of the 78 patients, 43 (55%) were treated with pantoprazole for SUP, and 35 (45%) patients were treated for GIB. We found that none of the 43 patients treated for SUP had an appropriate indication for pantoprazole, but all of the patients with GIB (35) had an appropriate indication. Of the 35 patients treated for GIB with pantoprazole, only 40% (14/35) received the correct dose. In all cases of incorrect dosing, patients were underdosed.

Conclusions: Pantoprazole is not being prescribed appropriately for stress ulcer prophylaxis in our patient population. Even the patients appropriately receiving pantoprazole, the majority were prescribed an incorrect dose. Appropriate indications and dosing of pantoprazole could eliminate the shortages seen at our institution.

Education/Outcomes – P266

A PROFICIENCY-BASED CURRICULUM FOR ROBOTIC TWO-LAYER HAND SEWN ANASTOMOSIS, Makram Gedeon MD, Mouza T Goova MD, George Walker RN, Farid J Kehdy MD, Homero Rivas MD, Daniel J Scott MD, University of Texas Southwestern Medical Center, Dallas, Texas.

Introduction: Validated curricula are now widely available for laparoscopic skills but not for robotic surgery. The purpose of this study was to develop and evaluate a proficiency-based curriculum using an inanimate model for two-layer hand sewn anastomosis using the daVinci robot.

Methods: The model was developed by repetitive iterations using various materials; a Daisie model holding 2 parallel foam intestinal organs was selected. The anastomosis was created using the daVinci system with 2 needle drivers (primary arms) and scissors (4th arm), a 15mm bougie, and four 18cm braided sutures placed in a running fashion on 3cm premarked segments of foam. Objective scoring included time and errors based on a previously validated system; errors included suture fraying, breakage, or laxity, knot security, inaccurate bite size or travel, and anastomotic size and patency. A proficiency level was defined as the mean score of 3 repetitions performed by an expert with extensive robotic experience (score 55 or 35 minutes with no errors). After an orientation, robotic novices (n=3, PGY5-Fellow) performed 3-5 repetitions to determine feasibility, construct validity, and benefit of training. Workload was assessed after each repetition using the validated NASA-TLX visual analogue scale. Comparisons were by t-tests; values are mean ± s.d. (p<0.05 considered significant).

Results: The curriculum required 25 man-hours for development and the model was suitably durable for repetitive practice; materials cost less than \$100 for the entire study with sutures donated. Baseline trainee and expert performance were significantly different (19.3 ± 12.1 vs. 54.7 ± 4.0, p=0.01), supporting construct validity. Trainees significantly improved after practicing 3.6 ± 1.3 hours, as indicated by baseline and final scores (19.3 ± 12.1 vs. 50.3 ± 3.0, p=0.01), but none reached proficiency in 3-5 repetitions. No difference in workload was detected between novices and experts (68 ± 23 vs. 66 ± 7, NS).

Conclusions: This model is cost-effective and suitable for proficiency-based robotic anastomosis training. With addi-

tional training time, it is anticipated that novices may reach expert performance. Interestingly, robotic surgery seems to even the playing field from a workload standpoint while trainees are acquiring the skills necessary to perform a complex task. Such training may ultimately play a role in surgeon credentialing on robotics prior to proctorship or adoption into practice.

Education/Outcomes – P267

THE CONSTRUCT VALIDITY OF COMPUTER-DERIVED PERFORMANCE METRICS FOR SELECTED SIMULATED LAPAROSCOPIC TASKS, J. A Oostema MD, Matthew Abdel BS, Jon C Gould MD, University of Wisconsin School of Medicine and Public Health, Department of Surgery

Introduction: A surgical skills assessment tool is said to demonstrate evidence of construct validity if users with more experience, and by inference more skill, perform better or more efficiently. Computer derived motion metrics such as smoothness (the number of times an instrument tip changes velocity during a task) and path length may be more sensitive measures of skill for a particular task than traditional metrics such as time.

Methods: Twenty-four medical students (third year), 19 surgical residents (PG1-5), and 3 attending surgeons were asked to perform four different tasks 3 times in a hybrid computer-based physical laparoscopic trainer (ProMIS, Haptica Inc., Dublin). The 4 tasks in order of complexity were laparoscopic orientation (Task 1), object positioning (Task 2), sharp dissection (Task 3), and intra-corporeal knot tying (Task 4). Metrics recorded were time, path length, and smoothness. Laparoscopic operative experience for each user was quantified using case logs. Correlations were determined using regression analysis and ANOVA.

Results: A statistically significant correlation was observed between experience and performance for all three metrics for tasks 2-4 (all p< 0.01). Smoothness was the only metric to correlate in the laparoscopic orientation task. Within tasks, time and smoothness correlate much more strongly with experience and to a similar degree. The strongest correlation was observed for the knot tying task (r2=0.60 for time and 0.59 smoothness). An r2=1.0 would represent a perfect correlation between experience and the specified metric.

Conclusions: The computer-derived metrics measured by the hybrid trainer correlate with laparoscopic experience. Further study is necessary to determine if specific metrics are better indicators of actual skill.

Education/Outcomes – P268

INSURANCE VARIATIONS IN DEMOGRAPHICS AND OUTCOMES FOR GASTRIC BYPASS SURGERY, J Hagedorn BA, Encarnacion BA, E Ketchum BS, I Liu BS, DB Williams MD, J Morton MD, Stanford Departments of Surgery

Introduction: Bariatric surgery is now increasing recognized by insurers as an important therapy. Little is known regarding the variation in demographics, serology, and outcomes among different insurance groups. The purpose of this study to identify variations among different insurance groups.

Methods: A retrospective chart review of patients undergoing laparoscopic Roux en Y gastric bypass between July 20023 and June 2006 at the Stanford Hospital was conducted. Patient demographics, comorbidity resolution, cardiac risk factors, and weight loss in different insurance groups were compared using ANOVA and chi-squared analysis as appropriate. The patient population was divided into three groups: private insurance, Medicare, and Medicaid.

Results: 479 patients were identified with 74% having private insurance, 10% Medicare and 8% Medicaid. The remainder of the patients was excluded in this review. The statistically significant results are below.

	Private	Medicare	Medicaid
% Female	81	92	97
% BMI>50	28	84	37
Trigly prep	172	145	254
DM resolution	80	88	100
%BMI Loss-12 mo	32	34	38



Conclusions: Patient demographics, serologics, and outcomes differed among insurance groups. These differences may be related to access to care and socio-economic status for these different insurance groups. Recognizing that variation exists for insurance status among gastric bypass patients may allow for targeted and tailored care.

Education/Outcomes – P269

A SYSTEMATIC REVIEW OF EDUCATIONAL INITIATIVES DESIGNED TO IMPROVE LAPAROSCOPIC SKILLS, Fatima A Haggag MPH, Eric C Poulin MD, Joseph Mamazza MD, Robin P Boushey MD, The University of Ottawa, The Ottawa Hospital

Introduction: In the current era of cost containment, reduced training hours and schedule constraints, increased pressure has necessitated innovative training strategies for teaching surgical skills outside of the OR. Consequently, many alternative training methods have been proposed for teaching lap skills. However, the effectiveness of the existing training models in teaching lap skills has not yet been proven. We aim to determine the effectiveness of educational methods designed to improve the lap skills of surgical novices.

Methods: We searched the Cochrane Library, MEDLINE, Health Star, EMBASE, ERIC and the references list of related reviews and articles. From these, we identified studies of technical surgical skills training methods where educational strategies were used to determine their effects on improving the lap skills of surgical novices.

Results: From an initial 4251 abstracts, the review of full text identified 21 RCTs with 552 participants that described technical surgical skills interventions focused on improving lap skill performances of novices and reported objective measures of surgical performance. The quality of reporting and methodology of included studies were generally poor by today's standards. These RCTs often lacked adequate sample size and baseline group comparability. The majority of interventions used computer simulations (CS) (10/21) or video box simulations (VBS) (5/21) to teach lap skills. Training on CS or VBS combined with structured didactic training helps novices adapt to the fulcrum effect and perform surgical tasks significantly faster. No economic evaluations comparing surgical educational strategies with standard training or other educational interventions were identified.

Conclusions: Certain elements appear to be consistently associated with improvement in basic lap skills. However, the design features of the studies make it unclear as to which characteristics are beneficial. Further research is needed to explore these elements.

Education/Outcomes – P270

COMPARISON AND VALIDATION OF TWO DIFFERENT SURGICAL SKILLS SIMULATORS, Dieter Hahnloser MD, Rachel Rosenthal MD, Christian Hammel, Daniel Oertli, Markus Müller, Pierre-Alain Clavien, Department of Visceral and Transplantation Surgery, University Hospital Zurich, Switzerland

Background: Simulators are increasingly incorporated in surgical training and validation is important. The simulations need to resemble the task they are based upon (face validity) and the simulator should be able to differentiate between levels of experience (construct validity).

Aim: To assess two different types of computer-based simulators: the fully computerised virtual reality (VR) simulator Xitact LS500 (VR-simulator) and the hybrid ProMisTM simulator.

Methods: 146 participants (61%) of the 22nd Davos International Gastrointestinal Surgery Workshop performed on a voluntary basis three similar exercises (camera navigation, clip and cut, and dissection) on the two different simulators. Objective performance parameters recorded by either simulator and subjective evaluation by questionnaire were compared between beginner (n=73) and advanced participants (n=73).

Results: The camera navigation exercise was completed by 52% of the participants on the VR- and by 47% on the hybrid simulator with no difference in performance parameters between beginners and advanced trainees. The hybrid simulator was graded more realistic (70% vs. 20%, p=.001) and

more useful (65% vs. 36%, p=.043) than the VR-simulator. Participation was higher at the clip and cut exercise (75% VR- and. 52% hybrid simulator) and advanced trainees performed significantly better (shorter tool-tip-travel distance, smoother, quicker and with higher score) on both simulators compared to beginners. The clip and cut exercise was graded more realistic on the hybrid (81% vs. 44%, p=.007) and similar useful on both simulators (77% vs. 72%). The dissection exercise was completed more often on the hybrid simulator (47% vs. 23%, p=0.002). Only the hybrid simulator was able to distinguish between advanced trainees and beginners, with significantly higher scores for all performance parameters for the latter. The hybrid simulator was graded more realistic (70% vs. 33%, p=.016) and more useful (83% vs. 62%, p=.12). Overall, acceptance of requirement to train on and to be evaluated by such simulators is still low (53% and 50%, respectively).

Conclusion: Fully computerized VR- or hybrid simulator performance parameters can distinguish between beginner and advanced trainees for perceptual motor skills (proving construct validity), but not for visuo-spatial exercises such as the camera navigation.

Education/Outcomes – P271

GRADUATING LAPAROSCOPIC FELLOWS WOULD PERFORM MORE SOLID ORGAN AND BILIARY PROCEDURES IN THEIR "IDEAL" FELLOWSHIP THAN THEY ACTUALLY PERFORMED IN FELLOWSHIP TRAINING, Jason Harper MD, David S Tichansky MD, Atul K Madan MD, Division of Minimally Invasive Surgery, Department of Surgery, University of Tennessee Health Science Center, Memphis, TN, USA

Introduction: With the increase in minimally invasive surgery (MIS) fellowships, the concept of the ideal and standardized training curriculum is important. We have previously presented data to support the hypothesis that the expected procedure mix in current MIS training is different from what current MIS fellows would call their "ideal" fellowship. We hypothesize that upon completion of MIS fellowship training, graduating fellows would have performed a higher volume of certain types of cases in their "ideal" fellowship.

Methods: A survey of recently graduated MIS fellows examined the case mix and volume they performed as fellows and the case mix and volume they would have performed in an "ideal" fellowship. Differences between actual and ideal case volume were analyzed by Wilcoxon test.

Results: To date, 12 questionnaires were returned. All but one participant completed a one-year fellowship. The average fellows per program were 1.8. Fellows performed an average of 269.5 procedures including 42.4 diagnostic and 3.3 therapeutic endoscopies. All participants were satisfied overall with the actual case load they performed. All but one participant were satisfied overall with the actual case diversity in their fellowship. All participants felt well prepared for practice. Graduating fellows believed their actual training was equivalent to "ideal" training in ventral and inguinal hernia repair, gastric bypass, lap banding, colectomies, antireflux, cholecystectomy, appendectomy, thoracoscopy, therapeutic and diagnostic endoscopy, and gastric, esophageal, adrenal, and kidney resections (p=ns). However, their actual training fell short of their "ideal" case volume in CBD exploration and spleen, liver, and pancreas resections (p<0.05).

Conclusion: In 4 of 19 (21%) MIS procedure types, recently graduated fellows performed less case volume than in an "ideal" fellowship. There is a continuing need to better define and standardize the ideal MIS fellowship curriculum.

Education/Outcomes – P272

EXPERT PERFORMANCE CHARACTERISTICS OF A NEW VIRTUAL REALITY SURGICAL SIMULATOR, Michael C Hsu MD, John R Romanelli MD, Jay N Kuhn MD, David B Earle MD, Ron W Bush BS, Neal E Seymour MD, Baystate Medical Center and Tufts University School of Medicine

Introduction: In order to define appropriate surgical performance objectives for criterion-based simulation training



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of basic laparoscopic skills, expert performance characteristics of a new laparoscopic virtual reality (VR) surgical simulator were determined.

Methods: 5 expert laparoscopic surgeons repetitively performed 6 manipulative tasks (n=14 task trials) on a SurgicalSIM VR simulator (METI, Sarasota, FL; SimSurgery AS, Oslo, Norway) during distributed 1 hour sessions. VR tasks consisted of abstract object manipulation (4 tasks), and part-task laparoscopic cholecystectomy exercises (2 tasks) set at intermediate difficulty configurations. All tasks were scored for time, instrument tip path length, and errors with mean performance determined for 4 iterations of each task after stable performance was achieved.

Results: Performance improvement occurred for all tasks, and stable performance was achieved after a variable number of iterations (2-10 task trials). Expert performance data are shown (Table).

Task	Time (sec)	Path Length(cm)	Errors
Retract-Dissect	84±6	253±25	3±1
Traverse Tube	72±9	258±25	2±1
Place Arrow	92±11	201±20	3±2
Apply Clips	42±3	75±8	1±0
Dissect GB	100±14	121±11	4±1

Conclusions: Variability in number of tasks to achieve stable performance is an expected consequence of skills variations between subjects. At the selected difficulty configurations only very small additional incremental performance improvements appear possible after 14 task trials. To determine suitability of these configurations to train novice surgeons, comparisons to completed learning curves for novices must be made.

Education/Outcomes – P273

SHOULD HAND SUTURED GASTROJEJUNOSTOMY BE THE GOLD STANDARD - LESSONS LEARNT IN OVER 970 CONSECUTIVE LAPAROSCOPIC GASTRIC BYPASS CASESWITH-OUT LEAK., Ashutosh Kaul MD, Thomas Sullivan BS, Dominick Artuso MD, Edward Yatco MD, Thomas Cerabona MD, New York Medical College

Aim of this presentation is to communicate our series of 970 consecutive laparoscopic gastric bypasses done at a single center without any leak from gastrojejunostomy (GJ).

This is a retrospective analysis of prospectively maintained data from a tertiary care center. Data was analyzed from Jan 2001 till June 2006. Redo cases, sleeve gastrectomies, lap bands and biliopancreatic diversions were excluded. All cases were done by four bariatric surgeons and by fellowship trainees under their guidance.

Our technique for creation of the GJ is a four layered hand sutured (inner absorbable and outer non absorbable) sized over an 18 French orogastric tube. The roux limb is brought up in a retrocolic retrogastric route. We test the anastomosis intraoperatively using air injection and by gastrograffin swallow the next day. 970 cases were done. 81 of these cases were done with Da Vinci robotic assistance. Average BMI was 49 (range 35 to 87) and average age was 41 years (range 16 to 75 years). 30 of these cases were over 65 years old. There were 3 conversions to open and 3 mortalities. One in a patient who threw an emboli to small bowel, one with PE at 27 days after surgery and third with aspiration pneumonia at 29th day after surgery). The 30-day readmission rate was 6.1%. Stricture rate was less than 2% with all being managed by endoscopic dilation. Both marginal ulcer and wound infection rate were under 1%. Median length of stay was 2 days.

On comparison of other series in literature we find that the hand-sutured method has the least reported incidence of leak and stricture rate. Though technically challenging it seems to have excellent results. This presentation and those in literature seem to suggest that sutured techniques may have value in preventing leaks. Further randomized multi-institutional studies may be needed to better define the gold standard in creation of gastrojejunostomy in laparoscopic gastric bypass.

Education/Outcomes – P274

SYSTEMATIC REVIEW OF THE DATA PROVIDED FOR REGULATORY APPROVAL OF NOVEL ENDOLUMINAL GERD THERAPEUTICS., Pavi S Kundhal MD, David R Urbach MD, University Health Network, Toronto, Canada.

Background: GERD is a common medical condition, for which a variety of medical and surgical therapies are available. Recently, several endoluminal devices for treatment of GERD have entered the marketplace. While approval of new pharmaceuticals requires a substantial body of evidence of effectiveness and safety from large controlled trials, the amount of medical evidence required for approval of medical devices is typically much smaller.

Methods: Our objective was to review the data submitted for approval of new endoluminal technologies for GERD by the Food and Drug Administration (FDA). Commonly used endoluminal therapies were identified through literature review and consultation with local experts. Applications to the FDA were then reviewed using the electronic versions available on the FDA website. When the evidence for clinical approval was based on a predicate device, that data was used.

Results: Currently, there are 5 devices on the market (one was recalled in 2005), and we were able to find information on 4. In three cases approval of the current form of the therapy was based on effectiveness and safety data from a predicate device, with approval based on being 'substantially equivalent.' In terms of assessing clinical safety and effectiveness, single prospective multiple centre trials were used. The average number of patients in each study was 65.3. The longest follow-up of these four devices was 12 months. In all devices, biocompatibility and long term potential toxicity were evaluated in animal models. One device was subsequently recalled by the FDA in 2005, due to reports of adverse events.

Conclusion: Endoluminal GERD therapeutics are commonplace. However, very little human data on long term safety and effectiveness are available prior to their approval for public use. This is in contrast to the large randomized controlled studies that are typically required for new pharmaceuticals.

Education/Outcomes – P275

IMPROVEMENT OF LAPAROSCOPIC SKILLS USING SIMULATORS FOR MEDICAL STUDENTS, Masashi Kurobe MD, Kazuhiko Yoshida MD, Katsuhiko Yanaga MD, Department of Surgery, Jikei University School of Medicine

INTRODUCTION: For safe performance of laparoscopy, surgeons must learn differences between open and laparoscopic surgery for which a training system should be developed to improve laparoscopic skills. The purpose of this study was to evaluate the effects of laparoscopic training by simulators for medical students who have "0" experience in laparoscopic surgery.

METHODS: For a task to assess laparoscopic skills, we tested "intracorporeal knot" which requires needle transferring, placement of a suture, and knot tying. Fifteen medical students were enrolled in this study. None of them had previous laparoscopic experience. These students were divided into two groups; training group (n=9) or non-training group (n=6). Training group was given the task to practice the laparoscopic simulators for 5-10 minutes per day for one month. Speed of performance was measured before and after the training in each group.

RESULTS: Training group showed a significant improvement in performance after practice as compared to before (240.1 ?) 84.9 to 87.6 ?) 64.5 sec. [Mean ?) SD]) (p<0.05). Non-training group showed no difference (239.0 ?) 53.7 to 210.0 ?) 59.8 sec.). The training group after practice exhibited significantly better performance as compared to the non-training group (p<0.05).

CONCLUSIONS: The laparoscopic simulators showed a significantly positive effect or improving laparoscopic skills even to the medical students. This study demonstrates that the development of training system is crucial to laparoscopic surgeons and that the motivation for persistent practice is important. These simulators may also help to recruit medical students to surgery.



Education/Outcomes – P276

MINIMALLY INVASIVE SURGERY FELLOWSHIP - A 6TH YEAR OF RESIDENCY?, A Park MD, B T Heniford MD, S M Kavic MD, T H Lee MD, University of Maryland, Baltimore, MD; Carolinas Medical Center, Charlotte, NC

Introduction: With the expanding breadth and acceptance of Minimally Invasive Surgery (MIS) in general surgery, the acquisition of advanced laparoscopic skills is becoming increasingly important for residents. Minimum standards have been set for American graduates by the Accreditation Council for Graduate Medical Education (ACGME). Our aim was to assess the evolving experience of MIS fellows and compare it to the ACGME requirements, as well as the fellow's own perception of the number of cases required for competence.

Methods: A survey was designed and distributed to 80 MIS fellows. There were a total of 54 responses. Results were compared to a similar survey distributed in 2003 (before the advent of the 80-hour work week) for which there were 31 responses, and to the ACGME statistics for 2004-2005. Fellows were asked to detail their operative experience during residency, as well as to specify the minimum number of cases they felt were needed to achieve competence. Other questions probed expectations and motivations for applying to fellowship.

Results: Competence estimates were similar from 2003 to 2006. Current ACGME guidelines call for a total of 25 advanced and 60 basic cases. Although these numbers were easily attained by most fellows, they still describe graduating from residency with competence in only the most basic laparoscopic cases, despite some overall increase in the number of advanced cases performed (see table).

	ACGME 2004-5 average	Mean # performed as resident by 2003 MIS fellows	Mean # performed as resident by 2006 MIS fellows	Mean # estimated by 2006 fellows as needed for competence
Cholecystectomy	100.6	115.0	109.9	34.4
Colectomy	6.5	5.9	16.0	27.1
Fundoplication	4.7	8.3	7.1	21.8

Conclusions: Residency programs do not appear to have kept pace with the growth of MIS as an accepted or preferred operative approach to surgical problems. MIS fellowship has been a popular choice among surgical residents, as fellows feel they are not competent to perform advanced procedures based on their resident experience alone. Interest in research or an academic career is at best a secondary consideration. It is not unreasonable to suggest that the MIS fellowship has simply become, for many, a sixth year of surgical residency.

Education/Outcomes – P277

PATIENT PERCEPTION OF MEDICARE FEE SCHEDULE OF LAPAROSCOPIC PROCEDURES, Atul K Madan MD, David S Tichansky MD, Jason Harper MD, University of Tennessee Health Science Center

Introduction: It seems that public perception is that physicians receive substantial payments for procedures. This investigation explores patient perception and opinion of Medicare reimbursements to surgeons related to laparoscopic surgery. Our hypothesis was that patients think the surgeon Medicare fee schedule is higher than actuality.

Methods: Patients filled out an IRB exempted survey. The survey included a written description of laparoscopic gastric bypass (LGB), laparoscopic band placement (Lap Band), laparoscopic cholecystectomy (Lap Chole) and Initial Patient Visit for 30 minutes (IPV). All participants were asked to give their thoughts of what Medicare currently reimburses for these procedures as well as what the payment should be. The survey also asked other questions about reimbursement related to Medicare.

Results: There were 96 participants in the investigation with 43% of patients not filling in reimbursements for at least one procedure. Table demonstrates what the perceived mean reimbursements by each procedure. 88% of patients looked at their bills from physicians and insurance companies carefully. 98% thought Medicare should pay more for more difficult cases. 85% thought Medicare should pay

more if the patient visits the surgeon more times during the global period. 32% feel Medicare pay physicians well and 91% thought that Medicare should increase fees. 42% patients felt that private insurance companies pay more than Medicare.

Procedure	Perceived Fee	Suggested Fee	P value
LGB	\$14,963	\$16,877	= 0.26
Lap Band	\$11,971	\$14,572	= 0.23
Lap Chole	\$8,746	\$10,555	= 0.19
IPV	\$144	\$181	= 0.10

Conclusion: Most of our patients overestimated what Medicare currently pays for some laparoscopic procedures. Surgeons need to do a better job in educating patients about the Medicare fee schedule.

Education/Outcomes – P278

ENDOSCOPIC SURGICAL SKILL QUALIFICATION FOR LAPAROSCOPIC CHOLECYSTECTOMY IN JAPAN, Sumio MATSUMOTO PhD, Hiromi TOKUMURA PhD, Yuichi YAMASHITA PhD, Taizo KIMURA PhD, Toshiyuki MORI PhD, Masaki KITAJIMA PhD, ESSQS Committee of the Japan Society for Endoscopic Surgery

The Japan Society for Endoscopic Surgery (JSSES) started Endoscopic Surgical Skill Qualification (ESSQS) in 2004, and carried out second examination in 2005. Assessment was performed by reviewing documents, which included laparoscopic surgery experiences, and qualifying unedited video tape by two independent referees. We adopted two criteria to evaluate surgical skills, as common and procedure-specific criteria to each gastrointestinal organ. Common criteria were given 60 points regarding basic endoscopic practice, and procedure-specific criteria were given 40 points to evaluate specialized skills of the practice. Laparoscopic cholecystectomy was evaluated by ten practice steps and degree of difficulty in completion. The proper skill evaluation was by the following items, elevating gall bladder (GB), retracting duodenum and transverse colon, exposing layer around cystic duct, identifying cystic artery and right hepatic artery, identifying common bile duct, transecting cystic duct, layer of dissecting from liver bed, bleeding control at liver bed and retrieval of GB. Each step was given three points respectively, and further points were added by referee, from neither for easy case to 10 points for difficult case according to the difficulty to complete.

In 2004, 110 surgeons were qualified among 170 candidates (66%). In 2005, 62 surgeons were qualified among 139 candidates (45%). To assess inter-rater agreement between referees, Cohen's weighted kappa value was calculated. It was 0.18 in 2004, up to 0.32 in 2005. These results were accomplished by revision of criteria and frequent meeting to make consensus among referees. We hope that this ESSQS will secure good outcome to decrease the number of complications and incidences of endoscopic surgery in Japan.

Education/Outcomes – P279

AUTOMATED PROMIS SIMULATOR METRICS PREDICT READINESS FOR FLS CERTIFICATION, Anthony L McCluney MD, J Cao, G N Polyhronopoulos MD, D D Stanbridge, L S Feldman MD, G M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal, QC, Canada

INTRODUCTION: SAGES Fundamentals of Laparoscopic Surgery (FLS) tasks are validated measures of technical skills. Certification requires travel to a testing site and a fee, thus a reliable method of predicting readiness for the exam would be advantageous. The ProMIS simulator (Haptica) provides automated scoring. FLS tasks can be placed in the ProMIS simulator and scored using time (TT), as well as motion analysis metrics: instrument path length (PL) and instrument smoothness (IS). This study was designed to evaluate these automated ProMIS metrics and their ability to predict readiness for FLS certification.

METHODS: 33 subjects (12 students, 16 residents PGY 1-4, and 5 experts) performed FLS tasks in the standard simulator and in ProMIS. Tasks were scored by FLS and ProMIS metrics. For each ProMIS metric, the total score was calcu-



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lated by summing the scores for the 5 FLS tasks. Pearson's correlations were calculated for ProMIS metrics versus standard FLS scores. Multivariate regression analysis identified independent predictors of standard FLS performance. These variables were then used for sensitivity and specificity calculations in order to establish a ProMIS pass-fail score for predicting readiness for FLS certification. Significance was defined as $p < 0.05$.

RESULTS: TT ($r = -0.82$), PL ($r = -0.56$), and IS ($r = -0.75$) all correlated significantly with standard FLS score. Multivariate regression analysis identified TT as the strongest predictor of FLS score. A TT score of 1000 maximizes sensitivity and specificity and was identified as the pass-fail for reliably predicting FLS performance.

CONCLUSIONS: Automated ProMIS metrics correlate well with standard FLS performance. In this study sample, a TT score less than 1000 reliably predicted a passing FLS certification score.

Education/Outcomes – P280

INTER-RATER AGREEMENT IN ENDOSCOPIC SURGICAL SKILL QUALIFICATION SYSTEM IN JAPAN, Toshiyuki Mori MD, Taizo Kimura MD, Tatsuro Yamakawa MD, Masaki Kitazima MD, Kyorin University, Fujinomiya Municipal Hospital, Teikyo University, Keio University

As we previously reported, the Japan Society of Endoscopic Surgery (JSES) has founded the Endoscopic Surgical Skill Qualification System (ESSQS) in an effort to encourage sound advances in techniques and more widespread use of endoscopic procedures in Japan. In addition to paperwork, applicants were requested to submit unedited videotapes that recorded laparoscopic procedures. For objective analysis of the skill level of each applicant, criteria was made for general and organ specific skills, sharing 60 and 40 points, respectively. Submitted tapes were evaluated with these criteria in a double blind fashion. When two judges scored more than 70 points, sanction was given, and when the decision splitted, the tape was subjected to the third judge or discussion by the working group of each organ. In the first year of 2004, a total of 422 surgeons applied, 212 surgeons were qualified (53%). In addition to the fact that granting rate varies widely in organs, ranging 28% in the esophagus to 65% in the biliary tract, inter-rater agreement (weighted kappa value, Cohen) of the two judges was as low as 0.31, ranging 0.18 in the biliary tract to 0.40 in the stomach. Toward the 2005 qualification, consensus meetings were held to improve inter-rater agreement. In the stomach group, decision was made to limit the procedure to laparoscopic distal gastrectomy for the better agreement. In 2005, a total of 275 surgeons applied, 128 surgeons were qualified (47%). Inter-rater agreement of the two judges improved to 0.40, most remarkably in the stomach group from 0.37 in 2004 to 0.59 in 2005. Preliminary calculation shows that the complication rate of qualified surgeons compares significantly better than the others. In the process of revision of criteria and consensus discussion, procedures are much standardized. ESSQS is the first system to certify technical aspect of endoscopic surgery, run by an academic body. We believe this system will enhance the surgical skills of endoscopic surgeons and thus decrease adverse outcome. It may also play an important role in the education system of endoscopic surgery.

Education/Outcomes – P281

SELF-REPORTED LEARNING PREFERENCE IS NOT RELATED TO GAINS IN SELF-CONFIDENCE LEVELS OF TRAINEES UNDERGOING BASIC SKILLS TRAINING IN MINIMALLY INVASIVE SURGERY WHEN COMPARED TO TEACHING METHOD EMPLOYED, J T Paige MD, T Yang MD, Y Tang MS, R Hoxsey MD, A Marr MD, S Weintraub MD, J Hunt MD, S Chauvin PhD, Departments of Surgery, Obstetrics and Gynecology, Office of Medical Education, Research and Development Louisiana State University Health Sciences Center, New Orleans, LA

Background: Teaching basic skills in minimally invasive surgery (MIS) has become an essential component of general surgery residency curricula. It can be a time intensive

endeavor for busy faculty. Optimizing learners' ability to acquire such skills efficiently, therefore, is desirable. Increased self-confidence is the first step toward skill acquisition. We examined if trainee self-reported learning modality preference and method of teaching corresponded to improved self-confidence in MIS basic skills training.

Methods: From March to July, 2005, a total of 108 medical students, general surgery residents, and ob/gyn residents underwent instruction in three basic tasks (two-handed peg transfer, one-handed peg transfer, key threading) on an inanimate box trainer during a single session. Instruction was either video-based ($n = 39$), text-based ($n = 34$), or faculty tutored ($n = 32$). Participants provided pre-session information regarding self-reported learning modality preference (aural, visual, written). They also completed pre- and post-session attitudinal questionnaires using a 5-point Likert-type scale focusing on self-confidence in performing various targeted basic MIS skills. Total mean scores and mean gains were calculated from the questionnaires. ANCOVA analysis was used to determine the effect of learning modality and teaching method on self-confidence.

Results: Self-confidence ratings were complete in 105 forms. Although participants demonstrated a significant mean gain in self-confidence following the session ($\Delta = 0.65$, $p < 0.0001$ paired t-test), mean gains were similar comparing participants receiving instruction compatible with their preferred learning modality (e.g. video-based with visual learning preference) and those who did not (e.g. video-based with written learning preference).

Conclusion: Self-reported learning modality preference was not related to the mean gain in self-confidence of trainees undergoing MIS basic skills training. Compatibility between teaching method and preferred learning modality did not influence self-confidence for performing targeted skills. Further investigation is necessary to determine whether accommodating trainees' preferred learning modalities by teaching method plays a role in enhancing actual skill performance.

Education/Outcomes – P282

SELF-REPORTED VIDEO GAME EXPERIENCE IS ASSOCIATED WITH INCREASED SELF-CONFIDENCE LEVELS OF TRAINEES PRIOR TO BEGINNING BASIC SKILLS TRAINING IN MINIMALLY INVASIVE SURGERY, J Paige MD, T Yang MD, Y Tang MS, R Hoxsey MD, A Marr MD, S Weintraub MD, J Hunt MD, S Chauvin PhD, Departments of Surgery, Obstetrics and Gynecology, Office of Medical Education, Research and Development Louisiana State University Health Sciences Center, New Orleans, LA

Background: Reduced tactile sensation, two-dimensional depth, and the fulcrum effect make minimally invasive surgery (MIS) a challenge both to teach and learn. Video game experience appears to enhance MIS skills acquisition, but the reason for this observation is far from clear. We examined if prior gaming experience helped with MIS skills acquisition by boosting self-confidence in learners.

Methods: From March to July, 2005, a total of 108 medical students, general surgery residents, and ob/gyn residents underwent instruction in three basic tasks (two-handed peg transfer, one-handed peg transfer, key threading) on an inanimate box trainer during a single session. Participants provided pre-session information regarding video game experience. They also completed pre- and post-session attitudinal questionnaires using a 5-point Likert scale focusing on self-confidence in performing various objectives-related basic MIS skills. Total mean scores and mean gains were calculated from the questionnaires. ANOVA and ANCOVA analysis was used to determine the effect of prior video game experience on these scores.

Results: Three participants failed to complete a pre-session questionnaire, leaving 105 individuals for which self-confidence values could be determined. Participants with prior video game experience within the last year had higher pre-session self-confidence levels compared to those without such experience (2.32 ± 1.01 vs. 2.15 ± 0.86 , $p = 0.01$). Additionally, participants with self-reported expertise in video game use had higher pre-session self-confidence lev-



els compared to those who self-reported as novices (2.34 ± 0.93 vs. 2.08 ± 0.91 , $p = 0.04$). Mean gains in self-confidence post-session, however, were similar between those participants with video game experience with those who had little experience.

Conclusion: Prior video game experience within the last year and self-reported expertise in video game use give learners in MIS skills acquisition increased levels of self-confidence prior to training. Such increased self-confidence may predispose individuals to be more receptive to learning.

Education/Outcomes – P283

METASTATIC BREAST CARCINOMA INITIALLY PRESENTED AS ACUTE CHOLECYSTITIS. CASE REPORT AND REVIEW OF THE LITERATURE.

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Introduction: Breast cancer mostly metastasizes to the liver, bones and the lungs. Less frequently, metastatic breast cancer is found in the central nervous system, the skin, endocrine organs (ovary, adrenal, pituitary), the pericardium and the peritoneum. The gallbladder is an infrequent site of metastatic malignant disease although malignant melanoma, renal cell carcinoma and cervical carcinoma have been documented.

Methods and Procedures: Because metastasis of breast carcinoma to the gallbladder has rarely been reported, we describe such a case that was incidentally recognized after cholecystectomy for acute cholecystitis, in an otherwise disease free 46 years old female who had undergone modified radical mastectomy for breast cancer two years ago. The patient, being considered as one with metastatic breast carcinoma, was subjected on adjuvant chemotherapy consisting of doxorubicin, cyclophosphamide and 5-FU. A year later she died because of generalized peritoneal seeding of the tumor.

Conclusions: Metastatic gallbladder involvement is rare, especially with primary breast carcinoma. It usually leads to symptoms of pain abdomen, mimicking acute or chronic cholecystitis. Its prognosis is poor after the development of gallbladder metastases. Thus, pain abdomen in a patient with breast carcinoma should be suspicious of metastatic gallbladder and treated aggressively as it portends a poor prognosis

Education/Outcomes – P284

ABSTRACT VIRTUAL REALITY TRAINING DEVELOPS CORE LAPAROSCOPIC SKILLS COMPARABLE TO EXPERIENCED LAPAROSCOPIC SURGEONS: RESULTS OF A PROSPECTIVE RANDOMIZED TRIAL COMPARING TWO VIRTUAL REALITY TRAINERS.

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Introduction: While simulation is becoming more widely accepted in surgical training, comparative trials on the training effectiveness of these simulators are lacking. We sought to compare the effectiveness of two abstract virtual reality trainers to train laparoscopic skills as assessed by the Fundamentals of Laparoscopic Surgery (FLS). We then compared the post training performance of the novice subjects with a group of experienced surgeons.

Methods: 20 novice medical students were recruited. Each subject performed a pre-test consisting of 3 FLS tasks - Peg Transfer (PT), Pattern Cut (PC) and Intracorporeal Suture (IS) - placed in the ProMIS augmented reality simulator (Haptica, Ireland). They were then randomized to train to predetermined levels of proficiency on 3 tasks of the Minimally Invasive Surgical Trainer-Virtual Reality (MIST-VR) (Mentice, Sweden) or the Rapid Fire/Smart Tutor (RFST) (Verifi, Elizabethtown, PA). After reaching the proficiency levels, both groups then took a post test consisting of 3 trials of the

same tasks used for the pre-test. Post test performance by both groups was then compared to a control group, composed of 10 experienced surgeons who had completed the same post test.

Results: MIST-VR and RFST groups demonstrated statistically significant improvement from the pre-test to the post test on all 3 FLS tasks ($p < 0.0001$). There was no significant difference in post test performance between the MIST-VR and RFST groups. When the simulation trained groups were compared to experienced controls there was no significant difference in performance with respect to PT. The experienced controls did significantly outperformed the MIST-VR group in PC ($p < 0.01$) and IS ($p < 0.05$), but differences between the experienced controls and the RFST group did not reach statistical significance.

Conclusion: Simulation based training on either the MIST-VR or the RFST simulator improves the skill level of novices as assessed by FLS. The post training skill level of these novices compares favorably with a group of experienced surgeons. Virtual Reality trainers, such as RFST and MIST-VR, train fundamental laparoscopic skills equally and to a level comparable to a group of experienced practicing surgeons.

Education/Outcomes – P285

A SINGLE MASSED SKILLS COURSE FOR SURGERY TRAINEES DOES NOT CONVEY LONG TERM PERFORMANCE BENEFIT.

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BACKGROUND: Promotion in our residency program is contingent on achieving minimal performance criteria for partial tasks and passing Fundamentals of Laparoscopic Surgery (FLS). Basic Endolaparoscopic Surgery Tasks (BEST) are the checkerboard, bean drop, terrible triangles, endostitch, and intracorporeal suturing. Top Gun Laparoscopic Skills and Intracorporeal Suturing Course (TG) uses similar tasks with feedback and consistently improves skill acquisition in videotrainers. The aim of our study was to determine whether a structured TG course augments performance on FLS two years later.

METHODS: We retrospectively compared FLS scores among resident trainees who took TG course to residents who did not participate in TG. In addition to clinical duties, all residents were provided performance criteria expectations for BEST and one-hour per month protected practice time in the skills lab for two years. Data were analyzed using Mann Whitney t tests and Spearman correlation.

RESULTS: No difference was noted between those trained on the TG system versus no TG training in terms of FLS cognitive or manual skill performance scores (mean \pm SD; $p < 0.05$; manual skills $p = NS$, cognitive skills $p = NS$.) Only moderate correlation was observed between TG intracorporeal suturing training performance and overall FLS manual skills scores (Spearman $r = 0.6$, $P = 0.35$)

FLS	TG + BEST (n=5)	BEST (n =7)
Cognitive	500 \pm 56	474 \pm 85
Manual skills	471.6 \pm 68	496 \pm 96

CONCLUSIONS: All residents participating in a mandatory integrated laparoscopic skills curriculum passed the FLS examination. Prior partial task training on the TG system did not improve cognitive or manual skills performance on the FLS examination compared to colleagues. An intensive course may convey no advantage to clear proficiency expectations, posted benchmarks and ample interval opportunity to practice.

Education/Outcomes – P286

INSTITUTIONAL ACTIONS AND PROBLEMS FOR EDUCATION SYSTEM ESTABLISHMENT IN AN ENDOSCOPIC SURGERY DEVELOPING AREA IN JAPAN.

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Introduction We herein report institutional actions and problems for system establishment in an endoscopic surgery



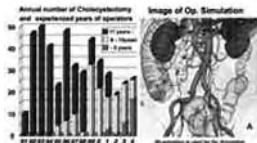
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developing area in Japan.

Actions and Results (1) Preoperative surgical simulation?F In case of cholecystectomy, complete checking of local anatomy and variations is performed by 3-D visualization of vessels inside and outside of the liver using MD-CT and biliary system using MRCP and/or DIC-CT. As a result, no complication of biliary tract has occurred, and the rate of young surgeon as an operator has increased. In case of gastrointestinal surgery, surgical simulation consisted of 3-D CT including virtual colonography and accurate assessment of lymph-node metastasis using diffusion-weighted MRI and PET-CT made operation time shorter and operative blood loss smaller. (2) Periodical educational seminar and training in animal laboratory: Educational seminars were held 3 times per year by experienced endoscopic surgeons. Furthermore, training courses in animal laboratory were held twice per year for young surgeons including young residents. Both actions succeeded in raising surgical spirit and skill up of young surgeons. One of ideal training methods using computer-enhanced surgical simulation is too expensive to receive its benefit. (3) An institutional policy?F The rate of endoscopic surgery for gastrointestinal cancer dramatically increased after changing institutional policy in 2004 (9.3% in 2001-2003 versus 52.5% in 2004-2006).

Conclusions Above-mentioned actions are necessary to establish safe and secure educational system in endoscopic surgery developing area under strong leadership as a whole of Department of Surgery, instead of a part of surgeons who are interested in endoscopic surgery.



Education/Outcomes – P287

ESTABLISHMENT OF HIGH-QUALITY INTERACTIVE TELESURGERY SYSTEM IN ASIA-PACIFIC AREA USING SUPERFAST INTERNET CONNECTIONS, Shuji Shimizu MD, Naoki Nakashima MD, Koji Okamura PhD, Masao Tanaka MD, Kyushu University, Fukuoka, Japan

Background: Endoscopic surgery has revolutionized the field of surgery, and now much attention is being paid to the effective method of adequate education and training. With rapid development of information and communications technology, we established a high-quality telesurgery system between Japan and Korea without any loss of image quality during transmission using high-speed Internet connections (*Surg Endosc* 20:167-170, 2006). The aim of this study was to extend this new system to other Asia-Pacific regions.

Methods: Kyushu University Hospital in Fukuoka, Japan, was linked to 20 institutions and 13 meeting venues in 18 cities in Korea, China, Taiwan, Thailand, Singapore, Vietnam, Hawaii, and Australia over Asia-Pacific Advanced Network (APAN), an international research and education consortium. Digital video transport system (DVTS), free software which transforms digital video signals directly to Internet Protocol, was installed in a regular personal computer with network bandwidth of 30 Mbps per channel. Security software was used to protect patients' privacy. Questionnaires were performed to evaluate the system.

Results: Between February 2003 and July 2006, 36 international teleconferences on endoscopic surgery were performed, 13 of which were real-time demonstration of surgery and 23 were interactive teleconferences using videos or PC presentations. Multiple stations were connected in nine events. The frame rate of transmitted pictures was 30/sec, and the time delay was restricted in the range of 0.3-1.0 sec between the stations. With reply rate of 59% (409/713) and 57% (398/713), 295 (72%) answered the image quality to be very good and 95 (23%) good, and 307 (77%) answered the sound to be very good and 71 (18%) good, respectively.

Conclusions: This is the first time to establish the advanced telesurgery system in such a wide range of international scale, which provides remote audience with the same quality of surgical streaming just as in an actual operating room. Because it is economical and easy to set-up, and high-speed R&D network is also available in western countries, we believe our cutting-edge system based on superfast Internet will facilitate the prevalence of newly developed, less invasive surgical procedures effectively and beyond geographic borders to whole world.

Education/Outcomes – P288

OBESITY AS A FACTOR IN LAPAROSCOPIC SURGERY, Ramandeep S Sidhu MD, Prasanta Raj MD, Mario Scarpino MD, Shannon M Tarr MD, Richard Treat MD, Fairview Hospital

Background: Laparoscopic cholecystectomy is considered the standard of care for most symptomatic gall bladder diseases. Obesity has been a documented independent predictive factor for conversion to open cholecystectomy. This study investigates whether or not obesity is a major factor in determining the outcome of laparoscopic cholecystectomy.

Methods: Retrospective chart review of 603 patients scheduled for laparoscopic cholecystectomy. Three BMI groups (normal, overweight and obese) were compared.

Results: There was no statistically significant difference in the conversion rate, intraoperative and postoperative complication rates, or length of stay. The only statistically significant difference was in the duration of surgery.

Conclusions: Laparoscopic cholecystectomy is a safe and effective treatment for gall bladder disease among obese patients. Use of long trocars, instruments, open insertion of umbilical port, meticulous dissection, subxiphoid port placement and additional 5mm port to retract the liver or push down the omentum for better visualization of anatomy is recommended.

Key words: laparoscopic cholecystectomy, obesity, BMI, conversion rate

Education/Outcomes – P289

ROBOTIC SUTURING ON THE FLS MODEL POSSESSES CONSTRUCT VALIDITY, IS LESS PHYSICALLY DEMANDING AND IS FAVORED BY MORE SURGEONS COMPARED TO LAPAROSCOPY, Dimitrios Stefanidis MD, Anahita Mostafani, Chris Bell MD, Lee Ann Lau MD, Marc Zerey MD, Makram Gedeon MD, Andrew Harrell MD, George Walker RN, Amanda Walters BS, B Todd Heniford MD, Daniel J Scott MD, Department of Surgery, Carolinas Medical Center

Background: The value of robotic assistance for intracorporeal suturing has not been well defined. The objective of this study was to compare robotic with laparoscopic suturing on the FLS model in a large cohort of surgeons. Construct validity for the simulated tasks was examined and surgeon performance, workload and suturing preference was assessed.

Methods: Attendees (n=117) of the Robotic Station at the SAGES 2006 Learning Center placed intracorporeal sutures on the FLS box-trainer model using conventional laparoscopic instruments and the DaVinci robot. Participant performance was recorded using a validated objective scoring system with a cut-off time of 5 minutes. A questionnaire regarding demographics, task workload and suturing modality preference was completed. Construct validity for both tasks was assessed by comparing the performance scores of subjects with various levels of experience. The validated NASA-TLX questionnaire, which rates the mental, physical and temporal demand of a task as well as the performance, effort and frustration of the subject, was used for workload measurement. For all statistical comparisons p<0.05 was considered significant.

Results: 84% of participants had prior laparoscopic and 10% prior robotic suturing experience. Within the allotted time, however, 83% of participants completed the suturing task laparoscopically compared to 72% with the robot. Construct validity was demonstrated for both simulated tasks accord-



ing to the participant's advanced laparoscopic experience, laparoscopic suturing experience, and self reported laparoscopic suturing ability ($p < 0.001$ for all) and according to the prior robotic experience, robotic suturing experience and self reported robotic suturing ability ($p < 0.001$ for all), respectively. While participants achieved higher suturing scores with standard laparoscopy compared to the robot (84 ± 75 vs. 56 ± 63 , respectively; $p < 0.001$), they found the laparoscopic task to be more physically demanding (NASA score 13 ± 5 vs. 10 ± 5 , respectively; $p < 0.001$) and favored the robot as their method of choice for intracorporeal suturing (62% vs. 38% , respectively; $p < 0.01$).

Conclusions: Construct validity was demonstrated for robotic suturing on the FLS model. Robotic assistance decreases the physical demand of intracorporeal suturing compared to conventional laparoscopy and, in this study, was the preferred suturing method by most surgeons. Curricula for robotic suturing training need to be developed.

Education/Outcomes – P290

TRAINING SEMINAR SPECIALIZED IN FUNDAMENTAL SKILLS OF ENDOSCOPIC SURGERY IN JAPAN, Kazuo

Tanoue PhD, Satoshi Ieiri PhD, Kozo Konishi MD, Ken Okazaki PhD, Shouhei Yamaguchi MD, Daisuke Yoshida MD, Kenoki Ohuchida PhD, Takefumi Yasunaga, Hideaki Nakashima PhD, Makoto Hashizume PhD, Advanced Medicine and Innovative Technology, Kyushu University Hospital

(BACKGROUND) Recently, development of an endoscopic surgery in Japan is remarkable, but surgical complications by lack of technique and recognition for an endoscopic surgery has become a social problem. Since a professional education / training for the purpose of medical safe standard improvement is very important, we regularly perform the seminar that is specialized in a fundamental manual skill for young surgeons, at our training center for endoscopic surgery.

(SUBJECTS and CONTENTS) By August, 2006, 255 surgeons attended in 21 times of the seminars. Training contents are as follows; 1: A basics lecture about endoscopic surgery, 2: The box training for space perception, coordinated movement of right/left forceps and a suture/ligation, 3: Virtual reality training by a simulator, 4: Practical training using an animal, such as dissection of lymph nodes and vessels, hemostasis with clipping, ultrasound activated device or vessel sealing system, and a repair suturing for injured organ. Before/after training, we perform our original technical evaluation for trainee. The technical evaluation task using the box trainer and the rubber sheet that a circle with eight dots inside/outside were printed is as follows; a trainee sutures between certain dots, and performs the remaining seven places of continuous sutures along the circle successively. At last, the trainee ligates twice with an edge of initial ligation and finishes the task. In each trainee, a time to finish the task and a trace of both forceps were recorded, and the distance that was out of needle entry from the point, a tear of rubber, and a slack of a thread were recorded as errors.

(RESULTS) By skill evaluation before/after training, the trainee who were able to accomplish all the task increased to ten from 0, and the trainee who were able to accomplish initial suture ligation increased to 97% from 71%. The time to finish the initial suture ligation was significantly shortened, and average of the continuous suture number increased significantly. In a trace of forceps, movement distance decreased with right and left, and speed increased. However, the average of errors of a tear and a gap increased after the training.

(CONCLUSION) The individual training system for skill-up and the evaluation system of fundamental skills are necessary for establishment of education in endoscopic surgery. Therefore, our training seminar is important as education of basics stage.

Education/Outcomes – P291

POOR PREOPERATIVE JOB PERFORMANCE AND CAREER ADVANCEMENT SECONDARY TO OBESITY IS ASSOCIATED WITH GREATER WEIGHT LOSS FOLLOWING LAPAROSCOPIC GASTRIC BYPASS, David S Tichansky MD, Whitney Orth BS, Atul K Madan MD, Division of Minimally Invasive Surgery, Department of Surgery, University of Tennessee Health Science Center, Memphis, TN, USA

Background: Patient motivating factors to be compliant and maximize weight loss vary greatly. Each patient represents a unique web of intrinsic and extrinsic motivators, some more effective than others. Multiple tools continue to preoperatively attempt to determine patients' motivation to do well postoperatively and predict outcomes. Most have limited success. Herein, we study the effectiveness of a preoperative Impact of Weight on Quality of Life (QOL) Questionnaire in predicting weight loss outcome after laparoscopic gastric bypass (LGB).

Methods: 100 consecutive patients were enrolled by completing the pre-operative questionnaire. Percent excess body weight loss at one year (EBWL) was analyzed against the score of each section of the questionnaire and the total score of the questionnaire using Pearson's correlation coefficient test.

Results: Complete questionnaire results and one year weight loss data were available on 81 patients. Negative Work-related QOL section scores reflecting poor job performance and career advancement were associated with greater EBWL ($p = 0.047$). No other single test section score (Health-related QOL, Social-related QOL, Mobility-related QOL, Self Esteem-related QOL, Sex-related QOL, Activity-related QOL, and Eating-related QOL), nor the total test score, had a statistical correlation with EBWL.

Conclusion: Preoperative poor job performance and career advancement are associated with greater EBWL after LGB. Perhaps extrinsic motivators (i.e.: from a job) are the strongest of all.

Education/Outcomes – P292

A SIMPLE AND EFFECTIVE SELF-TRAINING METHOD FOR LAPAROSCOPIC KNOT TYING, Kazunori Uchida MD, Naoki Haruta MD, Kazurou Okada MD, Masazumi Okajima MD, Manabu Yamamoto MD, Takanobashi Central Hospital Endoscopic Surgery Center

<@>Intracorporeal suturing and knot tying is absolutely required for recent advanced laparoscopic surgery. Square knot is the ideal choice, however, it is not always easy and comfortable even for experienced laparoscopic surgeons. In order to complete the laparoscopic square knot without hectic effort, we developed a simple and effective self-training sheet to achieve the goal. To complete the square knot tying easily, making a "C" loop is the most important point and the core of this technique. Our innovative self-training sheet was developed based on a handwriting learning strategy. Practice with this sheet helps easy and smooth square knot tying with the correct sequence by operating 2 forceps and the thread.

Education/Outcomes – P293

CLINICAL AND SEROLOGIC PREDICTORS OF GASTRIC BYPASS COMPLICATIONS, DB Williams MD, J Hagedorn MS, B Encarnacion BS, E Ketchum BS, I Liu BS, M Curet MD, J Galanko PhD, J Morton MD, Stanford Department of Surgery

Background: Roux en Y Gastric Bypass (RNYGB) is a highly effective intervention for morbid obesity. There has been recent concern regarding the incidence of complications associated with RNYGB. The purpose of this study is to identify predictors of complications in this patient population.

Methods: From August 1, 2003 to March 1, 2006, 487 patients underwent RNYGB at a single academic institution. Patient records were reviewed for preoperative demographic, comorbidity, and serologic data and post-operative complications at 12 months. A liberal inclusion criteria for complications was employed including Intra-abdominal Abscess, Anastomotic Leak, Arrhythmia, Bleeding Requiring



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Transfusion, Bowel Obstruction, Cerebro-Vascular Accident, Deep Venous Thrombosis/Pulmonary Embolus, Myocardial Infarction, Pneumonia, Ulcers/Strictures, Urinary Tract Infection, Micronutrient Deficiencies, Wound Infections/Dehiscences/Hernia, Readmissions, and Reoperations.

Results: Overall patient demographics and comorbidities were: mean age (43), mean BMI (49), sex (83% female), previous abdominal surgery (56%), diabetic (34%), hypertensive (51%), hyperlipidemia (40%), sleep apnea (36%), and mean number of comorbidities (4). There were 0% mortality, 5% reoperation, and 21% overall complication rates. An abbreviated complication list is as follows, %: anastomotic leak (2), GI Bleeding (4.6), Bowel Obstruction (3), PE/DVT (1.5), and Ulcers/Strictures (3.5).

The patient population was divided into the two cohorts of those with and without complications. Patients with and without complications were similar respectively for the following preoperative variables: %, age >50 (27 vs. 27), %, female (83 vs. 83), % previous abdominal surgery (57 vs. 56), hemoglobin A1C (6.3 vs. 6.4), and number of comorbidities (4 vs. 4). The two groups did differ for two variables: % BMI >50 (39 vs. 28, P=.05) and Triglycerides/HDL ratio (5.2 vs. 3.7, P=.04).

Conclusion: Bariatric surgery is the only effective enduring and enduring treatment for morbid obesity. Identifying predictors of bariatric surgery complications can aid in risk modification and stratification. Complications in this population were partly predicted by BMI >50 and an elevated Triglycerides/HDL ratio, a novel marker of the metabolic syndrome.

Education/Outcomes – P294

THE DEVELOPMENT OF A VIRTUAL REFERENCE MANUAL FOR PERI-OPERATIVE NURSES WORKING IN A MINIMALLY INVASIVE SURGICAL SUITE, Shirley Yeung RN, Julie L Harnish MSc, David R Urbach MD, University Health Network, Toronto, Ontario, Canada

Introduction: Continuing education is necessary for peri-operative nurses to maintain their skills within the dynamic environment of minimally invasive surgery (MIS). It is becoming more common for hospitals to provide training and orientation for nurses online. In December 2005, the Toronto Western Hospital asked the MIS nurse specialist to create a reference manual for laparoscopic procedures which could be made available 24/7 via the hospital's Intranet site.

Methods: A virtual reference manual was created using web-based publishing software. The manual contains information on 4 laparoscopic procedures: cholecystectomy, appendectomy, adrenalectomy, and ventral herniorrhaphy.

Results: For each of the above surgical procedures there are 8 sections encompassing: anatomy/physiology, anesthesia, patient positioning and preparation, draping, procedure description, medication, surgeon preferences, and postoperative care. Prior to publication all sections were reviewed by experts in the field. The manual also contains synoptic videos of the procedure for nurses to review, along with images of equipment, room set up, and draping procedures. Special attention is paid to the set up of instruments and the step-by-step use of laparoscopic equipment.

Conclusion: The creation of a virtual reference manual was a collaborative effort of OR personnel, surgeons, and administration. Having an online resource should reduce the uncertainty and "fear" nurses experience when working in a MIS suite with unfamiliar equipment. This will be particularly helpful for the novice OR nurse, or the nurse from another service who is asked to fill in. The virtual reference manual will be available online in Fall, 2006. Once the manual is formally launched, further research is planned to assess the impact online resources have on nursing.

Education/Outcomes – P295

95.5 % PRACTICING PHYSICIANS RECOGNIZE THE SIGNIFICANCE OF HANDS-ON COURSE FOR LAPAROSCOPIC SKILL IN PEDIATRIC SURGERY, Jyoji Yoshizawa MD, Shinsuke Ohashi MD, Keiichirou Tanaka MD, Masashi Kurobe MD, Masaki Kanai MD, Naruo Kuwaashima MD, Syuichi Ashiduka MD, Kazuhiko Yoshida MD, Takao Oki MD, Jikei University school of medicine

Introduction: Laparoscopic skill is an increasingly important part for pediatric surgeons. We offered 1.5 day laparoscopic hands-on course for practicing physician in pediatric surgery. Assessment of the requirements and contents for the hands-on course was achieved by surveying the participants of the course.

Materials and methods: One time per year for six years, hands-on courses for laparoscopic surgery were held from 1999 to 2004. 123 practicing physicians in pediatric surgery attended the course. The course included a lecture about basic skill, the box training for a suture and practical training using an animal. At the conclusion of the course, the course evaluations were used to survey its success. The survey consisted of assessment of the requirements, length of the course, necessities of demonstration, the number of procedure and the number of practicing physicians per one table, et al.

Results: We achieved a 78% response rate from 123 participants. 95.5 % of the attendee felt that the course improved their skills or made difference in their training. The adequate length would be one day (48%), on the other hand 1.5 day was 25%, and 2 days was 30%. 41 attendees (42.7%) expected several demonstrations, but 55 attendees (57.3%) did not expect any other demonstrations except Nissen's procedure. Emphasis of the attendee was placed on practical training using an animal. Two attendees per one table (71%) were more popular than three attendees.

Conclusion: This hands-on course for pediatric surgeons should be significant to develop the basic and advanced skills for pediatric laparoscopic surgery.

Education/Outcomes – P296

MEASURING SURGICAL TEAM QUALITY USING A BENCH MODEL SIMULATION: CONSTRUCT VALIDITY OF LEGACY INANIMATE SYSTEM FOR ENDOSCOPIC TEAM TRAINING (LISETT), Bin Zheng PhD, Danny V Martinec, Peter M Denk MD, Prekash Gatta MD, Yashodhan S Khajanchee MD, Mark H Whiteford MD, Lee L Swanstrom MD, MIS program Legacy Health System

Efficient and safe performance of surgery requires dedicated collaboration amongst the surgical team. Up to now, surgical team skills, such as communication and cooperation, have mainly been developed in the OR at the potential cost of the patient safety. This project examines the construct validity of using an inanimate simulation to improve team skills outside the OR.

The Legacy Inanimate System for Endoscopic Team Training (LISETT) formulates two team-obligated tasks on a commercially available laparoscopic training box. The first task requires an individual to manipulate the laparoscope appropriately while his/her teammate transports an object between 3 pegs located separately. The second task demands an individual to remove an obstacle above a suturing site and control the laparoscope while his/her teammate performs an intracorporeal suture.

The dyad teams were assembled of staff surgeons, laparoscopic fellows, senior and junior surgical residents, or medical students. Tasks were video and audio recorded with both surgical site and room view. Performances were assessed using a comprehensive score system on team's movement speed and efficiency (penalty given as errors were made). Participants' surgical experiences were obtained by a pre-test survey and a team performance self evaluation was conducted subsequently to each trial.

LISETT scores correlated positively with surgeon's experience ($r = 0.776$, $p < 0.001$), which supported our hypothesis. Teams constructed by experienced surgeons (staff surgeons and fellow, $n = 5$) performed significantly better (89.1 ± 4.3)



than intermediate (fellow and senior residents 77.3 +/- 9.3, n = 8) and inexperienced group (junior residents and medical students 40.2 +/- 17.8, n = 9). Data was further differentiated by the team performance score to examine the impacts of team quality on the LISETT score. The top-rated teams performed better (81.3 +/- 10.8; n = 6) than the intermediate (62.2 +/- 26.3; n = 12) and the low-rated teams (58.6 +/- 19.9). The LISETT scores increased progressively with the increasing surgical experience and self-rated team quality, revealing strong evidence for construct validity of using the LISETT program for team training outside the OR.

Endolumenal Therapies – P297

DIAGNOSTIC DILEMMA: ERCP STATUS POST ROUX-EN-Y GASTRIC BYPASS, Lewis A Diulus BA, Bipan Chand BA, Suthep Udomsawaengsup BA, Cleveland Clinic Foundation

1. Objective of the study/technique: With an ever increasing patients population who have undergone Roux-en-Y gastric bypass surgery, a new diagnostic dilemma occurs when a sub-set of these patients require upper endoscopy to evaluate the bilopancreatic system. The anatomical changes created during by the bypass procedure make standard methods for this evaluation difficult. We describe the technique used to combine laparoscopic and endoscopic evaluation and treatment in two such patients.

2. Description of the methods Two patients presented with recurrent pancreatitis after cholecystectomy. The first underwent a HIDA scan revealing Sphincter of Oddi dysfunction. Preoperatively a PTC catheter was placed. Laparoscopy was then performed with lyses of adhesions freeing the gastric remnant. A gastrotomy was made and a trocar was placed directly into the remnant. An on-table ERCP was performed with a sphincterotomy. The gastrotomy was closed with a stapler. The second patient had an MRCP which demonstrated a dilated pancreatic duct with a possible stricture. Laparoscopy was again performed and the gastric remnant was freed in a similar fashion. Three sutures were placed in the anterior surface of the remnant using a suture passer and this was brought to the anterior abdominal wall. A trocar was then placed into the remnant. An ERCP was performed. Incomplete drainage of the biliary system was found and a sphincterotomy was performed to allow drainage. The trocar when then removed and replaced with a Malecot catheter. The sutures placed in the remnant were then used to secure it to the abdominal wall.

3. Preliminary results Both patients had resolution of their symptoms postoperatively. The patients have been followed for one year, and three months, respectively without any complications from the procedures.

4. Conclusions/Expectations. We demonstrated a novel approach to evaluate the bilopancreatic system via laparoscopically assisted ERCP in patients who have previously undergone Roux-en-Y gastric bypass surgery. With cooperation and communication between surgery, radiology and gastroenterology, this combined procedure can successfully be performed in the operative room.

Endolumenal Therapies – P298

SUCCESSFUL COMPLETION OF NEOADJUVANT CHEMORADIATION AND RO RESECTION AFTER MALIGNANT ESOPHAGEAL PERFORATION: A CASE FOR ENDOSCOPIC STENTING, Jonathan M Hernandez MD, Scott T Kelley MD, James S Barthel MD, University of South Florida Department of Surgery and the H. Lee Moffitt Cancer Center and Research Institute

INTRODUCTION: Perforation of the esophagus at the site of malignancy secondary to instrumentation is an uncommon but often catastrophic complication that presents a formidable challenge to the surgeon. Particularly challenging is the management of locally advanced (T4) tumors with aortic involvement. We describe for the first time a case in which a Polyflex® Esophageal Stent, a covered, self-expanding, silicone-coated stent was used as a bridge to allow the patient to receive neoadjuvant chemoradiation with subsequent minimally invasive R0 resection.

METHODS AND PROCEDURES: A 74-year old female was found to have adenocarcinoma at the gastroesophageal junction. Endoscopic ultrasound was undertaken, demonstrating AJCC stage T4N0 with invasion of the aortic wall at 40cm. After the procedure, a barium study demonstrated a free perforation at the level of the tumor. We elected to cover the perforation with a Polyflex® stent and a subsequent study showed complete sealing of the leak. The patient was discharged within 48 hours and maintained nutrition orally. She completed neoadjuvant chemoradiation therapy with cisplatin, 5 fluorouracil (5-FU), and external beam radiation (50 Gy). Restaging revealed significant tumor regression and the patient underwent minimally invasive esophagectomy.

CONCLUSION: We report the first case of endoscopic stenting of a locally advanced perforated esophageal cancer for the purposes of administering neoadjuvant chemoradiation. The use of covered plastic stents is particularly useful since they do not interfere with subsequent radiation therapy. At the time of surgery, the stent was in good position despite significant tumor downstaging. Although definitive conclusions cannot be drawn from a single case, this study would suggest chemoradiation does not preclude the use of endoscopically placed covered stents.

Endolumenal Therapies – P299

TRANSANAL ENDOSCOPIC RESECTION OF CARPET-LIKE ADENOMAS OF THE RECTUM., Pasquale Spinelli, MD, Giuseppe Calarco MD, Xiaoguang Ni MD, Andrea Mancini MD, Department of Diagnostic and Surgical Endoscopy, National Cancer Institute, Milan, Italy.

The management of large rectal adenomas encompasses a variety of procedures including conventional both endoscopic or surgical approaches. In recent years endoscopic transanal resection using a urological resectoscope has been proposed as an alternative treatment modality. From October 1995, 72 patients with carpet-like adenoma of the rectum have been submitted to transanal endoscopic resection by urological resectoscope. The technique was similar to Trans-Urethral-Resection. We used a continuous flow resectoscope, 27 Fr external diameter, (Olympus A2614) which provides clear visualisation of the operative area, through a 4 mm diameter telescope, 12°.

An adequate follow-up is available for 58 patients (21 male and 37 female with a mean age of 67 yrs range 18-88). Severe dysplasia, malignant adenomas and invasive carcinomas were treated in 12, 7 and 2 patients, respectively. Complete eradication was obtained in 55 patients; in the remaining 3 patients, initially treated for malignant adenomas, an invasive adenocarcinoma was observed during the follow-up and treated by RT (1 pt) or surgery (2 pts). The mean number of treatment sessions was 2,5 (range 1-7). The mean time between the first treatment and the complete eradication was 6 months (range 1-18).

Complications were 5 intraoperative bleeding treated with local injection of epinephrine (1:20.000) and 4 early postoperative bleeding, one controlled with local injection of epinephrine (1:20.000) and three spontaneously recovered. One perforation below the peritoneal reflexion occurred and it was treated conservatively.

No early or late mortality was reported.

Our experience shows the efficacy of transanal endoscopic resection by means of urological resectoscope in the treatment of carpet-like adenomas and for pT1 cancer, in patients unfit for major rectal surgery.

Ergonomics/Instrumentation – P300

BARBED SUTURE FOR CLOSURE OF MIDLINE ABDOMINAL INCISIONS: A PROSPECTIVE COMPARATIVE TRIAL, Fatemeh Abtahi MD, Spencer Brown PhD, Christopher Bell MD, Rod Rohrich MD, UT SouthWestern Medical Center at Dallas

Objective: The purpose of this study is to identify the properties of these barbed sutures while performing closing the abdominal midline incision and compare that to standard sutures using the same materials without barbs.

Introduction: Surgical sutures are the most frequently used



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biomaterial for wound closure and tissue approximation; however wound closure depends on the surgeon's ability to tie a secured knot. A knotless (self-anchoring) suture has been developed, in which bidirectional barbs are introduced into an absorbable monofilament suture that eliminates the need for tying a knot to obtain suture closure. The barbs are designed to grip tissue and obviate the need for tying a knot during tissue approximation. They can pass easily through tissue in one direction, but can not be reversed, therefore providing knot security.

Goals: The purpose of this study is to identify the properties of these barbed sutures while performing closing the abdominal midline incision and compare that to standard sutures using the same materials without barbs. Those properties that are being measured are; tensile strength, tissue reactivity, and cosmetic result of the midline incision closure at different time points (day 0, week 1, week 2, week 6). Also this study will show that, the time needed to close a midline incision with barbed suture is shorter than using standard sutures.

Study design: This is a prospective, comparative study of abdominal midline incision closure in the porcine model which is being evaluated for suturing time, tensile strength, and histopathology related to wound healing, and cosmesis after surgery.

Study design: Fifty-four (54) large adult pigs will be used to address similar stresses on midline closures as observed in human. Each animal will have an abdominal midline incision and closure. Three groups are defined by time of animal harvest.

Preliminary Results: The barbed suture is a faster and reliable closure technology based on our initial data. This novel barbed suture, based on the same material as standard sutures, is safe and will provide surgeons a superior alternative for closing the midline incisions.

Ergonomics/Instrumentation – P301

A "ONE SIZE FITS ALL" APPROACH IS NOT MEETING THE NEEDS OF A GROWING PERCENTAGE OF WOMEN SURGEONS WHO ARE USING DISPOSABLE LAPAROSCOPIC INSTRUMENTS. Danielle Adams MD, Stephen J Fenton MD, Bruce Schirmer MD, David M Mahvi MD, Peter F Nichol MD, University of Utah, University of Virginia and University of Wisconsin

Introduction: An increasing number of women are entering the field of general surgery. Surgical devices have traditionally been targeted at men. We hypothesized that due to a smaller hand size, female general surgery residents would have significantly more difficulty utilizing the "one size fits all" handles of disposable laparoscopic instruments when compared to male residents.

Methods: General Surgery Residents were surveyed at three large, academic, general surgery training programs (University of Utah, University of Virginia and University of Wisconsin). Training year, gender, glove size and laparoscopic case experiences were recorded. Participants were asked to evaluate 4 disposable laparoscopic instruments (stapler, ultrasonic shears, Ligasure® and laparoscopic retrieval bag) and asked if each instrument required one hand only, one hand with some assistance or two hands to use properly. Additionally, participants were asked to subjectively assess each instrument by rating it as easy, occasionally awkward or always awkward. Data were tabulated and analyzed (chi square & Mann-Whitney analysis) comparing male to female residents for each instrument.

Results: A total of 81 residents were asked to participate. There were 51 anonymous responses (23 women and 28 men). Women's glove size was significantly smaller than men's (6.5 vs. 7.5, $p < 0.0001$), whereas, the clinical year and number of laparoscopic cases were not significantly different between the two groups. Women reported the following instruments to be more awkward than their male counterparts: stapler ($p < 0.0003$), ultrasonic shears ($p < 0.0143$) and Ligasure® ($p < 0.023$). Women were also more likely to use more than one hand only when operating an instrument (stapler $p < 0.0001$, ultrasonic shears $p < 0.0006$, Ligasure® $p < 0.0111$) as opposed to men. Interestingly, the majority of

both male and female residents found the laparoscopic retrieval bag required more than one hand to use (86% v 67%, $p = 0.098$).

Conclusions: Current disposable laparoscopic instruments are not designed for individuals with small glove sizes. Women have significantly more difficulty with the "one size fits all" laparoscopic instrument handles. With the increasing number of women entering general surgery programs, this problem will persist until instruments are designed to target surgeons with small hand sizes.

Ergonomics/Instrumentation – P302

USE OF CAVITATION LESS ULTRASONIC SHEARS TO REDUCE AMOUNT OF INTRAOPERATIVE SCATTER. Prakash Gatta MD, Nathaniel E Uecker MD, Lee L Swanstrom MD, Legacy Health System

PROPOSITION: With the widespread use of ultrasonic dissection in Laparoscopic Surgery, cavitation and scatter have become more common problems. In order to address this, we have trialed a prototype ultrasonic device with minimal cavitation effects. The goal of this study was to measure the amount of cavitation, scatter, laparoscope contamination and compare it with regular ultrasonic coagulation shears.

METHODS: A total of 4 devices were used to compare the effect of scatter in an in vitro setting. The new Cavitation Less Device (CLD) was compared to three other commonly used commercially available devices. The primary parameter measured was the distance of scatter of ink over a large sheet of blotting paper. The data collected was analyzed utilizing the Analysis of Variance. In vivo assessment was performed in animals to measure laparoscope contamination and coagulation capability

RESULTS: A total of 25 occurrences were recorded for each device, with scatter distance varying between 0mm to 1200 mm. The average distance of the CLD was 66mm, and those of the other three ranged between 339mm to 919mm. The Analysis of Variance showed a statistically significant difference between the CLD and the remaining 3 devices, with a p value of < 0.001 . All devices coagulated tissue equally well. Laparoscope contamination was less with the CLD but did not achieve statistical significance.

CONCLUSIONS: The CLD is a new device that reduces the amount of intra-operative scatter. This reduces the incidence of scope contamination during dissection and potentially reduces operating time

Ergonomics/Instrumentation – P303

PROSPECTIVE ANALYSIS OF VISUAL CANNULA ENTRY IN LAPAROSCOPY: ENDOTIP. Karen B Glass MD, Artin M Ternamian MD, George Tolomiczenko MD, Violine Marcoux MD, Miran A Ternamian MD, University of Toronto;

Women's College Hospital and St. Joseph's Healthcare

Objective: Describe safe application of the threaded visual cannula, review efficacy of this method, and determine incidence of complications.

Design: Prospective observational cohort study (Canadian Task Force classification II-1).

Setting: University affiliated teaching hospitals.

Subjects: Authors' AT and KG's patients, May 1994 - 2006, having laparoscopic procedures for different gynecologic conditions were entered. Data sheets indicate demographics, number and kind of previous abdominal or pelvic surgery, primary and ancillary port particulars, complications, findings, and surgical procedures performed.

Intervention: Most primary port applications were pre-insufflated to a variety of initial intraperitoneal pressures. After three failed attempts to secure adequate pneumo-peritoneum, or when patients were assigned pre-operatively for no pre-insufflation, then the visual cannula was applied directly.

Measurements and results: No failed primary or ancillary port insertion encountered, irrespective of BMI, location of primary port insertion, number of previous surgeries, and existence of peritoneal adhesions. No major port complications were encountered. Port slippage was infrequent, port infection rare, and port competence well maintained.



Trainees unfamiliar with the visual cannula's application, lacked ability to interpret monitor entry images, and the method's predictive value were lost.

Conclusions: Laparoscopic primary and ancillary port creation continues to be associated with serious yet avoidable complications. Use of visual entry methods allows surgeons to document port dynamics during port insertion and removal. The ability to observe the interaction of tissue, instrument and force will enhance our understanding of accident causation, eliminate hindsight bias, and allow error analysis to improve patient safety.

Ergonomics/Instrumentation – P304

A NEW AND SIMPLE " WRIST BAND " TECHNIQUE OF HAND ASSISTED LAPAROSCOPIC SURGERY, Jyotsna S Kulkarni MD, Sanjay B Kulkarni MD, Deepti V Kamat MD, Kulkarni Endo Surgery Institute

Today hand assisted laparoscopic surgery is used by novice surgeons as a learning step. It is useful for experts to perform complex solid organ surgery with reconstruction. Many devices are available for hand assisted laparoscopy. These devices are at times cumbersome to use. They are disposable and expensive.

We have used a new, simple and effective "Wrist Band" technique for hand assisted laparoscopic surgery for six years. A 7cm (surgeons glove size) muscle splitting incision is made at the pre-planned site. Two gauze pieces are wrapped around the surgeons non dominant wrist, above the sleeve of the gown but below the glove. A blue gauze is inserted in the abdomen. This gauze is used for mopping. The surgeons glove is lubricated with jelly for easy insertion in to the abdomen through the incision. The "Wrist Band" is adjusted to prevent CO2 leak through the incision. The rest of the trocars are inserted by palpation or under vision.

We have used this technique for hand assisted laparoscopic donor nephrectomies (105 cases), nephro-ureterectomy (10 cases), colectomies (4 cases), splenectomies for very large spleens (6 cases), Whipples procedure (3 cases).

The advantages of hand assisted laparoscopic surgery are many. It gives surgeon the tactile feel and 3D spatial orientation. It facilitates finger dissection and helps to control bleeding. This gives more confidence to the surgeon. The gauze is used to clean the telescope tip. Extraction of large specimen is quick and easy. The overall operative time is reduced. Our new and simple "Wrist Band" technique is a very useful tool. This is specially applicable in developing countries, where the total surgical cost at times is less than the expensive hand port device.

Ergonomics/Instrumentation – P305

ASSESSMENT OF TABLE HEIGHT CHANGE WITH LAPAROSCOPIC INSTRUMENT CHANGE, Gyusung Lee PhD, David Dexter II MD, Tommy Lee MD, J. Scott Roth MD, Patricia Turner MD, Stephen M Kavac MD, Adrian E Park MD, University of Maryland

Surgeons seldom change the set height of an operating table once beginning a case and never do so to accommodate difference in instrument handles. Previous studies sought to determine optimal table height without taking into account the influence of different instrument handles. We gave surgeons different styles of instrument handles and free range to choose optimal table height, based on comfort. Board-eligible, Board-certified general surgeons were recruited to complete two FLS tasks: peg board transfer (task 1) as well as intracorporeal suturing and knot tying (task 2). All tasks were conducted on a training stand with adjustable operating table and monitor height (Stryker). Subjects for task 1 were given 2 disposable pistol grip (PG) dissectors (USSC) and 2 inline (IL) needle drivers (Ethicon) for task 2. Nineteen reflective markers were placed on each subject's upper body, and 4 markers were placed on each instrument. A motion capture system (Vicon) used these

markers to calculate upper-body joint angles and instrument shaft angles. For both PG and IL instruments, the table height was adjusted until maximum comfort was achieved. Kinematic measurements were made while instrument tips were in the center of the operative field. When using PG instruments, optimal table height averaged 98.1cm. When using IL instruments, a significant change was found as the table height lowered by 6.4cm to average of 91.7cm ($p < 0.005$). Multiple changes in joint kinematics were observed when surgeons changed to IL instruments. Notable changes were in shoulder and wrist joint excursions while there was no significant change in elbow angle. With the IL instruments, elevation angle decreased from 45 to 33 degrees ($p < 0.005$). Optimal table height differs when surgeons work with PG versus IL instruments. A table height change based on instrument change faces limitations, such as drape and stand rearrangement and time consumption. Given such difficulties, ergonomic factors warrant further analysis to determine if a standard optimal table height for different instrument handles exists or if an ergonomic redesign of handles is warranted. Additionally, our data suggests that wrist position in addition to elbow position significantly impacts surgeon comfort and optimal table height. Further investigation will be conducted as part of our comprehensive research, including imaging, display, surgical ergonomics using whole body analysis, and human factors.

Ergonomics/Instrumentation – P306

USE OF OXIMETRY-CAPABLE INSTRUMENTS FOR THE DIFFERENTIATION OF VASCULAR AND NON-VASCULAR STRUCTURES DURING LAPAROSCOPY, Ozanan R Meireles, Eric J Hanly MD, Lia R Assumpcao MD, Takintope Akinbiyi MS, Marcin Balicki BS, Gregory S Fischer PhD, Sunipa Saha MS, Samuel Shih MD, Russell H Taylor MD, Mark A Talamini MD, Michael R Marohn DO, Department of Surgery, Johns Hopkins University School of Medicine, Baltimore, MD

Introduction: Decreased tactile sensation and two-dimensional visualization are limitations in laparoscopic surgery. These disadvantages can be critical when attempting to distinguish between vascular and non-vascular tubular structures in laparoscopic surgery. We hypothesize that oximetry-capable laparoscopic graspers can discriminate vascular from non-vascular structures based on differential oximetry wave form patterns.

Methods: A laparoscopic grasper was fitted with built-in oximetry capability. Two pilot experiments were performed in adult swine. In the 1st study, known vascular and non-vascular structures were grasped at random with the prototype instrument while a second investigator blinded to the physical structures being grasped interpreted the wave form of the oximetry readings. In the 2nd study, readings were obtained in the distal renal vessels while the proximal renal artery was intermittently clamped, causing momentary blood flow interruptions toward the instrument sensors. Again, a second blinded investigator interpreted the oximetry patterns over time.

Results: Investigators reliably (100% accuracy) distinguished oximetry patterns of vascular from non-vascular structures. Arterial structures showed characteristic high-amplitude oximetry waves compared to semi-flat waves from non-arterial structures. This characteristic wave form disappeared when blood flow was interrupted with vascular clamping, but promptly returned after blood flow was restored.

Conclusions: Oximetry-capable instruments can distinguish vascular from non-vascular tubular structures during laparoscopy, and may have clinical utility. Such "smart" instruments are now being tested clinically and may help compensate for some of the limitations inherent in laparoscopy. Oximetry-capable instruments may improve patient safety by aiding in proper identification of tubular structures during laparoscopic surgery.



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Ergonomics/Instrumentation – P307

A COMPUTERIZED ANALYSIS OF STANDARD VERSUS HIGH DEXTERITY LAPAROSCOPIC INSTRUMENTATION IN TASK PERFORMANCE, V K Narula MD, K M Reavis MD, D R Renton MD, D J Mikami MD, B J Needleman MD, J W Hazey MD, K E Hinshaw BS, W S Melvin MD, THE OHIO STATE UNIVERSITY HOSPITAL, CENTER FOR MINIMALLY INVASIVE SURGERY

Introduction: Minimally invasive surgery is becoming the standard of care for the majority of abdominal procedures. Laparoscopic instrumentation is constantly undergoing improvements to give surgeons an advantage. Articulated instrumentation provides a distinct advantage in the field of robotic surgery. Applying the same principles to standard laparoscopic instrumentation could offer increased degrees of freedom to make complex laparoscopic tasks easier to perform. We utilized a novel computerized assessment system to objectively evaluate task performance comparing Standard and High Dexterity (HD) laparoscopic instrumentation.

Methods: Advanced laparoscopic surgeons (2-12yrs experience) performed 3 unique task modules utilizing Standard and HD laparoscopic instrumentation (Novare Surgical Systems, Cupertino, CA). Performance was evaluated using a computerized assessment system (ProMIS, Dublin, Ireland) and results were recorded as time (sec), path (mm), and precision. Each surgeon had an initial training session followed by two testing sessions for each module. A Paired Student's T-Test was used to analyze the data.

Results: Nine surgeons completed the study. Objective assessment of the data is presented in the table below. Module 1 was statistically significant, whereas Module 2 and 3 showed no difference in task performance with the HD instrumentation.

Standard L/S vs. HD Instrumentation			
Module	Time (sec)	Path (mm)	Precision
1- Suturing *	201 vs. 326	12895 vs. 18035	1419 vs. 2134
2-Needle Pass	112 vs. 131	6617 vs. 6213	787 vs. 913
3-Bead Transfer	39 vs. 36	2140 vs. 2164	261 vs. 236

* p < 0.05

Conclusion: HD instrumentation is in its infancy. Results showed no advantage using HD instrumentation. This could be due to the learning curve associated with new instrumentation and technology. With future developments in HD technology and training, the user interface will improve and may offer an advantage over standard laparoscopic instrumentation.

Esophageal/Gastric Surgery – P308

ROBOTIC-ASSISTED SURGERY FOR GASTRIC MALIGNANCIES: SHORT TERM RESULTS, C A Anderson MD, M Hellan MD, V Trisal MD, K Kernstine MD, J Ellenhorn MD, A Pigazzi MD, City of Hope

Background: Minimally-invasive surgery has been described for benign diseases of the foregut, however there is limited literature reporting its use in malignant diseases.

Methods/Participants: Between 8/30/04 - 7/28/06, 20 patients, with a median age of 61.7 (37-80) years, underwent minimally invasive resections with a combination of robotic and laparoscopic techniques for gastric cancer. The study group consisted of 6 females and 14 males with a median BMI of 25.8 and an ASA score of 3. 11 patients had GE junction tumors that required combined gastric and esophageal resection, 8 patients received a subtotal gastrectomy, and 1 patient had a wedge resection. Surgical procedures were performed for adenocarcinoma in 17 patients and three for a GIST tumor, a squamous cell carcinoma, and a highly dysplastic adenoma. 89% of the GE tumor patients received neoadjuvant chemoradiation therapy.

Results: 18 procedures were performed with robotic assistance and 2 with only conventional laparoscopic techniques. Conversion rate was 5%. The median operating time was 432 minutes. There was one intraoperative complication requiring colonic resection. The median number of nodes harvested was 24 (6-42). Patients were hospitalized a median of 9 days (3-64). The median time to patients resuming a solid diet was 6 days.

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30-day mortality was 0%. There were 2 anastomotic leaks after esophagogastric resections. Three patients were stage zero after resection, eleven were stage I, four were stage II, and one was stage III. Median follow-up time was 9 months (0-21) with no recurrences.

Conclusion: This early experience suggests that minimally invasive surgery is safe and feasible in patients undergoing oncologic procedures for gastric cancer. Due to the short-term follow-up no conclusions can be made about recurrence or survival yet. Further research is needed to demonstrate an advantage of either robotic or laparoscopic techniques over open procedures for gastric cancer.

Esophageal/Gastric Surgery – P309

SINGLE CENTER REVIEW OF TREATMENT OF ZENKER'S DIVERTICULUM: OPEN VS. TRANSORAL, Shahin Ayazi MD, Steven R DeMeester MD, Bethany J Lehman BA, Satish Kesavaramanujam MD, Christian G Peyre MD, Nuttha Ungnapananin MD, Jessica M Leers MD, Andrew L Tang, Jeffrey A Hagen MD, John C Lipham MD, Tom R DeMeester MD, Department of Surgery, Keck School of Medicine of the University of Southern California

Background: The traditional approach to surgical therapy for a Zenker's diverticulum is an open cricopharyngeal myotomy with excision or suspension of the diverticulum. A more recent endoscopic alternative is a transoral stapling of the diverticulum, but reports have suggested a higher recurrence rate with this technique. The aim of this study was to compare the outcome of these two techniques focusing on relief of the major symptoms and the incidence of perioperative complications with each.

Methods: A retrospective review of 32 patients with primary surgical intervention for a Zenker's diverticulum at our center from 1998-2006.

Results: There were 21 males and 11 females with a mean age of 71. Dysphagia was present in 28 (87.5%), bland regurgitation in 14(43.7%) and both symptoms were present in 10 (31.2%). The mean pouch size by endoscopic measurement was 2.5 cm (Range 2-4.5) in the open group and 3.7 (Range 3-4.7) cm in the endoscopic group. An open procedure was performed in 18 (56.2%) and in 14 (43.8%) an endoscopic procedure was performed. Median follow-up was 62.5 days in the open group and 98.1 days in the endoscopic group. Complete symptom relief was noted in 64.5% of the open group and 62.5% of the endoscopic group, with improvement in symptoms noted in 93.7% and 92.8% respectively. One patient in each group needed another intervention for persistent troubling symptoms. There were two reoperations in the early postoperative period, both in the open group for drainage of a neck hematoma. Conversion to an open approach was performed in two patients due to inability to satisfactorily complete the endoscopic procedure.

Conclusion: In this series, patients were selected for an endoscopic approach only if their Zenker's diverticulum measured greater than 3 cm in size, and with this criterion the successful relief of dysphagia and regurgitation was similar to patients treated with an open approach. Further, no patient in the endoscopic group required early reoperation for a surgical complication. We conclude that an endoscopic approach is as effective as an open approach for relief of dysphagia and regurgitation symptoms during short-term follow-up in appropriately selected patients.

Esophageal/Gastric Surgery – P310

DAY CASE LAPAROSCOPIC ANTIREFLUX SURGERY: A PROSPECTIVE STUDY, NS Balaji, K Moorthy, Raj Nijjar, A Eisawi, CVN Cheruvu, University Hospital of North Staffordshire

Background: Laparoscopic Antireflux surgery (LARS) is the gold standard for the surgical treatment of Gastro oesophageal reflux disease (GORD). It is traditionally performed as an inpatient procedure.

Aims: To prospectively analyse the practicality of the provision of a Day case (DCLARS) provision of LARS and assess clinical outcomes.

Methods: DC LARS was performed on ASA 1-2, fully independent patients with a carer at home. The preoperative work up included endoscopy and oesophageal pH manometry. Perioperative protocol included preoperative counselling, standardised anaesthetic, antiemetic and analgesic regimes. A loose floppy 360 degree fundoplication was performed in all patients. The primary end points were achievability of discharge as a day case, length of hospital stay (hours) and readmission rates. Secondary endpoints were the postoperative complications, pain, nausea and dysphagia scores in the first week after surgery. MVSS (Modified Visick Symptom Score) and global satisfaction profiles were assessed at a later follow-up to evaluate the effectiveness of DCLARS in symptom control related to GORD.

Results: 42 consecutive patients (M: F - 33:9) with a median age of 43(IQR 32-48) and BMI of 27(IQR 25-29) formed the study group. The preoperative % time pH< 4 was 14(IQR 10-20) and DeMeester score 58(IQR 39-81). The median postoperative stay in hospital was 6.75 hours (IQR 6-8) and all 42 (100%) patients were discharged on the day of surgery. There were no readmissions, although there were two re-attendances with gas bloat.

Median post operative pain, nausea and dysphagia scores (Visual analogue scale of 0 -10) were assessed at discharge, 3, 5 and 7 days after surgery. The pain score was 5, 3, 2 and 2 at days 0, 3, 5 and 7 after surgery. The dysphagia score was 3, 1.5, 0 and 0 at days 0, 3, 5 and 7 after surgery. Post operative nausea pain score was 0 on all these days (0, 3, 5 and 7).

The global satisfaction score was 9.5/10 recorded at the first follow up clinic visit (6 weeks). MVSS scores of 1 or 2 (good result) was recorded in 39/40, 38/40 and 39/40 patients for reflux, dysphagia and gas bloat respectively. 2 (4.5%) patients had an MVSS of 3 or 4 (unfavourable outcome) for dysphagia and needed conversion to partial fundoplication at a later stage.

Conclusion: Our study demonstrates that DCLARS is feasible with good clinical outcomes in patients with symptomatic GORD.

Esophageal/Gastric Surgery – P311

THE INFLUENCE OF LAPAROSCOPIC ANTIREFLUX SURGERY ON DIETARY AND POSTURAL TRIGGERS OF GASTRO-OESOPHAGEAL REFLUX, NS Balaji, K Moorthy, Vasanth Dipesh BA, M Deakin, CVN Cheruvu, University Hospital of North Staffordshire

Background and Aim: (GOR) symptoms are known to be precipitated by specific diet and posture acting as triggers. The aim of this study is to assess the benefit of laparoscopic Antireflux surgery (LARS) on significant triggers of GOR identified preoperatively.

Methods: A pilot phase 1 study prospectively identified the preoperative dietary and postural triggers of GORD. These were used as the trigger specific evaluation tool in the current phase 2 study. The triggers included different food varieties (chocolate, spicy and fatty foods), beverages (citrus juices, coffee, tea), alcohol, smoking and posture (supine, bending and exercise). The severity of symptoms related to these stimuli were graded prior to surgery as severely incapacitating (SI), moderately incapacitating (MI) or having no effect (NE). The effect and extent of relief after surgery were graded as complete relief (CR), significant relief (SR) or no effect (NE).

Results: Our study comprised of 43 patients (M: F- 29:14) with a median age of 46(IQR 35-54) who were assessed preoperatively and at a median of 8 months following LARS for trigger specific relief of reflux.

Spicy food and alcohol were the most severe preoperative dietary triggers in 37/43 (86%) followed by citrus juices 36/43(83%) and fatty food 34/43(79%) respectively. Supine posture was the worst postural preoperative precipitant in 37/43 (86 %) (SI reflux-29 (78%) or MI reflux-8(22%)) of patients while bending and exercise affected 34/43(79%) and 25(58%) of patients. However smoking appears to have little effect (SI reflux-0, MI reflux-2)

Complete relief of reflux after LARS was seen in 95% (33/37) and in 79% (27/34) of patients after spicy and fatty food

intake respectively. 92% (34/37) of patients enjoyed reflux free alcohol intake following surgery. Complete relief from supine reflux was seen in 89% (33/37) and significant relief in the rest.

Conclusion: Our results conclude that LARS provides significant postoperative symptom relief of specific trigger provoked reflux. Trigger based assessment tools could be of value in evaluating post operative outcomes.

Esophageal/Gastric Surgery – P312

RETROSPECTIVE REVIEW OF RESULTS OF LAPAROSCOPIC PARAESOPHAGEAL HERNIA IN 106 PATIENTS WITHIN A RURAL POPULATION OPERATED BY A SINGLE SURGEON, MURALIDHARAN R BASKER MD, YASIR AKMAL MD, UMOH J NSIKAK MD, RYAN HARDY MD, CARLY WHITEHEAD MD, STEPHANIE DUNKLE-BLATTER MD, ALLIE SCHUESS, ANTHONY T PETRICK MD, GEISINGER HEALTH SYSTEM

OBJECTIVE: Controversy remains over optimal management of the crura during repair of paraesophageal hernias (PEH). The objective of our study was to compare outcomes of laparoscopic PEH hernia repair (LPEHR) with primary crural closure (PC) versus crural closure with mesh reinforcement (MC).

METHODS: We retrospectively reviewed data that was prospectively collected for 106 consecutive patients (M:F=1:2.5; mean age, 60.6; age range=33-91) undergoing initial LPEHR between November 2001 to June 2006. Pre and post operative evaluation included a standardized GERD symptom questionnaire, assessment of antacid use, UGI, and EGD. Manometry and esophageal pH testing were done selectively. LPEHR included Collis gastroplasty (n=94) and Nissen fundoplication (n=105). PC was performed in 67 patients and MC was utilized in 39 (Crurasoft® n=29; Surgisis® n=9; Alloderm® n=1)). Statistical analysis was done using Chi-square test.

RESULTS: All cases were completed laparoscopically. Mean LOS was 2.3 days (Range 1-22 days). 90-day and in-hospital mortality rate was 1.8%. The 90-day major complication rate was 6.6% (4 leaks, 1 MI, 1 Gastric necrosis, 1 Acute recurrence). There was no significant difference between PC and MC groups. The minor complication rate was 10.8%. One patient had esophageal erosion of mesh 5 months postop. 83% of patients utilized PPI's preoperatively while only 23.5% of patients required PPI therapy postoperatively (p<.001) at mean follow up of 22.7 months. 84.9% judged their outcomes good/excellent. Overall in both PC and MC groups resolution of heartburn, emesis, dysphagia, respiratory symptoms, and abdominal pain were all statistically significant (p<.001) with no difference between groups. All patients had postop UGI and 15% had EGD to objectively assess recurrence rates. There were no recurrences in the MC group with a mean follow up of 6.2 months. In the PC group, the recurrence rate was 5.6% with a mean follow up period of 8.9 months (p >0.05).

CONCLUSIONS: Laparoscopic repair of PEH was safe and results in significant clinical improvement and diminished use of antacids in those patients experiencing heartburn. Our study utilizes rigorous objective follow up. Early analysis suggests recurrence rates are low in both groups with a nonsignificant trend toward better recurrence outcomes in the MC group than the PC group. We recommend the use of biologic mesh due to our experience with erosion of synthetic mesh in one patient.

Esophageal/Gastric Surgery – P313

EFFICIENT CLIPLESS MINILAPAROSCOPIC CHOLECYSTECTOMY? A STUDY OF 641 CASES, Gustavo L Carvalho

PhD, Elizabete M Andrade, Luis H Lira, Alexandre W Dantas, Flavia F Queiroga, Gilvan Loureiro MD, Frederico W Silva MD, Carlos H Ramos MD, Pernambuco State University, School of Medicine, Recife, Brazil

INTRODUCTION: With the advances in minimally invasive surgery, it has been possible to use more accurate equipment with a reduced diameter, which has led to state-of-the-art 2-mm instruments (needle trocars). Nevertheless,



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because of the increased cost of this procedure it has not been described in the literature with a large patient series. **OBJECTIVE:** To present modifications to the laparoscopic technique which may make it possible to conduct mini-lap procedures safely and effectively, thereby considerably reducing the cost of this type of surgery and showing that it can improve the life quality of the patient.

METHOD: From Jan 2000 to Aug 2006, 641 consecutive patients underwent minilaparoscopic cholecystectomy (MLC). The patients were suffering from chronic lithiasic cholecystitis at various stages of the disease or gallbladder polyps and were submitted to MLC, including acute cholecystitis and intraoperative cholangiography. Tech - After the pneumoperitoneum at the umbilical site, 4 trocars are inserted; 2 of 2-mm (support trocars), 1 of 3-mm (work trocar) and 1 of 10-mm diameter, through which a 10-mm 30-degree laparoscope is inserted. Neither the 3-mm laparoscope, nor clips, nor expensive endobags are used. The cystic artery is safely sealed by electrocautery, near the gallbladder and the cystic duct is sealed with surgical knots. Removal of the gallbladder is carried out, in a bag made with a glove wrist, through the 10-mm umbilical site.

RESULTS: MLC was attempted in all 641 patients (75.7% fem; mean age, 46.6 yr; range 14-94 yr). The total operative time was 32 min; range 13-105 min. The average hospital stay was 18h (96% were discharged within 24h). There was no conversion to open surgery; 3.3% of patients (underwent conversion to standard (5-mm) lap-chole because of difficulty with the procedure; there were 2.3% minor umbilical site infections and 1.7% incisional herniations. There was no mortality, no bowel injury, no reoperation, no bile leakage, no bile duct injury and no postoperative hemorrhage.

CONCLUSION: MLC is a safe and effective procedure which results in a better esthetic effect for the patients, when compared with conventional laparoscopy. The modifications to the technique allow for a considerable reduction in costs, associated with the original MLC procedure, since neither clips, nor endobags, nor mini-loops are used. Furthermore, no 3-mm laparoscope is used, which is the most expensive component of the mini-lap instruments.

Esophageal/Gastric Surgery – P314

NISSEN FUNDOPLICATION IS EFFECTIVE FOR THE TREATMENT OF THE NUTCRACKER ESOPHAGUS - PRELIMINARY DATA, Gustavo L Carvalho PhD, Thiago G Vilaça, Ana Beatriz T Ramos, Flavia F Queiroga, Luis H Lira, Carlos Brandt, Renata F Vieira, Pernambuco State University, School of Medicine, Recife, Brazil

Introduction: The nutcracker esophagus (NE) is a primary motor disorder characterized by esophageal peristaltic contractions of high amplitude. There is relationship between gastroesophageal reflux disease (GERD) and NE but, in spite of this, there is no consensus on the use of surgery in this association of diseases. The purpose of the present investigation was to evaluate the treatment of NE by laparoscopic anti-reflux surgery (LARS) in carriers of NE associated with GERD.

Patients and Method: From January 2000 to August 2006, 256 patients with GERD underwent LARS, of whom six presented NE. The diagnosis of GERD was confirmed by upper gastrointestinal endoscopy and 24-h esophageal pH monitoring when necessary. NE was confirmed by esophageal manometry. Follow up evaluation with endoscopy and esophageal manometry were performed in all 6 patients.

Results: There was no need for conversion to open surgery and there were no deaths or major complications resulting from the procedure. Five patients are asymptomatic and one is oligosymptomatic. The amplitude of peristalsis in the distal esophagus decreased from 251.4 ± 28.8mmHg to 192.2 ± 58.5 (t=2.221-p=0.050). Although the lower esophageal sphincter pressure increased from 8.9 ± 4.2 to 11.6 ± 7.1 (t=0.791-p=0.4472), the difference was not statistically significant.

Conclusion: Laparoscopic Nissen was shown to be safe and effective for the treatment of nutcracker esophagus in patients with associated GERD. Besides the improvement in esophageal motility and control of the gastroesophageal reflux, improvement or disappearance of NE symptoms was observed in all patients.

Esophageal/Gastric Surgery – P315

ECONOMIC BENEFITS OF THE PROVISION OF DAY CASE LAPAROSCOPIC ANTI-REFLUX SURGERY, Krishna Moorthy MD, NS Balaji MD, A Samee MD, CVN Cheruvu MD, Upper Gastrointestinal Unit, Department of Surgery, University Hospital of North Staffordshire, Keele University, Stoke-on-Trent, UK.

Introduction The feasibility of performing day case Laparoscopic Anti-Reflux Surgery (LARS) is well recognised. However, the economic benefit of such a strategy has not been previously explored. In this study we aim to assess the cost effectiveness of day case LARS.

Methods All the procedures were performed by one surgeon over a 2 year period (2003-05). Patients in both cohorts (Day Case- DC and Inpatient- IP) were discharged on a standard schedule of post-operative analgesia and anti-emetics. A post-operative follow-up protocol consisting of telephonic follow up by the Day Surgery unit and 3 visits by the district nurse (DN) was established for the DC group. Data on readmissions, re-attendances, additional DN visits and visits to the General Practitioner (GP) was collected. Short-term direct costs up to the first post-operative follow-up appointment at 6 weeks were analysed. Pre-operative costs were similar in both cohorts. Thus the study variables include the operative and post-operative costs. Costs of hospital stay and the procedure including the theatre time, the disposables used and staffing were obtained from the trust's financial directorate. Costs for GP visits and DN visits were acquired from standard National Health Service cost sources.

Results There were 20 patients in the IP group and 26 in the DC group. The IP patients were operated in the period between 12/03 and 12/04 while the DC patients were operated in the period between 10/04 and 12/05. Both groups were well matched for clinical presentation, endoscopy, manometry and pH findings. The total operative costs were higher in the IP group [(830 (IQR-240.2) v 768.6 (232.5); p=0.01]. The median hospital stay in the IP group was 1 day (range 1-3). There were no readmissions in the DC group. There were median 3 (range 3-4) DN follow-up visits and 1 (range 0-1) GP visit in the DC group. The median post-operative costs were significantly higher in the IP group [£352 (IQR- 352) vs £ 317 (IQR- 24); P=0.001]. The total short-term costs were also significantly higher in the IP group [1368.6 (522.5) vs 1085.6 (244.7); P=0.001]. The clinical outcomes were comparable in both groups with no major complications.

Conclusion The results of this study show that the provision of laparoscopic LARS on a day case basis, in comparison to inpatient practice, is associated with comparable clinical outcomes, high patient satisfaction and significant short term direct cost benefits.

Esophageal/Gastric Surgery – P316

EARLY EXPERIENCE WITH LAPAROSCOPIC GASTRIC RESECTION, William C Conway MD, John D Webber MD, Detroit Medical Center/Wayne State University

Introduction: Laparoscopic gastric surgery has gained acceptance for benign disease, while this technique in malignant disease remains controversial. Laparoscopic approaches are less invasive, leading to reduced post-operative pain, reduced length of stay, and an overall increase in quality of life. An early experience with laparoscopic gastric resection is presented.

Methods: From 1/05 to 4/06, four patients underwent gastrectomy via the laparoscopic approach at Harper University Hospital. Procedures included two distal gastrectomies, one proximal gastrectomy, and one laparoscopic-assisted total gastrectomy, all with Roux-en-Y reconstructions. Medical charts and operating room records were reviewed in these cases.

Results: The indications for gastrectomy in our series included prophylactic gastrectomy due to genetic positivity for E-Cadherin in the setting of a family history of gastric cancer, distal gastric adenocarcinoma, pyloric stricture, and submucosal mass, which was identified as a GIST tumor on pathologic exam. Operative times ranged from 4.5 to 7.5



hours, and no cases were converted to an open procedure. Average blood loss was 112.5cc. Morbidity included an abdominal wall hematoma and iatrogenic hypotension; no mortality was noted. Average post-operative length of stay was 4.75 days. In the case of known adenocarcinoma, four nodes were obtained, one of which was positive.

Conclusions: Laparoscopic gastric resection is safe, well-tolerated, and may improve post-operative length of stay as well as post-operative debility. This technique is especially suited for benign disease and prophylactic resection in patients with E-cadherin positivity. In light of the minimal number of nodes obtained, more experience needs to be obtained before applying this technique to patients with gastric adenocarcinoma.

Esophageal/Gastric Surgery – P317

INCIDENCE OF FAMILIAL ACHALASIA OR ACHALASIA-TYPE SYMPTOMS AMONG RELATIVES OF PATIENTS UNDERGOING HELLER MYOTOMY WITH DOR FUNDPLICATION, Sebastian G de la Fuente MD, Eric J DeMaria MD, Joshua E Roller MD, Aurora D Pryor MD, Duke University Medical Center

Objective: Allgrove syndrome is a rare familial autosomal recessive disorder characterized by achalasia, alacrima, and adrenal insufficiency (triple-A syndrome). Genetic mutations responsible for this syndrome have been identified; however, the incidence of the disease, or of familial Achalasia in general, in patients undergoing surgery for Achalasia is unknown. In the present study we evaluated the incidence of Achalasia-type symptoms in family members of patients undergoing surgery for manometry-confirmed Achalasia.

Methods: A retrospective review was performed of all consecutive patients undergoing laparoscopic Heller myotomy with Dor fundoplication by a single surgeon at Duke University Medical Center. Basic demographics including age, sex, race, operative technique, family member affected, and length of stay were collected.

Results: A total of 54 patients were operated on by the one surgeon (AP) from 2003-2006. Of these, 5 patients (9%) had a family member with Achalasia-type symptoms. Sixty percent of patients with relatives affected were males and all were white. The mean age was 57 years old. All patients underwent preoperative evaluation including barium swallow as well as manometry that confirmed the diagnosis. Three of the patients underwent preoperative esophageal dilatations at other institutions and one had Botox injection prior to surgery. One patient had both Botox injections and multiple esophageal dilatations before referral. Three patients had first-degree relatives affected (son, sisters) and the remaining two had second-degree family members (aunts) with Achalasia-type symptoms. All underwent laparoscopic Heller myotomy with Dor fundoplication. No patients reported dry eyes (alacrimia) or had clear symptoms of adrenal insufficiency. There were no intraoperative or postoperative complications. The mean length of hospital stay was 23 hr.

Conclusions: Approximately 9 percent of patients with Achalasia have a relative affected with Achalasia or Achalasia-type symptoms. Of these, the majority are first-degree family members. For this reason, the initial work up for patients presenting with Achalasia should include assessment of the presence of Achalasia-type symptoms in their families. It is possible that another genetic variation exists that is associated with familial Achalasia and further investigation into this population is warranted.

Esophageal/Gastric Surgery – P318

CLINICAL EXPERIENCE WITH PROPHYLACTIC STENTING OF HIGH RISK ESOPHAGEAL ANASTOMOSES, Peter M Denk MD, Yashodhan Khajanchee MD, Lee L Swanstrom MD, Legacy Health System, Portland, OR

Esophageal surgery has improved significantly through advances in technique and technology. It has now become routine and even "safe" in experienced centers. Mortality from anastomotic leaks has improved however anastomotic complications including leak and stricture remain common

and represent significant immediate and late morbidity. Leaks lead to wound infections, increase pain, prolong hospital stays and delay recovery or adjuvant therapy. Late sequelae typically present as dysphasia that frequently requires endoscopic dilatation and adds to cost, discomfort and associated risks.

Based on our studies of prophylactic stenting of flawed esophageal anastomoses in an opossum model which documented leak prevention and reduced anastomotic strictures, we applied this technique to five selected patients undergoing laparoscopic total esophagogastrctomy.

Methods: Five male patients diagnosed with either Barrett esophagus with high grade dysplasia (1), or esophageal adenocarcinoma (4), had removable stents placed across the anastomosis at the time of esophagectomy. Three patients had laparoscopic transhiatal esophagogastrctomy with cervical anastomoses and two had laparoscopic/thoracoscopic approaches with thoracic anastomoses. All patients had laparoscopic feeding jejunostomies. Anastomoses were done with either two staple or staple / hand sewn technique. EGD was performed and Polyflex esophageal stents were placed under fluoroscopic guidance. Transmural sutures were placed at the proximal ends of the stents to secure them. Follow-up EGD with stent removal or subsequent intervention was based upon the patient's symptoms.

Results: Stents remained in place a mean 31 days (range 17 to 43). OR time averaged 7.1 hours. Length of stay averaged 23 days (range 7 to 45). 2 of 5 stents migrated, one of these patients developed a stricture but the other did not. One patient had a leak and after healing and stent removal went on to develop a stricture requiring several dilations. 3 of the 5 patients developed a stricture. Patients have had an average of 2.1 dilations per year postop (range 0 to 5.7) with a mean follow-up of 10 months (range 3-18).

Conclusion: Prophylactic stenting of esophageal anastomoses has the potential to prevent anastomotic leaks and decrease the incidence of strictures in selected high risk patients.

Esophageal/Gastric Surgery – P319

ARE MANOMETRIC STUDIES AND CALIBRATION REALLY NECESSARY FOR THE PROCEDURE OF LAPAROSCOPIC FLOPPY NISSEN FUNDPLICATION? Erhun Eyupoglu MD, Turgut Ipek MD, Metin Kapan MD, Adem Karatas MD, Ilknur Erenler Kilic, Department of Surgery, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey

Background: There are several surgical methods in gastroesophageal reflux disease (GERD) and the common aim is to minimize the postoperative complaints. We want to show if preoperative investigations have an effect on the choice of surgical procedure and postoperative results or not.

Material and methods: We treated 540 patients with GERD with laparoscopic Nissen fundoplication. Preoperative endoscopy, pH meter and passage graphy were performed on all patient. Manometric studies were not performed. In 17 patients classically Nissen fundoplication was done and calibrated with bougie. In 523 of these patients floppy Nissen were performed.

Results: The mean duration of operation was 60.0 (50-200) minutes. The overall duration of the hospital stay was 1.7 (1-8) days. In the postoperative period dysphagia occurred in 60 patients at the end of the first month, in 15 (2%) patients at the end of the third month, in 3 (0.5%) patients at the end of the first year and in 1 (0.1%) patient after 1 year. Gas bloating occurred in 65 (12%) patients. Local ischemia of the spleen occurred in 3 (0.5%) patient, and pneumothorax in another. Recurrence of the GERD occurred in 7 (1%) patients. Type 1 disruption occurred in 1 patient (0.2%) and type 4 disruption (0.2%) in another. Mortality rate was 0.1% (1 patient) due to esophageal perforation and pulmonary vein disruption during peroperative calibration.

Conclusion: In the postoperative period dysphagia is an important complaint which effects the life quality of the patients who underwent surgery for GERD. Decreasing the ratio of postoperative dysphagia is closely related with the type of the surgery. Laparoscopic floppy Nissen fundoplica-



tion provides an excellent symptomatic and physiological outcome in patients with typical symptoms of GERD. This procedure can be a safe and effective therapeutic modality even without manometric studies.

Esophageal/Gastric Surgery – P320

PARAESOPHAGEAL HERNIA AFTER LAPAROSCOPIC FUNDPLICATION, COMPLICATIONS AND FOLLOW-UP, Jose F Farah PhD, Alberto Goldenberg PhD, Vladimir Schraibman MD, Renato A Lupinacci PhD, Jose C Del Grande PhD, Federal University of Sao Paulo and Hospital Servidor Publico Estadual

Introduction: Post-operative laparoscopic anti-reflux anatomical failure range between 5- 40% and may be related to hazard complications. Anatomical failure can occur in asymptomatic patients making difficult to know the natural history of this complication.

Objective: evaluate the evolution of patients with anatomical failure.

Methods: 842 patients were evaluated through our records after laparoscopic fundoplication between 1995-2006. 508 (60,3%) performed an upper endoscopy. Only cases with stomach migration or gastric fundus migration through the torax (intact valve) were included.

Results: 32 (6,2%) patients presented paraesophageal hernia, 3 between 7-90 days after surgery. All were re-operated due to pain, dysphagia and vomit. Other 29 were diagnosed during routine exams (asymptomatic or dispeptic symptoms) between 13-60 months after surgery. Only one of these presented symptoms (vomit or pain) when all the others 28 did not present any event in a medium follow-up (12-84 months - mean 22 months).

Conclusions: This study suggests that clinical follow-up without re-operation in cases of asymptomatic migration may be enough.

Esophageal/Gastric Surgery – P321

LAPAROSCOPIC VERSUS OPEN D2 GASTRECTOMY FOR GASTRIC CARCINOMA, Douglas Fenton-Lee MD, Annanya Chakrabati MD, Eva Segalov PhD, David Williams MD, St Vincent's Hospital, Sydney

In specialised units D2 gastrectomy is performed for the management of gastric carcinoma. Laparoscopic D2 gastrectomy has been performed with minimal morbidity and mortality and with the benefits of a minimally invasive approach. The aim of this study was to evaluate the laparoscopic approach compared with the traditional open technique.

Method: In the period from January 2005-Aug 2006 we performed a prospective audit on patients undergoing laparoscopic and open D2 gastrectomy. Clinical data was prospectively collected and included patient demographics, stage of tumour, nodal harvest, postoperative complications, length of stay and survival. There was no difference in the surgical procedure performed whether it was performed open or laparoscopically. The oesophago-jejunal or gastrojejunal anastomosis was hand sutured and the entero-enterostomy a stapled anastomosis.

Results: Laparoscopic staging detected metastases in 13/36 (36%) of those patients deemed operable following other staging modalities. Thirteen patients underwent open and Ten laparoscopic D2 gastrectomy. The operative time was significantly longer in the laparoscopic group and length of stay was no different.

There was no postoperative mortality and no reoperations. There was one radiologically detected anastomotic leak in the laparoscopic group.

The median follow up is 7months(1- 18). There was no difference in the nodal harvest for the lap versus open group was median(range) 20(10-27) versus 15(6-36).

In this study the two groups were comparable in terms of patient demographics, postoperative complications and length of postoperative hospital stay. Laparoscopic D2 gastrectomy fulfilled the essential criteria for optimal cancer surgery in terms of R0 resection and number of lymph nodes harvested. Laparoscopic D2 gastrectomy may well become the optimal approach for the management of gastric cancer.

Esophageal/Gastric Surgery – P322

PREVENTION OF POSTOPERATIVE LEAKS FOLLOWING LAPAROSCOPIC HELLER MYOTOMY, Kelly R Finan

MD, David Renton MD, Ruth R Leath MPH, Mary T Hawn MD, University of Alabama

Purpose: Laparoscopic Heller myotomy has emerged as the preferred treatment for patients with achalasia. Post-operative leaks cause significant morbidity and impair functional outcome. This study assesses the efficacy of intra-operative leak testing on post-operative leak rate.

Methods: A retrospective analysis of all patients undergoing laparoscopic Heller myotomy by a single surgeon between November 2001 and August 2006 was undertaken. Prior therapy for achalasia, intra-operative mucosal injuries and post-operative leaks were assessed. Procedures were performed in a standardized fashion and a leak test was performed intraoperatively in all patients to assess for mucosal injury. Preoperative factors associated with mucosal injury was assessed by Chi-square analysis.

Results: One hundred and four patients were included in the study. Diagnosis was made by barium swallow and manometry. Prior treatment for achalasia, included previous Botox injection (25%), pneumatic dilation (27%), and prior transthoracic myotomy (12%). Intraoperative mucosal injuries occurred in 25% patients. All leaks were repaired with Vicryl suture and tested with Methylene blue stained saline (90%) or EGD (10%). There were no post-operative leaks and patients were started on diet day of surgery. Analysis of factors associated with mucosal injury demonstrated that prior Botox injection was associated with a statistically significant decrease in the rate of mucosal tear or injury (p=0.0296). A Dor fundoplication was performed in 70% of the patients. There were 3 postoperative complications; one aspiration pneumonia with induction of anesthesia, one mesenteric vascular injury, and one postoperative MI. There were no conversions to open procedure. The mean length of stay was 1.4 (+0.8) days.

Conclusion: Laparoscopic Heller myotomy for the treatment of achalasia is a safe procedure. Intra-operative leak testing minimizes the risk of post-operative leaks and expedites postoperative management with early refeeding. Prior treatment does not impair operative results. Long-term functional outcomes need to be assessed.

Esophageal/Gastric Surgery – P323

THORACOSCOPIC INTRATHORACIC ANASTOMOSIS USING SIDE-TO-SIDE (MODIFIED FROM ORRINGER) METHOD., S.

Furuta MD, R. Sunagawa MD, K. Inaba MD, S. Tonomura MD, M. Shoji MD, Y. Nakamura MD, J. Isogaki MD, Y. Komori MD, Y. Sakurai MD, I. Uyama MD, Fujita Health University, AICHI, Japan

BACKGROUND: Resection of the esophagus is the principal way for curative therapy of esophageal cancer. The right side thoracotomy combined with laparotomy is usually applied for esophageal resection, and the indication of thoracoscopic approach for esophagectomy is gradually increasing. In this procedure, the intrathoracic manipulation of esophago-gastric anastomosis is one of the choices for reconstruction. We applied side-to-side anastomosis (Modified from Orringer) for this anastomosis thoracoscopically.

METHODS: Our procedure for thoracoscopic esophago-gastric anastomosis is based on the side-to-side anastomosis reported by Orringer. The points of this technique are following. After esophagectomy, the mobilized stomach is manipulated into the posterior mediastinum in the original esophageal bed. The stump of the esophagus is pulled down until the distal end of the esophagus overlaps about 4cm with the stomach roll. A small esophagotomy is made at the distal end of the esophagus. A small gastrotomy is also made on the anterior gastric wall. This gastrotomy is made sufficiently below the tip of the proximal end of the stomach roll to allow the following insertion of the stapling device. After that, a stapling device is inserted both into the esophagus and stomach. Firing the stapler creates side-to-side esophago-gastrostomy. The common entry hole was



closed with interrupted suture.

RESULTS: We applied this anastomotic procedure to 5 cases of esophagectomy. No stenosis or failure of the suture was observed.

CONCLUSION: Thoracoscopic intrathoracic esophago-gastric anastomosis by side-to-side method is comparatively simple and safe method. We herein report our procedure.

Esophageal/Gastric Surgery – P324

LAPAROSCOPIC ANTIREFLUX RE-OPERATIONS IN ICELAND; OUTCOME AND ANALYSIS OF DATA FOR PREDICTABLE FACTORS FOR RE-OPERATIONS, Hildur

Guðjónsdóttir, Kristinn Tómasson PhD, Margrét Oddsdóttir MD, 1) University of Iceland, Medical school, Reykjavik, Iceland, 2) Research Center for Occupational Health and Working Life, Reykjavik, Iceland, 3) Dept of Surgery, Landspítali-University Hospital, Reykjavik, Iceland.

OBJECTIVE: The first laparoscopic antireflux reoperation (LAR) in Iceland was done in 1997. How do our re-operated patients fare, especially compared to those who are satisfied after a single operation? Do the patients that undergo re-operation have any common features?

METHODS and MATERIAL: Data was collected from medical charts from all patients (N = 42) who have undergone LAR in Iceland (1997-2004). All patients received by mail the Icelandic Quality of Life Questionnaire (IQL), Gastrointestinal Symptom Rating Scale (GSRS) along with additional questions on medications used, medical history. They were also asked to answer yes or no if they were satisfied with the results of the operation. The data from the re-operated patients (group A) was compared to our long-term results of laparoscopic antireflux operations (group B), in particular in relation to pre-operative symptoms, co-morbid illnesses and results of the questionnaires. The data was also analyzed for factors that could predict the need for re-operation.

RESULTS: 33 of 42 patients (79%) sent in their answers. 23 (70%) answered yes that they were satisfied with their second operation but 10 said no. Of those 10, seven patients (21%) had complaints that could be due to the operation or to GERD. The re-operated patients, group A, reported more severe pre-operative reflux symptoms compared to group B. The re-operated patients had a significantly higher number of co-morbid diseases that affected their quality of life. They also had significantly worse results on the IQL and on the GSRS as compared to patients in group B.

CONCLUSION: Patients with GERD who have required re-operation for their disease are less satisfied than those who have required a single operation, and their quality of life is significantly worse. Pre-operatively, the re-operated patients have in common a complex medical history and they report more severe symptoms of GERD as compared to patients who required only a single operation.

Esophageal/Gastric Surgery – P325

REVISIONAL LAPAROSCOPIC ANTIREFLUX SURGERY IS SAFE AND EFFECTIVE IN PROPERTLY SELECTED PATIENTS, Ryan W Hardy MD, Yaron Perry MD, Carly Whitehead, Murali R Basker MD, Allie Scheuss, Anthony T Petrick MD, Geisinger Medical Center

The purpose of our study was to review the outcomes of Revisional Laparoscopic Antireflux Surgery (RLARS). Historically, RLARS has been less successful than initial Laparoscopic Antireflux Surgery (LARS), however, experienced centers have found RLARS to be effective in patients who suffer recurrent GERD-related symptoms.

STUDY DESIGN: We retrospectively reviewed data that was prospectively collected for 41 consecutive patients (17 men and 24 women; mean age, 52.7; age range=19-77) undergoing 44 RLARS between Jan 2002 and Feb 2006. Pre and postoperative evaluation included standardized GERD symptom questionnaire, assessment of antacid use, UGI, and EGD. Manometry and esophageal pH testing were used selectively. QOLRAD questionnaires were completed in consecutive patients beginning August 2004. Statistical analysis was done using T-test and Chi-square testing.

RESULTS: 17 of the initial antireflux surgeries had been performed open. 43 RLARS were completed laparoscopically

with 1 conversion to open surgery. Mean LOS was 3.9 days (1 to 30). The mean follow-up was 23.1 months (2 to 48). Symptom results are summarized below

	PREOP	POSTOP
Heartburn	89%	24% c
Regurgitation	56%	20% c
Dysphagia	60%	33% c
PPI Use	78%	33% c
QOLRAD	94.94	149.47 t

Chi-square c= p<0.025 ; t-test t=p<0.0001. Post op UGI was completed in all patients (mean 7.5 mo) and demonstrated intact fundoplication with no hiatal hernia in 84% of patients. 67% of patients judged their outcomes to be good to excellent at most recent follow-up. 90-day major complications included leak and liver abscess (4.9%) and 6 minor complications (14.6%) occurred. There was no procedure related 90-day or in-hospital mortality.

CONCLUSIONS: RLARS was shown to be technically feasible even in patients with previous open fundoplication. Over a 2-year objective follow-up, RLARS was more effective than has previously been demonstrated at improving the triad of clinical symptoms, PPI usage and QOLRAD scores. Conversion and complication rates were low in our specialized center.

Esophageal/Gastric Surgery – P326

CLINICAL EVALUATION OF A LAPAROSCOPICALLY ASSISTED DISTAL GASTRECTOMY WITH AN EXTRA-PERIGASTRIC REGIONAL LYMPH NODE DISSECTION PRESERVING VAGAL NERVE BRANCHES FOR GASTRIC CANCER, Hideki Hayashi MD, Hiroshi Kawahira MD, Yoshihiro Kawahira MD, Yutaka Tanizawa MD, Hideaki Shimada MD, Takenori Ochiai MD, Research Center for Frontier Medical Engineering, Chiba University

Introduction: Laparoscopically assisted distal gastrectomy (LADG) with an extra-perigastric regional lymph node dissection accompanying preservation of hepatic and abdominal branches of vagal nerve has been performed on 9 patients with early gastric cancers in the Chiba University Hospital between November 2004 and September 2006. Clinical outcomes of these patients were compared with those of the 15 patients with LADG without preservation of vagal nerve branches (LADG group) performed during the same period.

Surgical procedure: Under pneumoperitoneum, the left and right gastroepiploic, and the right gastric vessels were divided at their origin, and the nodes along common hepatic and left gastric arteries, and celiac trunk were then dissected intracorporeally. Hepatic and celiac branches of the vagal nerve were preserved during the dissection of the nodes for LADG-VP group. Afterward, 6 cm mini-laparotomy was made in the epigastrium, and four-third of distal gastrectomy and B1 or Roux-en-Y reconstruction was performed extracorporeally.

Result: There were no conversion to open surgeries in both groups, and no statistically significant differences were observed between two groups in the mean operating time (327 min for LADG-VP and 332 min for LADG), mean time for laparoscopic procedure (208 and 219 min, respectively), blood loss (110 and 179g, respectively), and mean number of harvested lymph nodes in the extra-perigastric area (4.9 and 3.7 nodes, respectively). Postoperative course such as time to flatus (2.3 days for LADG-VP and 2.4 days for LADG) and body weight loss of 3 months after surgery (12% for both groups) were also similar between the groups. In contrast, ratios of the patients complaining of frequent constipation (20% for LADG and 0% for LADG-VP), diarrhea (7% and 0%, respectively) and dumping syndrome (7% and 0 %, respectively) after surgery were relatively higher in the LADG group.

Conclusions: LADG with an extra-perigastric regional lymph node dissection accompanying preservation of vagal nerve branches is safely feasible and could contribute to postoperative quality of life of patients with gastric cancer.



SAGES POSTER ABSTRACTS

Esophageal/Gastric Surgery – P327

LAPAROSCOPIC SUTURING AND PERITONEAL LAVAGE FOR DUODENAL ULCER PERFORATION, Atsushi Iida MD, Kei Honda MD, Akio Yamaguchi MD, First Department of Surgery, University of Fukui, Japan

(Introduction) Perforated duodenal ulcer induces pan-peritonitis. Recent conservative treatment gets success to avoid surgery, however many of the patients are bearing their pain, fasting and having a nasogastric tube for several days. We think the minimal invasive surgery is the best way for those patients, and introduce our procedure and results.

(Procedure) We have emergently operated for perforated duodenal ulcer patients since 2000. We performed laparoscopic suturing to close the perforation and covered the lesion by omentum to 17 patients. Peritoneal lavage was sufficiently performed, and then drain tube was placed on the duodenum.

(Results) Under the laparoscopic view, all of the patients had perforated duodenum and dirty ascites with white coat. We could close the hole and wash out the peritoneal cavity for all. The operating time were 71 -115 min, the blood loss was negligible. Oral intake and walking were started at the next day, and the hospital stay was seven to 16 days. All the patients were infected helicobacter pylori in their stomach and disinfected by oral antibiotics.

(Conclusion) The patients discharged finely without bearing conservative treatment. Laparoscopic suturing and peritoneal lavage were useful and satisfactory treatment for perforated duodenal ulcer patients.

Esophageal/Gastric Surgery – P328

HAND-ASSISTED LAPAROSCOPIC TOTAL GASTRECTOMY WITH SPLENECTOMY FOR ADVANCED GASTRIC CANCER, Mikito Inokuchi MD, Kazuyuki Kojima MD, Hiroyuki Yamada MD, Yoshihisa Sekita MD, Tatsuyuki Kawano MD, Dept. esophagogastric surgery, Tokyo medical and dental university

We performed hand-assisted laparoscopic total gastrectomy with splenectomy and D2 lymphadenectomy for advanced gastric cancer in the upper portion. We show this technique and the results.

We placed five ports and GelPort™ (Applied) through incision of 8 cm at the epigastrium. After dividing of the greater omentum, the distal pancreas and spleen were dissected from the retroperitoneum by a technique of hand-assisted laparoscopic surgery. The splenophrenic ligament and phrenoesophageal membrane was divided. We performed laparoscopic lymphadenectomy following that. The right gastroepiploic vessels were divided. The duodenum was dissected with endoscopic linear stapler. After the right gastric vessels were divided, we dissected the lymph nodes along common hepatic artery. The celiac artery, splenic artery (SPA) and left gastric artery (LGA) were exposed, and the LGA was divided. The vagal nerves were dissected. The dissection of the lymph nodes along the SPA was performed extracorporeally through the incision at the epigastrium. The dissection of esophagus and the anastomosis by the Roux-en-Y method were accomplished extracorporeally. We performed this procedure in five cases (three were male, two were female). The median age of the patients were 70 years (range; 56 ~ 76 years). The median operative time was 338 minutes (range; 311 ~ 382 minutes). Postoperative complication was observed in one case. Pneumonia and sepsis occurred, and were recovered conservatively. The median postoperative hospital stay was 17 days (11 ~ 40 days).

Esophageal/Gastric Surgery – P329

LAPAROSCOPIC RESECTION FOR GASTRIC REMNANT CANCER : REPORT OF 8 CASES., J. Isogaki MD, R. Sunagawa MD, S. Furuta MD, K. Inaba MD, S. Tonomura MD, M. Shoji MD, Y. Nakamura MD, Y. Komori MD, Y. Sakurai MD, I. Uyama MD, Fujita Health University, AICHI, Japan

BACKGROUND: Since laparoscopic gastrectomy is increasingly applied for gastric cancer resection along with the improvement in instrument and technique in Japan, laparoscopic surgery for gastric remnant cancer (GRC) is still

uncommon. We applied laparoscopic treatment for 8 cases of GRC and accomplished the surgical procedure laparoscopically in 7 cases. There are very few reports about laparoscopic GRC resection, we herein report our experience.

Patients and methods: From April 2002 to January 2006, 8 patients received laparoscopic surgery for GRC. Five were male and three were female. The primary diseases for the initial gastrectomy were peptic ulcer (n=4) or gastric cancer (n=4). The mean latency period between the initial surgery and diagnosis of GRC was 19.9 years. Seven GRC were defined as early stage and one was advanced.

RESULTS: Out of the 8 cases, we resected laparoscopically in 7 and converted to laparotomy in one. Total gastrectomy with Roux-en-Y reconstruction (n=6) or partial gastrectomy (n=1) were performed laparoscopically. Mean operation time was 383 minutes. At median follow up period of

CONCLUSION: We applied laparoscopic surgery for GRC and accomplished curative resection laparoscopically in 7 (87.5%) cases out of 8. Although our limited experience, laparoscopic resection for GRC is feasible and might be a choice of treatment for GRC.

Esophageal/Gastric Surgery – P330

NEW CONCEPT OF HYBRID ESOPHAGECTOMY TO ENHANCE ITS SAFETY AND RADICALITY FOR ESOPHAGEAL CANCER, Yosuke Izumi MD, Akinori Miura MD, Tsuyoshi Kato MD, Tokyo Metropolitan Komagome Hospital

Background: Minimally invasive esophagectomy offers many theoretical advantages including reducing postoperative morbidity and mortality. But numerous issues remain unresolved including the optimum approach and applicability to general surgeons.

Aim: To assess our outcomes after minimally invasive esophagectomy and investigate the optimum approach and applicability to general surgeons.

Method: Between August 2000 and December 2005, we introduced VATS esophagectomy for 21 cases with Stage I or II esophageal cancer. Our hybrid surgery consists of a right video-assisted thoracoscopic (VATS) approach for mobilization of the intrathoracic esophagus and lymph node dissection, and gasless laparoscopic gastric reconstruction for the esophagus. It preserves the advantages of open procedures by offering tactile sensation, while maintaining the benefits of a minimally invasive procedure.

Results: Postoperative serum CRP level and postoperative complications are not significantly different between open and VATS esophagectomy. Actual benefits of the minimally invasive procedures are improved exposure in upper and lower mediastinum and reducing postoperative pain. Postoperative vital capacity is well recovered in VATS group. The surgeons' ability to feel the tumor helps ensure wide-field dissection safely with hand-assisted technique during thoracoscopic surgery. Five-year survival is 100% in Stage 0 and 80% in Stage I, which is comparable to open surgery (82%). Postoperative mortality was 0% and morbidity rate was 35%, which is lower than open surgery.

Conclusion: Hand-assisted techniques can be the ideal bridge between open and totally thoracoscopic and laparoscopic procedures for surgical treatment of esophageal cancer.

Esophageal/Gastric Surgery – P331

TEN-YEAR FOLLOW-UP OF LAPAROSCOPIC HELLER MYOTOMY FOR ACHALASIA SHOWS DURABILITY, Louis O Jeansonne MD, Brent C White MD, Matthew D Shane MD, Craig B Morgenthal MD, Stanley Zagorski MD, Vickie Swafford BS, S. Scott Davis MD, Leena Khaitan MD, Barbara J Pettitt MD, John G Hunter MD, Edward Lin DO, C. Daniel Smith MD, Emory University School of Medicine

OBJECTIVE: Reports of long-term outcomes for laparoscopic Heller myotomy (LHM) are scarce. In this work, outcomes of LHM for achalasia in patients who underwent surgery more than 10 years prior were investigated.

METHODS: A cohort of patients treated with LHM and partial fundoplication (either Dor or Toupet) for achalasia



between 1993 and 1996 was followed for long-term outcomes, which were compared to baseline data at presentation.

RESULTS: Thirty-two consecutive patients were identified, and follow-up information was obtained for 20 patients (62.5%). Mean follow-up was 11.2 years (range 10.3 to 12.3 years). Three patients (9.4%) were deceased (mean of 40 months post-op). Of the 17 living patients, dysphagia was rated as severe in one (5.9%), mild to moderate in eight (47.1%) and absent in eight (47.1%) at 10 years. These were decreased from pre-operative scores, in which dysphagia was rated as severe in 42.9%, mild to moderate in 57.1%, and absent in 0% ($p < 0.05$). In addition, 10-year dysphagia scores were unchanged from those at short-term follow-up (mean of 27 months, $p = 0.84$). Other symptoms of heartburn, chest pain, voice symptoms, cough, and asthma were reported in less than 30% of patients at 10 years. Esophageal dilation following surgery was required in three patients, and two patients required repeat operations (esophagectomy in one patient, hiatal hernia in one patient). Satisfaction with the operation was reported by 16 patients (94.1%) at 10 years.

CONCLUSION: Most patients who underwent LHM with partial fundoplication reported satisfaction 10 years after the operation. A small number of patients required additional intervention. Dysphagia scores at 10 years were not different from those collected at short-term follow-up. Our data suggest that the efficacy of LHM is sustained at 10-year follow-up.

Esophageal/Gastric Surgery – P332

LAPAROSCOPIC ANTIREFLUX PROCEDURES; A SINGLE SURGEONS LONG-TERM RESULTS (5-10 YEARS),

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OBJECTIVE: Laparoscopic antireflux procedures (LAP) were introduced in Iceland in 1994. For the first 5 years, LAP in Iceland was almost solely done by a single surgeon. To evaluate the long-term results this study was undertaken.

METHODS AND MATERIAL: From 1994-1999, 158 patients underwent LAP in Iceland and fulfilled the inclusions definition (i.e. are alive today, LAP was the main procedure done, were adults, etc). These patients were sent 3 questionnaires - Gastrointestinal Symptom Rating Scale (GSRS), Quality of life in Reflux and Dyspepsia (QOLRAD) and the Iceland Quality of Life Questionnaire (IQL) - in addition to questions on medications and medical history. They were also asked to answer yes or no if they were satisfied with the results of the LAP. Their medical charts were reviewed and pre-op symptoms, medical history, measurements, procedure specifics and post-op problems noted.

RESULTS: One hundred and twenty answered or 76%. Ninety nine (83%) answered "yes" to the question are you satisfied with the results of the LAP, but 21 (17%) answered "no". The satisfied ones had significantly better quality of life scores than those who were dissatisfied. The satisfied patients scored significantly better on the GSRS. Twenty eight reported symptoms of gastroesophageal reflux (GERD) after the operation. Fourteen of those were in the unsatisfied group and 14 were satisfied with LAP. The seven that were dissatisfied, but without reflux symptoms reported bad health, bloating, abdominal pain, diarrhea, etc. Overall, the GERD symptoms were significantly worse in the unsatisfied patients.

CONCLUSION: Five to 10 years after LAP, more than 80% of patients are satisfied with the results. Compared to those that are dissatisfied, the satisfied ones score significantly better on both IQL and GSRS. These subjective results are acceptable, but objective data is needed to allow definitive conclusions to be made.

Esophageal/Gastric Surgery – P333

AERODIGESTIVE FUNCTIONAL OUTCOMES FOLLOWING MINIMALLY INVASIVE ESOPHAGECTOMY., L Kautzman

MD,C Senkowski MD,S Brower MD,J Garber MD, Memorial Health University Medical Center, Mercer University School of Medicine Savannah Campus

Improvement of swallowing function is an important outcome after esophageal surgery. Minimally invasive esophagectomy (MIE) for esophageal disease is being evaluated for both functional and oncological outcomes. Few studies have evaluated swallowing function. We review the ability to identify dysphagia in MIE patients.

A retrospective chart review of 18 patients over 3 years was performed. Demographics collected were pathology, stage, and use of induction therapy. Data obtained included radiographic swallow studies; speech therapy evaluation with modified barium swallow (MBS); type and timing of first diets; duration of tube feed supplementation; need for dilation; and dysphagia scores at 2 weeks and 2 months.

Subjective dysphagia scores were given from a scale of 0 to 6, ranging from no symptoms to solid food dysphagia.

These data compared radiographic and clinical data with patient outcome.

Of 16 radiographic swallows performed, 3 (17%) anastomotic leaks were reported and correlated with the patients clinically. Delayed gastric tube emptying (DGE) was demonstrated in 3 (17%) patients and aspiration in another 3 (17%). Speech therapists evaluated 14 patients and 3 underwent MBS secondary to bedside failure, which confirmed their clinical severe dysphagia. Diet was initiated on median day 7 and primarily was full liquid or pureed. Fifteen patients required tube feeding supplementation on discharge. Of these, median time of discontinuation was 8 weeks.

Stricture was diagnosed in 7 (39%) patients with endoscopy, all requiring dilations. Mean dysphagia scores at 2 weeks and 2 months were 1.6 and 1.8 respectively.

Patient group	Feeds @ 8 weeks	Stricture	Dysphagia score
1 (N=8)	N=3	N=4	1.3/2
2 (N=8)	N=3	N=3	1.8/1.4

group 1 passed studies; group 2 failed studies

MIE was associated with significant early morbidities including leaks, DGE, and aspiration. However, a comprehensive algorithm is needed to control for these complications and prevent the more serious event of aspiration. These observations are not translated into sustained morbidities and satisfactory outcomes are observed at two months.

Esophageal/Gastric Surgery – P334

RESULTS OF D2 LYMPH NODES DISSECTION IN

LAPAROSCOPY-ASSISTED DISTAL GASTRECTOMY, Hideki

Kawamura MD, Yukifumi Kondo MD, Kuniaki Okada MD, Hiroyuki Isizu MD, Hiroyuki Masuko MD, Department of Surgery, JA Sapporo Kosei Hospital

Introduction: Laparoscopy-assisted distal gastrectomy (LADG) for gastric cancer has recently been spreading rapidly, with an increasing number of medical institutions performing D2 lymph nodes dissection in this surgery, especially in Japan. Although the procedures are essentially the same as laparotomy, D2 lymph nodes dissection in LADG is more difficult. So we investigated safety and accuracy of D2 lymph nodes dissection in LADG. Knack of dissection is very careful handling of forceps. In the event of bleeding from lymph nodes or adipose tissue, hemostasis by compression and the like must be assured before proceeding to the next step.

Methods: This is a retrospective analysis of 104 patients undergoing gastrectomy for gastric cancer in our institution between November 2004 and April 2006. 35 cases were D2 in LADG and 69 cases were D2 in open distal gastrectomy (DG).

Results: Mean operative time was LADG; 284.2 minutes versus DG; 268.7 minutes (NS). Bleeding volume was LADG; 97.3 ml versus DG; 270.4 ml ($p < 0.05$). Postoperative hospital stay was LADG; 17.2 days versus DG; 22.6 days ($p < 0.05$). Complication rate was LADG; 8.6% versus DG; 18.8% (NS)



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(breakdown of complications in LADG: duodenal stump suture failure in Roux-en Y construction in 1 case, pancreatic juice leakage in 1 case, stenosis at anastomosis in 1 case), and the number of lymph nodes dissected was 49.5 versus 47.7 (NS).

Conclusion: D2 lymph nodes dissection in LADG is well applicable without problems with safety and dissection accuracy, if performed by a surgeon skilled in laparoscopic procedures. Currently, early gastric cancer is the only indication of LADG at our department. After carefully evaluating long-term results, this technique may be applicable to some advanced cancers.

Esophageal/Gastric Surgery – P335

RESULTS OF ROUX-EN-Y RECONSTRUCTION AFTER LAPAROSCOPY ASSISTED DISTAL GASTRECTOMY COMPARED WITH CONVENTIONAL OPEN DISTAL GASTRECTOMY, Kojima Kazuyuki MD, Inokuchi Mikito MD, Yamada Hiroyuki MD, Kawano Tatyuki MD, Sugihara Kenichi MD, Esophagogastric Surgery Tokyo Medical and Dental University Graduate School of Medicine

BACKGROUND: Although several studies compare surgical results of laparoscopic and open colonic resections, there is few study of laparoscopic gastrectomy compared with open gastrectomy.

HYPOTHESIS: When compared with conventional open gastrectomy, laparoscopy-assisted R-Y gastrectomy is less invasive in patients with gastric cancer. **DESIGN:** Retrospective review of operative data, and postoperative clinical course after R-Y gastrectomy.

SETTING: University hospital in Tokyo Japan.

PATIENTS: The study included 136 patients who were treated with R-Y gastrectomy for gastric cancer from February 2004 to August 2006: 94 with laparoscopy-assisted gastrectomy and 42 with conventional open gastrectomy.

MAIN OUTCOME MEASURES: Demographic features examined were operation time; blood loss; length of postoperative hospital stay; postoperative complications; co-morbidity rate; rehospitalization rate; BMI; and number of harvested lymph nodes.

RESULTS: Significant differences ($P < .01$) were present between laparoscopy-assisted and conventional open gastrectomy when the following features were compared: postoperative hospital stay (7.3 vs. 12.1 days), blood loss (86 vs. 353g) and operation time (283 vs. 223 minutes). There was no significant difference between laparoscopy-assisted and conventional open gastrectomy with regard to, number of harvested lymph nodes (31.4 vs. 33.9), BMI (22.9 vs. 23.0), co-morbidity rate (32% vs. 40%), rehospitalization rate (3.2 vs. 4.8%) and complication rate (11% vs. 10%).

CONCLUSIONS: Laparoscopy-assisted R-Y gastrectomy, when compared with conventional open gastrectomy, has several advantages, including less blood loss, and shorter hospital stay, with no decrease in operative curability and complications. When performed by a skilled surgeon, laparoscopy-assisted R-Y gastrectomy is a safe and useful technique for patients with gastric cancer.

Esophageal/Gastric Surgery – P336

MINIMALLY INVASIVE MYOTOMY FOR ACHALASIA IN THE ELDERLY, Arman Kilic BS, Matthew J Schuchert MD, Arjun Pennathur MD, Rodney J Landreneau MD, Hiran C Fernando MD, Neil A Christie MD, Sebastien Gilbert MD, Ghulam Abbas MD, James D Luketich MD, Department of Surgery, Heart, Lung, and Esophageal Surgery Institute, University of Pittsburgh Medical Center

INTRODUCTION: Elderly patients with achalasia are more frequently being referred for minimally invasive Heller myotomy (MIM). The associated morbidity and mortality of MIM in the elderly are not well defined. The objective of this study was to review our experience with MIM in the elderly.

METHODS: From May 1996 to May 2006, 56 patients (33 men, 23 women) 70 years or older (mean age 78, range 70 to 96) underwent MIM [54 laparoscopically (LAP), 2 video-assisted thoracic surgery (VATS)]. Variables analyzed included operative and hospital course, perioperative mortality,

postoperative interventions (re-do myotomy, esophagectomy, balloon dilation, botox injection), and dysphagia scores (range 1 ? no dysphagia to 5 ? dysphagia to saliva). This was compared to a concurrent series of 144 young (< 70 years old) patients undergoing MIM (140 LAP, 4 VATS) for achalasia at our institution.

RESULTS: Median hospital stay (2 vs. 3 days), conversions to open (0 vs. 3.6%), overall complication rate (13 vs. 11%), perioperative mortality (0 vs. 0%), improvement in mean dysphagia score following MIM (3.25 to 1.32 vs. 3.41 to 1.27), and postoperative interventions (17 vs. 20%) were similar between young and elderly patients at a mean follow-up of 20.9 and 13.3 months, respectively. Complications in the elderly group included 2 (3.6%) intraoperative esophageal perforations, 1 (1.8%) intraoperative gastric perforation, 1 ileus, 1 postoperative intubation, and 1 C. difficile infection. The two conversions to open were due to a significant degree of adhesions discovered intraoperatively and concern regarding the viability of the myotomy after microperforation.

CONCLUSIONS: MIM can be performed safely in elderly patients with achalasia. MIM affords similar symptomatic improvement in the elderly as compared to younger patients. MIM should be strongly considered as a therapeutic strategy in the good risk elderly achalasia patient.

Esophageal/Gastric Surgery – P337

THE ROLE OF LAPAROSCOPIC ANTI REFLUX SURGERY IN THE PREVENTION OF LUNG FAILURE DUE TO GASTRO OESOPHAGEAL REFLUX IN LUNG TRANSPLANT

PATIENTS., Douglas Fenton-Lee MD, Monique Malouf PhD, John Morton MD, Roo Killick PhD, Allan Glanville PhD, St Vincents Hospital, Sydney, Australia

The major cause of delayed graft failure in lung transplantation is the development of bronchiolitis obliterans syndrome (BOS). There appears to be a causal relationship between reflux and early graft rejection as well as the development of BOS. The mechanisms involved that produce these pathological changes have not been elucidated.

The aim of this study was to evaluate the efficacy of laparoscopic antireflux surgery in the prevention of graft failure in those lung transplant patients with gastro oesophageal reflux

Method: In the period from Jan. 2004-Dec 2005 lung transplant patients seen at the St Vincent's lung transplant clinic with deteriorating lung function attributed to BOS were investigated for reflux. Patients with reflux were identified from clinical history, endoscopy and 24 hr pH monitoring. Oesophageal manometry was also performed in all patients. Laparoscopic Nissen fundoplication was performed in all patients with definite reflux.

Results: There were 25 lung transplant patients that underwent laparoscopic Nissen fundoplication out of a total of 62 performed at St Vincent's Hospital.

There were no postoperative mortality and no reoperations. The median follow up is 5 months (1.5-19). There have been 2 deaths. Six patients have continued to deteriorate. Eight patients are stable and seven have improved lung function. The results of surgery in this cohort of patients are encouraging. The majority of patients in this study had well established BOS with irreversible lung damage. Therefore identifying transplant patients with reflux at an earlier stage for surgery may prevent permanent lung damage with loss of the transplant.

Esophageal/Gastric Surgery – P338

INDICATION OF LAPAROSCOPY-ASSISTED DISTAL GASTRECTOMY FOR GASTRIC CANCER: AUDIT FOR THE INSTITUTIONAL GUIDELINE, Young-Woo Kim MD, YW Doh MD, HJ Jung, JH Lee, KW Ryu, IJ Choi, CG Kim, JY Lee, JS Lee, JY Rho, SR Park, JM Bae, National Cancer Center

Backgrounds: Laparoscopy-assisted distal gastrectomy (LADG) is becoming popular procedure. However, oncological outcome is still not confirmed and the operation is not standardized yet. Therefore, in our institution, LADG was applied according to the strict guideline. The aim of this

study was to evaluate propriety of institutional guideline through comparing outcomes of LADG and those of ODG.

Materials and Methods: From October 2002 to May 2006, 210 cases of LADG were performed in clinical stage T1N0 or T1N1. 169 cases out of 210 were performed by one surgeon. During the same period, 528 cases of ODG were performed. A LADG was performed by one experienced surgeon and a ODG was done by four surgeons including laparoscopic surgeon. Data were analyzed retrospectively.

Result: The clinical and pathological parameters, including age, body mass index, tumor size, lymph node metastasis, TNM staging, histological type and extents of lymph node dissection were not significantly different. Mean operating time for the LADG group were significantly longer than that of the ODG group (264.9 vs. 171.7minutes, $p < 0.5$). Mean blood loss were significantly lower in the LADG group than in the ODG group (125.6 vs. 253.4 ml, $p < 0.5$). Extents of lymph node dissection and the mean number of harvested lymph nodes was not significantly different between two groups (38.0 vs. 38.2 $p = 0.878$) The LADG group showed faster recovery than ODG group. The average time to return of bowel function (first flatus and first liquid diet) was significantly shorter in the LADG group than in the ODG group. Also, postoperative hospital stay were shorter in the LADG group (7.7 vs. 10.2days, $p < 0.5$). Postoperative complications rate were significantly lower in the LADG group (1.8% vs. 9.1%, $p < 0.5$). Recurrence rate were not significantly different between two groups so far.

Conclusion: LADG showed better clinical outcome than ODG in many aspects when performed in cT1N0 and cT1N1 gastric cancer. So, our institutional guideline for LADG could be justifiable in short-term basis. Before considering expansion of indication of LADG, developing careful guideline and audit will be desirable.

Esophageal/Gastric Surgery – P339

TOTALLY LAPAROSCOPIC UNCUT ROUX-EN-Y GASTROJEJUNOSTOMY, Jin Jo Kim MD, Seung Man Park MD, Cho Hyun Park MD, Jun Gi Kim MD, Department of Surgery, Our Lady of Mercy Hospital, College of Medicine, The Catholic University of Korea, Incheon, Korea

Purpose: Uncut Roux-en-Y gastrojejunostomy (uRYGJ) has been known to be effective in avoiding bile reflux and delayed gastric emptying in the remnant stomach. The purpose of this study is to evaluate the efficacy of totally laparoscopic uRYGJ (TLuRYGJ) in avoiding bile reflux gastritis and delayed gastric emptying after distal gastrectomy.

Methods: Fourteen consecutive patients who underwent TLuRYGJ and were followed up at least 6 months after surgery. Eight male and 6 female patients with age of 55.1 \pm 10 years and BMI of 23.4 \pm 7.3.4 were enrolled. The reasons for gastrectomy were adenocarcinoma in 13 and duodenal ulcer obstruction in 1 patient. Intracorporeal uRYGJ was performed with laparoscopic linear staplers. First B-II anastomosis and then Braun anastomosis, finally in-continuity stapling with white cartridge on the afferent loop were performed.

Results: The operation time was 298 \pm 66 minutes, time for anastomosis was 44 \pm 13 minutes and the estimated blood loss was 90.6 \pm 51.5 ϕ . Oral feeding of liquid meal was started at 3.6 \pm 0.9 days and the hospital stay was 8.5 \pm 2.2 days after surgery. There were 2 cases of complication (14.3%, bleeding and ventral hernia) and was no case of mortality nor conversion to an open procedure. After follow up of 6 months, one patient (7.1%) showed symptom of delayed gastric emptying which need medication and 4 patients showed mild dumping syndrome, but there was no symptomatic bile reflux. In modified Visick classification, eight patients (57.1%) were classified as grade 1 and 6 patients (42.9%) were classified as grade 2. There was no patient whose grade is more than 3. Serum albumin level of the patients was not different from preoperative level ($p = 0.144$), but there was significant difference in body weight ($p = 0.001$) between the weight of pre and postoperative 6 months, though the amount of weight loss was mere (5.8 \pm 7.4.8%). Follow up endoscopic findings showed 1 case of bile reflux

(7.1%), 1 case of mild gastritis (7.1%) and 4 cases of moderate degree of residual food (28.6%) in the remnant stomach. In all patients, the in-continuity staple line made on the afferent loop was remained airtight.

Conclusions: TLuRYGJ showed good short term and long term clinical results, especially in avoiding bile reflux and delayed gastric emptying. In-continuity stapling with white cartridge seems to be suitable in occluding the afferent loop without cutting the bowel in TLuRYGJ.

Esophageal/Gastric Surgery – P340

QUALITY OF LIFE AFTER LAPAROSCOPY-ASSISTED DISTAL GASTRECTOMY, Seiichi Kitahama MD, Nobuyasu Kano MD, Hiroshi Kusanagi MD, Makio Mike MD, Hisakazu Hoshi MD, Michiko Kitagawa MD, Seiko Uwafuji MD, Yukihiko Watanabe MD, Satoshi Matsuda MD, Satoshi Endo MD, Keitaro Harasawa MD, Department of Surgery, Kameda Medical Center

Objective: To evaluate the quality of life of patients who had undergone laparoscopy-assisted distal gastrectomy (LADG) and its clinical outcome.

Methods: Quality of life was estimated using the 24-item questionnaire with a scoring system of 1, 2, and 3, and was compared between 27 consecutive patients with LADG and 24 with conventional open gastrectomy. All patients underwent reconstruction by gastroduodenostomy (Billroth II), and the pre- and postoperative diagnoses were early gastric cancer. All the patients who were treated between January 1996 and August 2003 are alive without recurrence as of today. Results: Patients who had undergone LADG were taking a normal diet with >66% of volume at each meal, and showed significantly better results with regard to weight loss and faster postoperative recoveries. Length of postoperative stay was shorter in LADG group than in conventional group.

CONCLUSIONS: Quality of life after LADG was better than that of conventional distal gastrectomy. LADG is technically safe, less invasive and more preferably accepted by patients. This can be the procedure of choice for the treatment of early gastric cancer.

Esophageal/Gastric Surgery – P341

PROBLEMS AND SOLUTIONS FOR INTRODUCTION OF LAPAROSCOPY-ASSISTED GASTRECTOMY FOR GASTRIC CANCER, Nobuhiro Kurita MD, Tomohiko Miyatani MD, Jun Higashijima MD, Kouzou Yoshikawa MD, Hidenori Miyamoto MD, Masanori Nishioka MD, Mitsuo Shimada MD, Department of Surgery, The University of Tokushima

Introduction) Laparoscopy-assisted gastrectomy including lymph node dissection is one of complicated procedures. The aim of this study is to clarify the problems and solutions for introduction of this procedure.

Patients and methods) The 31 patients (28: distal gastrectomy, 3: total gastrectomy) performed laparoscopy-assisted gastrectomy were evaluated after introducing to our institute in 2001. The hand assisted laparoscopic surgery (HALS) was performed from May, 2004 to October, 2004.

The patients were divided into three groups. The 9 patients (9: distal gastrectomy) before introduction of HALS were divided into the prior group. The 9 patients (7: distal gastrectomy, 2: total gastrectomy) were included in HALS group. The 13 patients (12: distal gastrectomy, 1: total gastrectomy) after October, 2004 were divided into the latter group.

All of the 27 patients of the prior and latter group were classified Stage I (Japanese Classification of Gastric Carcinoma). The 9 patients in the HALS group were classified Stage I: 2, Stage II: 4, Stage III: 1 and IV: 2, respectively.

The classification of lymph node dissection was D1 for the patients with Stage I and IV. D2 lymph node was dissected for the patients with Stage II and III.

Billroth I reconstruction was performed in the prior and HALS group. In the latter group, Roux-en Y reconstruction was selected.

Results) The one case in the prior group was converted to ordinary open surgery. The mean operation time was 8h. 2m. in the prior group and 8h. 32m. in the HALS group,



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respectively. The mean volume of bleeding was 545ml and 558ml, respectively. In the latter group, HALS was not selected and standardization of procedure was promoted after learning the procedures in the high volume center. The mean operation time was 7h. 46m and mean blood loss was 65ml in the latter group. The mean volume of bleeding in the latter group was significantly decreased compared with those of other two groups.

There are no death resulted from progress of gastric cancer except for the patients with Stage IV.

Conclusions HALS is not useful for introduction of this procedure. Standardization of procedures is considered to be essential to improve laparoscopy-assisted gastrectomy.

Esophageal/Gastric Surgery – P342

PERCUTANEOUS ENDOSCOPIC GASTROSTOMY (PEG) IN THE DIRECT PUNCTURE TECHNIQUE - - AN ALTERNATIVE TO OPEN JEJUNAL FEEDING TUBE PLACEMENT?, Jessica M Leers MD, Hartmut Schaefer MD, Jeffrey A Hagen MD, Peter H Collet MD, Arnulf H Hoelscher MD, Department of Surgery, University of Cologne, Germany and Division of Thoracic and Foregut Surgery, University of Southern California, Los Angeles, CA

Introduction: The percutaneous endoscopic gastrostomy (PEG) is a common procedure performed to restore enteral feeding in patients with temporary or permanent swallowing disorders. Most commonly, a PEG is placed by the pull through technique, however it has limitations. In patients with obstruction of the pharynx or esophagus, a bumper pull through is not feasible. Additionally, the pull through technique in patients with an esophageal stent risks dislocation. To address these difficulties a new device called the direct puncture PEG (cliny®) has been established.

Methods: The direct puncture PEG (cliny®) was placed in 26 patients with swallowing disorders and anticipated difficulties pulling the button through the pharynx or the esophagus. After passing the endoscope into the stomach two gastropexies were performed with the introducer system. These two sutures fixed the anterior gastric wall onto the abdominal wall. A trocar was then placed safely in between the two sutures. With a peel away system, the tube was introduced into the stomach. Finally, a water balloon at the tip of the tube was filled with 5 ml of saline to secure the catheter placement, and an external bumper fixed the system at the abdominal wall. The cuff of the catheter was deflated and inflated every 24 hours for the first 2 weeks to avoid dislocation. Afterwards, a constant gastrocutaneous fistula has been created and a new catheter can be placed safely.

Results: There were 9 female and 17 male patients included in the series. 25 patients had cancer of the pharynx or esophagus, one patient had an esophageal stricture caused by severe reflux esophagitis. The cliny® PEG was safely placed on all 26 patients. Two patients developed minor wound infections that were treated conservatively. In another two patients, tube dislocation occurred. One of these patients was referred for an open placement of a jejunal feeding tube. The other patient received a second percutaneous placement with the introducer technique while the gastropexies were still in place. In both patients the cuff was empty and the standard post interventional treatment was not performed.

Discussion: The cliny® direct puncture PEG system is safe, and can be used in cases of severe esophageal stenosis where a standard pull through PEG is not feasible. Other theoretical advantages include elimination of the risk of tumor implants and the ability to place the PEG in a patient who has a stent in place.

Esophageal/Gastric Surgery – P343
LAPAROSCOPIC GASTRIC RESECTION FOR BENIGN AND MALIGNANT CONDITIONS, Victor Y Liew MD, Craig Taylor MD, Murtaza Jamnagerwalla MD, Michael Ghuss MD, Laurent Layani MD, John Flynn Hospital Queensland Australia

35 cases of laparoscopic gastric resection has been performed at our institution. There were 21 laparoscopic partial gastrectomy, 8 distal gastrectomy & 4 total gastrectomy. Laparoscopic surgery was performed on benign ulcers,

polyps, GIST and EGC as curative intent whereas for invasive adenocarcinoma surgery was performed mainly for palliative intent. The conversion rate was 6% (2 cases). The mortality rate was 3% (1 case) and there was a case of non fatal anastomotic leak. 1 patient (benign leiomyoma) was lost to follow up. Overall the median follow up period was 12months, range 1-46months.

There were 8 cases of benign GIST, all had a laparoscopic partial gastrectomy. 1 patient died 5 months later from unrelated cardiac causes at the age of 90 years. All the others are still alive after a median follow up of 6.5 months, range 1-30 months. There were 5 cases of EGC, 4 underwent laparoscopic partial gastrectomy and 1 laparoscopic total gastrectomy for recurrent EGC. All patients are still alive after a median follow up of 7 months, range 1-46 months.

There were 10 cases of adenocarcinoma, 1 underwent a partial gastric resection, distal gastrectomy was performed in 6 patients and 3 had a total gastrectomy. Excluding the 1 post operative mortality, 5 out of the 8 patients are still alive after a median follow up of 18 months, range 7-38 months. The median number of lymph nodes harvested during a distal or total gastrectomy was 11, range 8-34.

There were 3 cases of local recurrence after initial successful resection. There was a case of isolated cutaneous (non port site) metastasis. All these cases were managed by further surgery.

For laparoscopic partial gastrectomy the median operating time was 75 minutes, median LOS 5 days. The median operating time for laparoscopic distal & total gastrectomy was 205 & 252.5 minutes respectively, the LOS was 6.5 & 8 days respectively.

At the present time laparoscopic gastric surgery remains an alternative treatment option. Its role in the surgical management of gastric neoplasm is still evolving. As the data supporting the adequacy of laparoscopic nodal dissection remains in its infancy the most appropriate indication for laparoscopic gastric surgery at the present time is for benign diseases especially for GIST. It may be an option for EGC or invasive adenocarcinoma in those who are not suitable for an open gastrectomy.

Esophageal/Gastric Surgery – P344

INITIAL EXPERIENCE WITH MINIMALLY INVASIVE IVOR LEWIS ESOPHAGECTOMY IN A COMMUNITY HOSPITAL, Rockson C Liu MD, James S Choi MD, Samuel K Liu MD, CK Chang MD, Kanti M Uppal MD, Kaiser Permanente Medical Center, Walnut Creek, California

BACKGROUND: Tertiary university centers have demonstrated the feasibility and safety of minimally invasive esophagectomy. However, there is a paucity of data from non-academic institutions. This study details our initial experience with minimally invasive Ivor Lewis esophagectomy in a community hospital.

METHODS: In the early part of 2006, 4 minimally invasive Ivor Lewis esophagectomies were performed with collaboration between a cardiothoracic surgeon and a fellowship-trained laparoscopic surgeon. The abdominal portion, completed entirely laparoscopically, included complete mobilization of the stomach and distal esophagus, Kocherization of the duodenum, lymph node dissection, a Heineke-Mikulicz pyloroplasty and a feeding jejunostomy. Resection of the esophagus/stomach, mediastinal lymph node dissection and a high thoracic anastomosis (above the azygos vein) with a circular stapler was performed through a minithoracotomy. Charts were reviewed retrospectively.

RESULTS: The mean age was 57 years (range, 44 to 68) and average BMI was 24.7 kg/m² (range, 18.7 to 30.6). Fifty percent of patients received preoperative chemoradiation. One patient had squamous cell carcinoma-in-situ and 3 patients had invasive adenocarcinoma. All procedures were completed as planned, with no conversions. The average operative time was 5 hour 27 mins (range, 4:42 to 7:13). The average hospital stay was 6.25 days (range, 6 to 7). There were no anastomotic leaks as demonstrated by esophagram on post-operative day 5 or 6. There were no mortalities and no complications with an average follow up of 75 days (range, 39 to 108).



CONCLUSION: Our initial results demonstrate the feasibility and safety of minimally invasive Ivor Lewis esophagectomy at a community hospital. Extended followup is necessary to demonstrate oncologic equivalence to the traditional approach.

Esophageal/Gastric Surgery – P345

DOES TREATMENT VOLUME INCREASE SURVIVAL IN PATIENTS WITH ESOPHAGEAL CANCER?, CK Chang MD, RC Liu MD, JS Choi MD, SK Liu MD, K Uppal MD, PR Fuchshuber MD, Department of Surgery, Kaiser Permanente, Walnut Creek CA

Background: The aim of this study was to review the overall survival in patients diagnosed with esophageal cancer among various medical centers based on diagnostic volume.

Methods: A retrospective review was undertaken to identify patients diagnosed with esophageal cancer at all Northern California Kaiser Permanente facility. All patients received their treatments between January 1988 and December 2004. Univariate and multivariate analyses of potential predictive factors were evaluated with the log-rank test and Cox regression.

Results: An analysis of 1495 patients among the 19 medical facilities identified only 5 locations had greater than 100 esophageal cancer diagnoses during the study period. Mean age was 65, with median survival of 9 months. Overall survival was 29 months versus 23 months in patients treated at high volume and low volume facilities, respectively ($p < .05$). Multivariate analysis demonstrated that age, stage and high volume centers were statistically significant in OS.

Conclusion: Multidisciplinary approach to the treatment of esophageal cancer may improve overall survival. Further research is needed to further identify factors which may lead to improved clinical outcomes.

Esophageal/Gastric Surgery – P346

LAPAROSCOPIC CARDIECTOMY (LC) FOR EARLY GASTRIC CANCER WITH PRESERVATION OF THE VAGUS NERVE, Eishi Nagai MD, Masato Watanabe MD, Shuji Shimizu MD, Hirokazu Noshiro MD, Masao Tanaka MD, Department of Surgery and Oncology, Kyushu University

Objective: One of the biggest advantages of laparoscopic surgery is that magnified view provided by the laparoscope enables the surgeons to identify and preserve the nerve fibers easily. Cardiectionomy for early gastric cancer has been reported to have the advantages of preventing poor nutrition. We report here the surgical technique of LC with preservation of the vagal nerve to mainly keep pyloric function.

Methods: After cutting the greater omentum, we divided left gastroepiploic artery and short gastric arteries with Ligasure Atlas. Next, we exposed the lesser omentum, taking care not to damage the hepatic branch of the vagal nerve. After that, we cut the anterior vagus on the distal side. After tapping the posterior vagus and the celiac branch of the vagus, we cut the gastric branches from the posterior vagus and detached the root of the left gastric artery to complete the No.7 lymphadenectomy. We divided the stomach along the anal cutting line to resect upper third of the stomach with liner stapler. After transection of the esophagus, the resected stomach was pulled out through the left subcostal incision of 3cm. After that, esophagogastrostomy was performed with linear staplers.

Results: Six out of 253 patients who underwent laparoscopy-assisted gastrectomy for gastric neoplasm received LC in our department. Mean operation time was 294 min, mean blood loss 131g, and mean hospital stay 18 days. No complications including reflux esophagitis was found in this series

Conclusion: LC may be an excellent option of the surgical treatment for early gastric cancer because of its minimal surgical invasiveness and better postoperative quality of life.

Esophageal/Gastric Surgery – P347

A PROSPECTIVE STUDY OF THE IMPACT OF INDUCTION, CONCURRENT CHEMORADIATION ON PERIOPERATIVE MORBIDITY AND MORTALITY FOLLOWING AN ESOPHAGECTOMY, Tracey L Weigel MD, Katie S Nason MD, James Maloney MD, Cassandra Kight MD, Kenneth Kudsk MD, University of Wisconsin-Madison

Background: Esophageal cancer (EC) treated with esophagectomy alone has poor long-term survival. Trials using induction chemoradiation (iCRT) followed by esophagectomy are ongoing, but the impact of iCRT on outcomes following esophagectomy is not well-documented. We hypothesize that perioperative complications and length of stay (LOS) are increased in patients undergoing esophagectomy after iCRT.

Methods: Patients evaluated for EC were included in a prospective, IRB-approved database between January 1, 2006 and May 31, 2006. Preoperative variables (e.g. body mass index, nutritional indices, percent body weight loss and treatment with iCRT) were collected. Perioperative variables including major complications (e.g. pneumonia, anastomotic leak) and death were recorded. Statistical analysis was performed using STATA®. Student's t-test and chi-square analysis was used for determination of differences between groups and univariate analysis to determine odds of increased LOS and major complications.

Results: To date, 23 patients have consented for inclusion in the database (first 6 months of data accrual). 21 patients underwent esophagectomy performed by a single surgeon with resident surgeon assistance. 8/21 (38%) patients received iCRT. There were no perioperative deaths. Median LOS (11.3 vs 11.2; $p = 0.95$) and anastomotic leak rates ($n = 2$, 25% vs $n = 1$, 7.7%; $p = 0.27$) for each group were similar. There was, however, a statistically significant difference in the rate of major complications in the iCRT group ($p = 0.03$).

Conclusions: iCRT is associated with a higher rate of major complications following esophagectomy. This is not associated with an increased LOS or mortality. Additional phase II trials are necessary to confirm the safety of esophagectomy following future iCRT strategies.

Esophageal/Gastric Surgery – P348

REVISIONAL SURGERY AFTER HELLER MYOTOMY FOR TREATMENT OF ACHALASIA: A DESCRIPTIVE META-ANALYSIS FOCUSING ON OPERATIVE APPROACH., Biswanath Gouda MD, Thomas J Nelson MD, Sunil Bhojru MD, Scripps Clinic, Torrey Pines, CA 92037

Background: We conducted a systematic review of published literature to study the incidence, demographics, operative approach and mortality associated with revisional surgery following primary Heller myotomy for achalasia. Management of achalasia has evolved from using whale-bone dilation to current modalities including botulinum toxin injection, pneumatic dilation and Heller myotomy. Although surgical myotomy is the gold standard in therapy, treatment failures are problematic and require revisional surgery.

Methods: We conducted a MEDLINE search of peer-reviewed articles published in English from 1970 to December 2005 using the following search terms: esophageal achalasia, Heller myotomy and revisional surgery. 33 articles satisfied our inclusion criteria.

Results: A total of 12,727 patients underwent Heller myotomy (open 94.8%, laparoscopic 5.2%) with mean age of 43.3 yrs (males 46%, females 50%). 16% of patients underwent an additional anti-reflux procedure during the same operation. Revisional surgery was performed in 6.19% ($n = 789$) cases with mean age of 41.8 yrs (males 53.7%, females 50.5%). Approaches to re-operation included thoracic or abdominal, open or videoscopic. Procedures performed at the second operation included revision of the original myotomy or creation of a new myotomy with or without an anti-reflux procedure or esophagectomy. The laparoscopic approach was used less frequently during revisional surgery than for the primary operation (2.3% vs. 5.2%). Reasons for re-operation were incomplete myotomy (51.8%), onset of



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reflux (34%), mega esophagus (16.2%) and esophageal carcinoma (3.04%). The mean follow up before revisional operation was 105.8 months for open approach and 25.7 months for laparoscopic approaches. The overall mortality rate was 0.63% following re-operative surgery.

Conclusions: Our systematic review of the literature for revisional surgery following Heller myotomy revealed a 6.19% rate of re-operation with a low mortality rate. Few patients underwent concomitant anti-reflux procedures during the primary operation. Most of the long-term follow-up has been in patients with open approach.

Esophageal/Gastric Surgery – P349

HELLER LAPAROSCOPIC SURGERY AS TREATMENT FOR ACHALASIA, Pablo E Omelanczuk MD, Jorge A Nefa MD, Sergio E Bustos MD, Walther Minatti MD, Department of General Surgery, Hospital Italiano de Mendoza. Argentina. Lateral Este 1015 Guaymallén, Mendoza. Argentina

Objective: Heller esophagocardiomyotomy is the surgery of choice for the treatment of Achalasia. In addition, laparoscopy gives a mini-invasive quality to this surgery. Dysphagia constitutes the main symptom. Diagnosis is performed by means of esophageal manometry. To show the technique and results.

Materials and Method: Over a period of 40 months, 45 patients were treated with Heller myotomy plus Dor fundoplication laparoscopically. All patients had lost weight, and there was a prevalence of females with an average age of 46. Twelve patients had Chagas disease. They were all assessed with serial X-rays, endoscopy, esophageal manometry, and their symptoms were assessed with a 0-4 score, 4 being the most severe.

Results: There was no conversion or mortality. In 2 patients the mucosa was perforated during myotomy. The mucosa was sutured without altering the result of the treatment. Average hospital stay was 48 hours. There were no post-operative complications. Twenty patients were followed up with manometric control and pH-probe testing, and only six of those had pathologic reflux.

Conclusions: Laparoscopic treatment of achalasia is possible and reproducible, while reducing the morbidity of laparotomy.

Esophageal/Gastric Surgery – P350

LAPAROSCOPIC INTRAGASTRIC RESECTION OF GASTROINTESTINAL STROMAL TUMORS, T Omori MD, K Nakajima PhD, A Nishitani MD, T Takahashi MD, J Nishimura MD, T Ito PhD, T Nishida PhD, Department of Surgery, Osaka University Graduate School of Medicine

Gastrointestinal stromal tumors (GISTs) are a rare neoplasm arising from the intestinal cells of Cajal. Laparoscopic wedge resections have become an acceptable approach to gastric GISTs because wide resections and excessive lymphadenectomies are usually not required. Laparoscopic intragastric surgery (LIGS) has been known as an intraluminal approach to gastric lesions. Recently, LIGS for intraluminal growth type of gastric GISTs have been sporadically reported with acceptable immediate surgical outcome. However, it still remains unknown whether LIGS is appropriate for gastric GISTs in regard to oncologic outcome e.g. tumor recurrence and long term survival. The objectives of this study were 1) to confirm the feasibility and safety of LIGS for gastric GISTs, and 2) to assess its short- and intermediate-term oncologic results. To our knowledge, this is the first surgical literature that evaluated intermediate-term oncologic results of LIGS for gastric GISTs.

Methods: A retrospective analysis of 10 patients with intraluminal growth type of gastric GISTs undergoing LIGS between April 2000 and July 2006 was performed. There were 4 males and 6 females with median age of 63 years old. Initially, balloon-type port 12mm in diameter was introduced just above the umbilicus and the stomach was then insufflated with carbon dioxide via the port, using an automatic surgical insufflator with the intraluminal pressure of 8 mmHg. Two working ports were placed into the stomach via the abdominal wall. The partial intragastric resection was performed using laparoscopic linear stapling devices. The resected specimen was removed via the initial port site.

Results: Stapler resections of gastric GIST were performed in all cases without any intraoperative complications. There was no conversion to open or any other laparoscopic surgeries. The median operative time was 136 minutes (range, 95-140 minutes), and median blood loss was 15 ml (range, 15-40 ml). The median maximal diameter size of the resected specimens was 35 mm (range, 25-45 mm). All patients showed rapid and uneventful recovery after surgery. There was neither mortality nor serious morbidity in this series. There were no recurrences during a median follow-up period of 53 months (range, 2-78 months).

Conclusion: The laparoscopic intragastric approach to gastric GIST tumors is feasible and safe, and associated with excellent short- and intermediate-term results. LIGS can be promising therapeutic methods for gastric GIST.

Esophageal/Gastric Surgery – P351

LAPAROSCOPIC HIGHLY SELECTIVE VAGOTOMY FOR DUODENAL ULCER WITH OR WITHOUT GASTRIC OUTLET OBSTRUCTION, Hiroaki Omori MD, Akira Sasaki MD, Go Wakabayashi MD, Department of Surgery, Iwate Medical University, Shizukuishi Omori Clinic

Background: Medical treatment heals ulcers in 90% of the cases but they recur in 50-70% of the patients. We present a proposal of laparoscopic treatment for patients with recurrent ulcer after a long-term medical treatment or with gastric outlet obstruction.

Method: Four patients underwent laparoscopic highly selective vagotomy (HSV) with or without pyloroplasty between 1998 and 2006. There were 4 male patients aged 19-45 years (mean age: 30 years). All patients were operated electively. For patients with a chronic peptic ulcer disease, pre-operative assessment involved a recent gastroscopy, upper G.I., gastric acid output measurement and mandatory 24-hour pH measurement.

Results: HSV proved feasible in 100% of the cases in spite of a history of previous surgery and peritonitis on patients with a perforated ulcer. There were neither conversions nor intraoperative complications. There was no mortality or morbidity except one patient with transient esophageal stricture following vagotomy around abdominal esophagus. All patients were rated Visick I and II. The acid output had significantly decreased 6.3 to 0.9 in BAO, 26.9 to 3.4 in MAO, respectively. No patient had recurrence in follow-up periods without medication.

Conclusions: Laparoscopic highly selective vagotomy is a treatment of choice for recurrent duodenal ulcer with or without gastric outlet obstruction. The laparoscopic approach shortens the hospital stay and improves patient's comfort.

Esophageal/Gastric Surgery – P352

LAPAROSCOPIC MANAGEMENT OF MARGINAL ULCER PERFORATION AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Sotero E Peralta MD, Frank Borao MD, Monmouth Medical Center, Long Branch, New Jersey

Marginal ulceration after Roux-en-Y gastric bypass occurs in 2-10% of patients. The cause of stomal ulcer is multifactorial and may result from a combination of acid from parietal cells in the pouch, ischemia of (or tension on) the Roux-en-Y limb to the pouch, and a history of tobacco or nonsteroidal anti-inflammatory drug (NSAID) use. Laparoscopic repair of perforated peptic ulcer was reported in 1990 but has not gained wide acceptance. We present the case of a 33 year-old female who presented two years and a half after a laparoscopic Roux-en-Y gastric bypass with pneumoperitoneum and peritonitis. An exploratory laparoscopy demonstrated an ulcer on the gastric pouch, with severe peritonitis and intraabdominal abscesses. A laparoscopic suture closure of ulcer with an omental patch was performed. We describe a case report of a successful laparoscopic management of an acute abdomen in patient status laparoscopic roux-en-y gastric bypass.



Esophageal/Gastric Surgery – P353

LAPAROSCOPIC HELLER MYOTOMY/TEN YEAR EXPERIENCE., Joseph B Petelin MD, J. T Methvin DO, Department of Surgery, University of Kansas School of Medicine, Kansas City Kansas, Surgix Minimally Invasive Surgery Institute, Shawnee Mission, Kansas.

Objective: We sought out to review the senior author's (JBP) 10-year experience with laparoscopic treatment of achalasia in a community-based hospital setting.

Methods: The records of all patients with achalasia admitted to JBP from January 3, 1996 through July 13, 2006 were reviewed.

Results: All 37 patients had esophagogastroduodenoscopy (EGD) findings consistent with (c/w) achalasia. All patients had an esophageal manometry study; 30 were c/w achalasia and 7 were non-diagnostic. Radiological studies performed in 35 patients revealed 34 c/w achalasia and 1 non-diagnostic. Sixteen patients had previous dilatation for achalasia, 4 had botulinum toxin injection (Botox), 9 had both Botox and dilatation, and 1 patient had previous open Heller myotomy. Laparoscopic Heller myotomy with Dor plication (LHD) was performed in 30 patients, and laparoscopic Heller myotomy with Nissen fundoplication (LHN) was performed in 7 patients. Robotic interface (DaVinci™) was used in 10 cases. No cases were converted to laparotomy. 18 concomitant procedures were performed in 13 patients.

Mean overall operative time was 115.6 min. (94.4 min for the last 12 patients). Mean postoperative length of stay was 35.1 h. The mean postoperative time to first liquid and solid oral intake was 12.1 h and 41 hr respectively. Dysphagia was resolved in 31 patients (84%); 5 patients had mild dysphagia but still improved from preoperative status. One patient reported moderate dysphagia that was not improved from preoperative status. Mild reflux symptoms were reported in 8 patients (22%). Intraoperative complications occurred in 4 patients (10.8%): 2 esophageal perforations repaired intraoperatively, 1 small bowel serosal injury during enterolysis repaired intracorporeally, and a small (5-10%) right apical pneumothorax which resolved without intervention. Postop atelectasis developed in 3 patients and pulmonary edema in one patient. Mean length of follow up was 100.4 days.

Conclusions: Laparoscopic treatment of achalasia can be performed successfully with minimal complications in a community hospital in the hands of adequately trained laparoscopic surgeons.

Esophageal/Gastric Surgery – P354

UTILITY OF TIMED BARIUM ESOPHAGRAM IN THE SURGICAL TREATMENT OF ACHALASIA. Christian G Peyre MD, Steven R DeMeester MD, Andrew L Tang MD, Shahn Ayazi MD, Jessica M Leers MD, Nuttha Ungnapatanin MD, Jeffery A Hagen MD, John C Lipham MD, Tom R DeMeester MD, Department of Surgery, Keck School of Medicine of the University of Southern California

Objective: Timed barium esophagram (TBE) is a simple and objective test that we hypothesize is a useful measure of improvement in esophageal emptying after laparoscopic myotomy (LM) and correlates with improvement in symptoms.

Methods: From 1999 to 2006, 29 patients underwent LM with partial fundoplication and had TBE obtained both before and after surgery. TBE was performed by ingesting 100-150 cc of thin barium in 30-45 seconds. Fluoroscopic images were obtained in the upright position at 1 and 5 minutes intervals. Difference in area of the residual column of barium within the esophagus between time intervals was calculated to obtain percent degree of emptying. Results: Preoperatively, all 29 patients complained of dysphagia and 28/29 complained of regurgitation. The median esophageal emptying on TBE was 24% (IQR 7, 42) with 24/29 having <50% esophageal emptying. LM resulted in complete resolution of dysphagia in 26/29 patients, complete resolution of regurgitation in all patients, and a significant increase in esophageal emptying [median 100% (IQR 42, 100), p<0.0001 (paired T-test)] on TBE. All patients with emptying >50% were asymptomatic at follow-up. Emptying was <50%

in 9 patients and of these 3 had persistent or recurrent dysphagia and 6 were asymptomatic.

Conclusion: TBE is an objective assessment of relief of out-flow obstruction after LM and esophageal emptying >50% was reliably associated with complete relief of dysphagia and regurgitation. Whether < 50% emptying in patients with improved symptoms will indicate a higher risk of late recurrence of obstructive symptoms remains to be seen.

Esophageal/Gastric Surgery – P355

LAPAROSCOPIC GASTRIC RESECTION: TECHNIQUE AND OUTCOMES IN 25 PATIENTS., George Poultsides MD, G. Peter Bloom MD, Rocco Orlando 3rd MD, Connecticut Surgical Group, Department of Surgery, Hartford Hospital, University of Connecticut School of Medicine

OBJECTIVE: The purpose of this study is to evaluate different laparoscopic approaches in the management of gastric neoplasms based on tumor location.

METHODS: Over a seven-year period 25 patients with benign or premalignant gastric tumors, less than 7 cm in size were evaluated for laparoscopic resection. Medical records were reviewed retrospectively to define technical details and perioperative outcomes.

RESULTS: Mean patient age was 61 years (range, 23-89). Operative strategies included wedge resection (n=9), segmental resection with gastroenteric anastomosis (n=5), transgastric resection (n=4) and enucleation (n=2). Five cases (20%) were converted to open; two secondary to adhesions, two due to tumor involvement of the transverse mesocolon and one following the intraoperative discovery of linitis plastica. Five antral tumors warranted laparoscopic distal gastrectomy due to size or proximity to the pylorus. Reconstruction with an extracorporeal hand-sewn Billroth I gastroduodenostomy was performed through a 5-cm accessory paramedian incision. Hand-assistance was mainly utilized for resection of cardia or prepyloric lesions. Purely laparoscopic resection was achieved in 55% of patients (n=11). Tumor localization with intraoperative EGD or preoperative endoscopic tattooing was utilized in 6 cases (30%). Mean operative time was 135 min (range, 49-295) and mean blood loss was 75 ml (range, 10-700). Final pathologic findings were gastrointestinal stromal tumor- GIST (10 patients), adenoma (3), in situ carcinoma (3), carcinoid (2), and gastric glomus tumor (2). All lesions had negative margins (range 2-45 mm). Mean tumor size was 3.3 cm (range, 1-5.5 cm). Mean hospital stay was 5 days (range 2-15). Three patients (15%) experienced major complications including splenic capsule tear requiring splenectomy, pseudomembranous colitis, and hand-port incisional hernia.

CONCLUSIONS: Laparoscopic gastric resections can be performed safely in selected patients with a variety of benign or premalignant gastric disorders. The use of an accessory incision for hand-assistance, extracorporeal anastomosis, and specimen extraction facilitates the procedure in difficult cases.

Esophageal/Gastric Surgery – P356

HAND-ASSISTED LAPAROSCOPIC TRANSDUODENAL RESECTION: INITIAL EXPERIENCE., George Poultsides MD, Biju Lukose MD, G. Peter Bloom MD, Rocco Orlando 3rd MD, Connecticut Surgical Group, Department of Surgery, Hartford Hospital, University of Connecticut School of Medicine

OBJECTIVE: The purpose of this study is to evaluate the feasibility and benefits of hand-assisted laparoscopic local excision of duodenal neoplasms.

METHODS: Over a seven-year period eight patients with duodenal tumors not amenable to endoscopic excision were evaluated for hand-assisted laparoscopic transduodenal resection. Contraindications included severe obesity and malignancy. Medical records were reviewed retrospectively to define technical details and perioperative outcomes.

RESULTS: Mean patient age was 70 years (range, 49-85). Mean body mass index (BMI) was 23 (range 21-25). Mean tumor size was 3 cm (range, 2-4.5 cm). Two lesions were located at the duodenal bulb, three at the second portion of the duodenum, but discrete from the ampulla of Vater, and



three at the third portion. The procedure was initiated using a right paramedian hand-port and additional working ports in the left upper quadrant for hepatic flexure takedown and wide Kocher maneuver. The duodenum was then delivered extracorporeally through the right paramedian incision and local excision of the lesion was carried out followed by hand-sewn closure of the duodenotomy. The plane of resection was submucosal when feasible (4 patients) and transmural in the remaining of the cases. Conversion to open by extending the incision for 3 cm was necessary for one lesion located at the third portion of the duodenum. Final pathologic diagnoses were tubular adenoma (four patients), carcinoid, gastrointestinal stromal tumor (GIST), lipoma, and Brunner's gland hyperplasia. All lesions were removed completely with negative margins. Estimated blood loss was < 50 ml in all cases. Mean operative time was 130 min (range, 105-170) Mean hospital stay was 5 days (range, 3-8). One patient developed a hand-port site incisional hernia. Recurrence has been observed in one of the four adenoma patients on routine endoscopic surveillance at a mean follow up of 33 months (range 6-84).

CONCLUSIONS: In selected patients, the addition of hand-assistance can safely facilitate laparoscopic local excision of benign duodenal tumors by providing tactile feedback, atraumatic and versatile retraction, safe blunt duodenal Kocherization and extracorporeal transduodenal resection.

Esophageal/Gastric Surgery – P357

LAPAROSCOPIC TRANSHIATAL ESOPHAGECTOMY (THE) WITH SELECTIVE LYMPHADENECTOMY FOR HIGH GRADE DYSPLASIA AND OESOPHAGEAL CANCER, S RAWAT, A.I SARELA, J WELLS, HM SUE-LING, MJ McMahon, SPL Dexter, LIMIT and LEEDS GENERAL INFIRMARY, LEEDS, U.K

Aim/ Introduction Laparoscopic THE may be an acceptable approach to early esophageal cancer with the potential for fewer pulmonary and wound related complications. This report summarizes our early experience with laparoscopic THE with selective lymphadenectomy in patients with HGD or early esophageal cancer.

Method Case notes for 23 consecutive laparoscopic transhiatal esophagectomies between June 2003 and July 2006 were reviewed. Patients with HGD in Barrett's esophagus or early esophageal cancer were selected. Patient demographics, intra-operative features, pathology results and clinical follow-up were examined.

Result There were 16 men and 7 women; median age 69 years (range, 50-80 years). Laparoscopic THE was successfully completed in 22 patients, with one conversion. The median operative time was 420 minutes (range 300-660 minutes). Two patients required blood transfusion. The median hospital stay was 18 days. There was no perioperative mortality. 6 Patients developed cervical anastomotic leakage that was managed in standard fashion. Median number of harvested lymph node was 18. Final pathological staging was HGD (n=3), Tis (n=11) and invasive cancer (n=9). There was no cancer recurrence or death at Follow-up range of 2 to 36 months.

Conclusions Laparoscopic transhiatal oesophagectomy is a technically challenging operation. It is possible to achieve adequate lymph node clearance with no mortality but morbidity is not avoided. Further experience and a longer term follow up are needed to assess its value and confirm the oncological safety of the procedure.

Esophageal/Gastric Surgery – P358

LAPAROSCOPIC HELLER MYOTOMY USING HOOK ELECTROCAUTERY: A SAFE, SIMPLE, AND INEXPENSIVE ALTERNATIVE, Josh E Roller MD, Eric J DeMaria MD, Sebastián G de la Fuente MD, Aurora D Pryor MD, Department of Surgery, Duke University Medical Center, Durham, NC

Objective: Laparoscopic Heller myotomy (LHM) is currently considered the standard surgical therapy for achalasia. Historically, it has been associated with an intra-operative esophageal perforation rate of 5-10%. Recent literature has suggested robotic-assisted Heller myotomy is safer because of a reported lower incidence of intra-operative esophageal perforation than conventional techniques. We evaluated the

results of LHM in a large series using simple hook electrocautery.

Methods: All patients undergoing LHM with Dor fundoplication (LHMDF) for achalasia by a single surgeon (AP) from 2003 through 2006 were retrospectively reviewed at a multi-center academic institution. Demographic, peri-operative and follow-up data were collected.

Results: A total of 54 patients underwent LHMDF for the treatment of achalasia. 52% were female and 48% were male and the average age was 50 years with 6 patients under the age of 18 years. The average BMI was 26.7 with 4 patients whose BMI was over 35. Average operative times, EBL, and length of stay were 113 minutes, 44ml, and 34 hours respectively. Only one patient was converted to an open procedure (1.9%) secondary to inadequate exposure attributed to an enlarged liver. There was one (1.9%) intra-operative esophageal perforation in the series, which was sutured during the original operation without sequelae. Botox injection therapy and endoscopic dilatation were administered pre-operatively in 24% and 43% of patients, respectively. Despite evidence that pre-operative Botox increases the risk of esophageal perforation, this was not demonstrated in our patient population. There were no post-operative leaks and persistent dysphagia was present in only 3.7% at an average of 5 months follow-up.

Conclusion: LHMDF using simple hook electrocautery is safe, inexpensive and effective for the treatment of achalasia. Our series demonstrates that with meticulous surgical technique, intra-operative esophageal perforation is a rare event using hook electrocautery and provides comparable safety to robotic-assisted Heller myotomy without the added expense of a robotic system.

Esophageal/Gastric Surgery – P359

GIANT HIATAL HERNIA DOES NOT ADVERSELY IMPACT OUTCOME AFTER LAPAROSCOPIC FUNDOPLICATION FOR GERD, Sharon Ross MD, Sarah M Cowgill MD, John E Mullinax BS, Emily Kraemer, Sam Al-Saadi MD, Desiree Villadolid MPH, Paul Toomey BS, Alexander S Rosemurgy MD, Department of Surgery, University of South Florida College of Medicine

INTRODUCTION: Giant hiatal hernia, and, thereby, a shortened esophagus, is believed to predispose to recurrence of symptoms and failure after laparoscopic fundoplication. This study was undertaken to compare long-term outcomes after laparoscopic fundoplication for patients with giant hiatal hernias and GERD vs. patients with GERD alone.

METHODS: Since 1990, 135 patients with GERD and giant hiatal hernias, defined as a patulous esophageal hiatus with at least half of the stomach in the mediastinum, underwent laparoscopic fundoplications and have been prospectively followed. Their symptoms were compared to symptoms of 135 concurrent patients with GERD alone undergoing laparoscopic fundoplication. Before and after fundoplication, patients scored, among many symptoms, the frequency and severity of dysphagia, chest pain, regurgitation, choking, and heartburn using a Likert scale (0=none/never to 10=always/severe). Data is presented as mean ± SD.

RESULTS: For patients with giant hiatal hernias and GERD vs. GERD alone, preoperative median DeMeester scores were similar (46 vs. 39, p=0.65) with similarly troubling symptoms (Table). Mean follow-up is 27 months ± 26.7. Laparoscopic fundoplication ameliorated the frequency and severity of symptoms of GERD (Table) without differences between patients with or without giant hiatal hernias (Table). For patients with giant hiatal hernias and GERD vs. GERD alone, 89% vs. 82% felt their symptoms were greatly improved or resolved, 87% vs. 80% felt their outcome was satisfying or better, and 91% vs. 84% felt they would undergo fundoplication again knowing what they know now.

CONCLUSIONS: After laparoscopic fundoplication, patients' symptoms improve and satisfaction is durable and high. Giant hiatal hernia does not adversely impact symptomatic outcome after laparoscopic fundoplication for GERD, and therefore, the need for concomitant esophageal lengthening procedures is questioned.



Frequency	Dysphagia		Regurgitation		Choking		Heartburn	
	Preop	Postop	Preop	Postop	Preop	Postop	Preop	Postop
GH and GERD	5 ± 3.6	3 ± 3.1*	4 ± 3.7	1 ± 2.0*	4 ± 3.6	1 ± 1.8*	6 ± 3.7	1 ± 2.1*
GERD alone	4 ± 3.7	3 ± 3.4	6 ± 3.7	2 ± 3.0*	3 ± 3.4	2 ± 3.1*	7 ± 3.3	2 ± 2.6*
Severity	Dysphagia		Regurgitation		Choking		Heartburn	
	Preop	Postop	Preop	Postop	Preop	Postop	Preop	Postop
GH and GERD	4 ± 3.7	1 ± 2.3*	5 ± 3.8	1 ± 1.9*	4 ± 4.0	1 ± 2.2*	5 ± 4.1	1 ± 1.7*
GERD alone	3 ± 3.5	2 ± 2.6*	6 ± 4.0	2 ± 2.7*	4 ± 3.3	2 ± 2.1*	7 ± 3.7	2 ± 2.7*

* p < 0.05, less than preop; † p < 0.05, more than preop; ‡ p < 0.05, less than GERD alone; § p < 0.05, more than GERD alone; ¶ p < 0.05, less than GERD alone; †† p < 0.05, more than GERD alone

Esophageal/Gastric Surgery – P360

LAPAROSCOPIC WEDGE RESECTION OF A DUODENAL CARCINOID: A CASE REPORT, Sam Rossi MD, Jeff Landers MD, Suthep Udomsawaengsup MD, Vijaya Nirujogi MD, Brethauer Stacy MD, Matt Metz MD, Bipan Chand MD, Cleveland Clinic Foundation

Background: Carcinoids of the small bowel arise from the Kulchitsky cells in the crypts of Lieberkuhn. Duodenal carcinoids are rare, with a reported incidence between 2-3%. Duodenal carcinoids are most commonly found in the proximal duodenum and rarely become symptomatic.

Methods: A 63 y.o. white male who underwent an EGD for anemia revealed a 8mm carcinoid lesion on the anterior duodenal bulb. Endoscopic ultrasound showed the lesion confined to the mucosa and submucosa. An endoscopic snare polypectomy was performed with residual disease in the duodenal bulb by final pathology. A CT scan of the abdomen and octreotide scan looking for metastatic disease were negative. Twenty-four hour urinary 5-HIAA levels were negative.



The patient underwent an exploratory laparoscopy and intra-operative endoscopy to localize the residual lesion. The residual polypectomy site was localized in the anterior duodenal bulb by endoscopy. The duodenum was Kocherized laparoscopically, revealing a 1 cm lesion involving the anterior/inferior aspect of the duodenal bulb with serosal involvement. A laparoscopic wedge resection of the lesion was performed with gross -negative margins. The defect was closed laparoscopically with a hand-sewn closure.

Results: The patient underwent a laparoscopic wedge resection of a duodenal carcinoid with a hand-sewn closure of the defect. The final pathology confirmed a 1cm carcinoid lesion with negative margins. The patient had an uneventful post-operative course.

Conclusion: Laparoscopic duodenal wedge resections are a safe approach for selective duodenal carcinoids that are amenable to laparoscopic resection.

Esophageal/Gastric Surgery – P361

LEARNING CURVE FOR LAPAROSCOPY-ASSISTED DISTAL GASTRECTOMY: CUSUM ANALYSIS FOR ONCOLOGICAL SURGERY, Junho Lee MD, Keun Won Ryu MD, Byung Ho Nam PhD, Young Woo Kim MD, Jae Moon Bae MD, Center for Gastric Cancer, National Cancer Center, Republic of Korea

Introduction: This study was conducted to evaluate the learning curve of laparoscopy-assisted distal gastrectomy (LADG) for patients with early gastric cancer in the aspect of oncological surgery.

Methods and Procedures: The authors prospectively reviewed the data of all patients that underwent LADG during 1-year period. Retrieved lymph node number was used as a surrogate marker of oncological outcome. The retrieved lymph node number cutoff value required for satisfactory LADG was defined as 15 or more. Cumulative sum (CUSUM) analysis was used to examine the learning curves of individual surgeons at CUSUM target accuracy rates of 85%, 90%, 92.5%, 95%, and 98%.

Results: One surgeon performed 55 curative intent LADG during the study period; their success rates exceeded 90%. Operating time was found to decrease with operative experience (Spearman correlation coefficient=-0.336, p=0.012) and closely correlated with body mass index. The learning period for LADG was calculated as 25 cases presuming a 92.5% success rate (Spearman correlation coefficient=0.545, p<0.001).

Conclusions: The current study suggests that the oncological learning period for LADG extends to 25 cases or 6 months. In clinical trials containing laparoscopic gastric cancer surgery, the learning curve for qualified surgery from a standpoint of oncological outcome, should be considered to minimize bias due to surgeon-associated factors.

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3-DEMENTION WRAPPING FOR ESOPHAGEAL ACHALASIA BY ENDOSCOPIC PROCEDURE, Kazuo Sato MD, Motoo Yamagata MD, Yukie Morishita, Minoru Matsuda MD, Shigeoki Hatashi MD, Surugadai Nihonuniversity hospital

Laparoscopic treatment for esophageal achalasia is becoming routine procedure in clinical fields. In study on 144 cases of esophageal achalasia?@?include open method and endoscopic procedure?], postoperative dysphasia was remained in advanced cases (Sigmoid type, Width of esophagus over 6cm,). The course of postoperative dysphasia was based on the shape of lower esophagus. Girard -Tanaka?es method was consist of long myotomy with 2-demention wrapping (sagital and transverse direction) for improving of the shape of esophagus. 13cases of sigmoid type with grade?Eof Achalasia [except history of surgical operation in upper abdomen were selected ,and the recently 2cases were Sigmoid type after balloon dilation .The procedure is as follows; Under general anesthesia, Supine position was made. 5 trockers were placed in abdomen and initial dissection exposing esophagus was made by LCS. About 12cm of esophagus and Cardia were freed by gentry dissection around esophagus. Vaginal nerves were confirmed and preserved.?@About 10cm of Longmyotomy was performed by J-Hook and Muscle specimen for pathological diagnosis was collected. Next ,2?`3 of transverse suture (sutured the edge of myotomy and serosa of cardia)were made each side. Sigmoid Type of esophagus was made straight by this suture for improving passage .Fainally, fundus was sutured with left side of hiatus of diaphragm and then fundopexy was performed. As the result, we made shorter duration of operation (from 256min. to 165min. as average). ?mo Complication was observed and Symptom were improved in 12cases, but postoperative dysphasia was remained in 3cases of sigmoid type Grade ?V. In addition, dilatation of esophagus was still remained in 5 cases of sigmoid type by postoperative X-ray findings. E.P.T of these cases showed type B .?@Our method was very useful for advanced esophageal achalasia like sigmoid type esophagus.

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LAPAROSCOPIC ANTRECTOMY: A DEFINITIVE TREATMENT FOR WATERMELON STOMACH, Kerrington D Smith MD, Charles E Dye MD, Vivek N Prachand MD, University of Chicago Department of Surgery

Laparoscopic antrectomy has recently been described in a case report as a treatment for gastric antral vascular ectasia (GAVE) syndrome, also known as watermelon stomach. The optimal treatment of GAVE is unknown. Ablative endoscopic approaches using Argon Plasma Coagulator (APC) effectively decrease transfusion requirements but recurrent bleeding is common requiring repeat ablative endoscopies. While surgical treatment in the form of antrectomy is curative, early reports of perioperative complications in high risk patients has generally limited surgery to patients who fail ablative therapies or medical management. We report the successful use of laparoscopic antrectomy in a series of three high surgical risk patients with GAVE whose gastrointestinal bleeding was refractory to medical and endoscopic therapies.

Three female patients, ages 56, 60 and 64 years old, with complicated medical and surgical histories presented with upper gastrointestinal bleeding. Upper endoscopy revealed the characteristic mucosal appearance of sharply demarcated, punctuate red spots scattered diffusely throughout the antrum. Histology demonstrated dilated mucosal capillaries with fibrin thrombi and fibromuscular hyperplasia of the lamina propria, characteristic of GAVE. Comorbidities in two patients included a history of multiple deep vein thromboses and pulmonary emboli requiring the placement of inferior



vena cava filter in addition to therapeutic oral anticoagulation. The third patient was a Jehovah's Witness and would not accept blood products. All three patients had prior abdominal surgery. Despite repeated APC therapy the patients continued to have anemia with ongoing gastrointestinal bleeding. Uncomplicated, laparoscopic antrectomy and Roux-en-Y gastrojejunostomy was performed. At 3 month and one year follow-up hemoglobin levels normalized and there were no ongoing signs of gastrointestinal blood loss. The cases reported here demonstrate a definitive therapy for ongoing blood loss in patients with GAVE syndrome refractory to medical and endoscopic management. As more surgeons become trained in advanced laparoscopy, the threshold for the recommendation for curative resection following failure of medical therapy will be lowered allowing even high risk patients to benefit from a definitive surgical treatment at an earlier stage of the disease process. Laparoscopic antrectomy is a curative and safe treatment for GAVE syndrome.

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EVALUATION OF ENDOSCOPIC HEMOSTASIS BY LOCAL INJECTION OF A FIBRIN GLUE IN HEMORRHAGIC GASTRIC ULCER IN DOGS, Hiroyasu Suga MD, Takao Nakagawa MD, Yukihiro Soga MD, Masaru Abe MD, Yoshizumi Deguchi MD, Noboru Akizuki MD, Takashi Kobayash MD, Masatake Ishikawa* MD, Tadashi Suzuki* MD, Yoshiaki Imamura MD, Department of Emergency Medicine, Tokyo Women's Medical University Medical Center East; *Department of Emergency Medicine, Tokyo Women's Medical University; **Department of Surgical Pathology, University Hospital Faculty of Medicine University of Fukui**

Introduction: Emergency patients suffer from disorders of the coagulation-fibrinolysis system, posing a problem in the endoscopic control of hemorrhagic gastrointestinal complications. Since October 2000, fibrin glue has been used in endoscopic hemostasis of hemorrhagic ulcer in those patients with coagulation disorders or who resisted the use of conventional clips or local ethanol injection. An experimental study was conducted on dogs to evaluate the hemostatic and wound healing effects of fibrin glue (FG) and basic fibroblast growth factor (bFGF).

Method: Dogs (weighing 13 to 15 kg) underwent a laparotomy under Nembutal anesthesia to produce 4 mechanical hemorrhagic ulcers at the pyloric antrum. A physiological saline (sham), a hypertonic physiological saline solution of Bosmin (HSE), ethanol (ET), or FG was injected locally followed by closure of the wound. On the 3rd and 5th postoperative day, a second laparotomy was conducted for gastrectomy for comparative evaluation of the local hemostatic effects and wound recovery. Then bFGF was locally injected to examine the local tissue for wound healing effects.

Results: The epithelial regeneration was most satisfactory in the FG-treated group. Fibrin remained under the mucosa until the 5th day, suggesting its persistent hemostatic effect. The sham group was free of injection-induced tissue damage but exhibited mucosal and submucosal hemorrhage. The ET-treated group was free of hemorrhage but had marked tissue damage and inflammatory cell infiltration. Tissue damage was slight in the HSE-treated group but the epithelial regeneration was poor in comparison with the FG-treated or sham group. When combined with bFGF, epithelial regeneration was noted on the 3rd day.

Conclusion: local FG injection resulted in good epithelial regeneration, suggesting satisfactory anti-hemorrhagic and wound healing effects. The addition of bFGF enhanced the ulcer healing effect.

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LAPAROSCOPIC RESECTION OF GASTROINTESTINAL MESHENCHYMAL TUMORS IN THE STOMACH, Nobumi Tagaya PhD, Akihito Abe MD, Masashi Tachibana MD, Tadashi Furihata PhD, Kiyoshige Hamada PhD, Keiichi Kubota PhD, Second Department of Surgery, Dokkyo Medical University, Tochigi, Japan

Background: At present, local resection with adequate margins is considered to be an effective treatment for a gas-

trointestinal mesenchymal tumor (GIMT). The treatment strategy for GIMTs located close to the esophagogastric junction (EGJ) is still controversial. We evaluated our technique and results to discuss the safety and usefulness of laparoscopic resection.

Materials and Methods: We performed laparoscopic resection of GIMT in 19 patients. The criteria that were used to select cases for resection were that the tumor was more than 2 cm in diameter or that there had been a tendency to increase in size during the follow-up period. In 9 patients in whom the tumor was located within 3 cm of the EGJ an intragastric laparoscopic approach was used, while in 10 patients where the tumor was further from the EGJ an exogastric approach was used.

Results: In all 19 patients the laparoscopic resection was successful with no complications. The intragastric group had a mean age of 63.1 years, whilst the exogastric group had a mean age of 59.7 years. The intragastric group had a mean maximal tumor size of 2.8 cm, mean operation time of 162 min and a mean post-hospital stay of 8.2 days whilst in the exogastric group these values were 3.5 cm, 106 min and 8.0 days, respectively. There was a significant difference ($p=0.0084$) in operation time between two groups. In both group, there were no recurrences during follow-up period of 83.9 months (intragastric) and 54.9 months (exogastric).

Conclusion: The good clinical outcomes suggested that the criteria that were used as an indication for laparoscopic resection and the surgical techniques were appropriate for the resection of GIMTs.

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LAPAROSCOPIC RESECTION OF AN ESOPHAGEAL EPIPHRENIC DIVERTICULUM WITH LONG MYOTOMY: A CASE REPORT AND REVIEW OF THE LITERATURE., Janos Taller MD, Gordon Wisbach MD, Jay Grove MD, Department of Surgery, Naval Medical Center, San Diego

Esophageal epiphrenic diverticuli are a rare disorder of the GI tract. Their true prevalence is not fully appreciated as most diverticuli are asymptomatic. Their mean age of presentation is in the 6th decade of life when decreasing physiologic reserve directly impacts on the patient's ability to tolerate large, invasive operations. Previously treated by thoracotomy, recent advances in optics, instrumentation and experience have allowed surgeons to apply minimally invasive techniques to esophageal pathology. We present a case report of such an operation and review the relevant literature on this topic.

Our patient is a 68 y/o man with a 50 year history of dysphagia who sought treatment as his symptoms worsened over the last year. He was evaluated with EGD, upper GI series, chest CT and manometry. These studies demonstrated a large 4+cm epiphrenic diverticulum with abnormal esophageal motility. The patient was offered laparoscopic resection with myotomy and consented for possible VATS or thoracotomy as needed.

5 trocars were placed for access: 2 - 10mm ports for a camera & stapler, 3 - 5mm ports for working instruments and 1 subxyphoid incision for liver retraction. The anterior diaphragm was split to facilitate access high into the mediastinum. Supporting esophageal tissue was divided with a combination of electrocautery and blunt dissection until the diverticulum was freed at its base. A 2.5mm endoscopic staple load was applied across the diverticulum for resection. A long myotomy was performed on the medial esophagus from the GE junction to the proximal aspect of the staple line. The anterior diaphragm was then repaired. No fundoplication was performed.

The case was completed in 278 minutes with 150 ml EBL. A small left pneumothorax was followed to resolution with serial CXR's. An UGI performed on POD#1 demonstrated no leak. The patient was advanced to liquids on POD#3 and discharged home on POD#6 on a soft mechanical diet. He returned to normal activity in 2 weeks & unrestricted diet in 3 weeks. His dysphagia has completely resolved. He has occasional GERD symptoms when lying supine within an hour of eating.

The laparoscopic approach to epiphrenic diverticuli allows



for superior exposure to anatomy while providing the inherent benefits of decreased morbidity and recovery times associated with minimally invasive surgery. Supported in the literature, we believe this approach is the desired treatment method for this problem

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PREVENTION OF ESOPHAGEAL ANASTOMOTIC LEAK WITH TEMPORARY PLACEMENT OF AN EXPANDABLE POLYVINYL STENT IN A PORCINE MODEL., Michelle Taylor

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Objective: Anastomotic leaks and strictures are a major cause of morbidity and mortality following esophageal resection and anastomosis. The aim of the current study was to assess the role of self-expandable removable polyvinyl stents in preventing postoperative leaks and strictures following a flawed cervical esophageal anastomosis in a porcine model.

Method: A total of 18 adult pigs were studied. Under general anesthesia the cervical esophagus was exposed and divided. A single layer anastomosis was performed using 4-0 absorbable sutures. After completion of the anastomosis a 1 cm defect was created at the anastomotic site by removing 2-3 sutures. The defect was marked with two clips and a self-expandable polyvinyl stent (14-18 mm) was placed across the anastomosis under fluoroscopic guidance in 16 animals. Contrast studies were performed before and after placement of the stents. No stents were placed in 2 control animals. Stents were explanted endoscopically after a maximum follow-up period of 4 weeks. Contrast esophagograms were performed and the strength of the scar was assessed by recording burst pressure. Histological assessment of the scar was performed to assess the quality of healing at the defect site.

Results: In control animals no spontaneous healing of the defect site was observed. One animal died within 48 hours and another was sacrificed on POD #7 due to severe dysphagia and continued leakage. 14/16 study-group animals demonstrated complete healing on contrast radiographs after a mean follow-up duration of 28 (+ 7) days. The bursting pressures of the healed area were in excess of 450 mmHg. Two animals that received 18 mm stents died within 48 hours due to tracheal compression. Nine of these animals had minimal or no stricture at the anastomotic site. In five animals (receiving 14-16 mm stents) the stents had migrated into the stomach. These animals demonstrated moderate-to-severe strictures. Histological assessment revealed adequate collagen deposition at the defect site.

Conclusions: Prophylactic placement of flexible polyvinyl stents across the esophageal anastomosis at the time of surgery dramatically reduces the chances of postoperative leaks. Care must be taken while selecting the stent diameter as larger stents may lead to tracheal compression and smaller stents may migrate and fail to prevent stricture.

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LAPAROSCOPIC NISSEN FUNDOPLICATION DOES NOT INCREASE DYSPHAGIA IN PATIENTS WITH ABNORMAL ESOPHAGEAL MOTILITY, Zurab Tsereteli MD, Klaus Thaler MD, Nathan P Hasemann BS, Brent Miedema MD, Bruce Ramshaw MD, William S Eubanks MD, Department of General Surgery, University of Missouri-Columbia, Columbia, MO

Introduction: Patients with GERD and abnormal esophageal motility are the most controversial subgroup of surgically treated patients because of potentially increased risk of postoperative dysphagia. After introduction of laparoscopic Nissen fundoplication a so called tailored approach was proposed: patients with esophageal dysmotility undergo partial (270° wrap) rather than complete (360°) fundoplication. However, many high-volume centers perform a total fundoplication on all patients with severe GERD regardless of the baseline esophageal function. Our objective was to determine if complete fundoplication is associated with increased

postoperative dysphagia in patients with ineffective esophageal motility.

Methods: Medical records of all adult (>18 yo) patients who underwent laparoscopic Nissen fundoplication for GERD the last five years were reviewed retrospectively. Of the 151 patients 28 (group A) met manometric criteria for abnormal esophageal motility (<30mm Hg mean contractile pressure or <80% peristalsis), 63 (group B) had normal esophageal function. Sixty patients had no manometric data and were therefore excluded from analysis. The follow-up time ranged from 1 month to 5 years; seven patients were lost to f/u in group B. The analyses done used stratification based on time of follow-up. Outcomes (postoperative dysphagia-primary endpoint, recurrence of GERD symptoms, free of medications) were compared using Cochran-Mantel-Haenszel methodology.

Results: The groups did not differ in terms of gender (p=0.46). Group A had higher age and ASA score (p=0.016 and 0.020), but this did not correlate with outcome. Two patients (7.1%) in group A and three patients (5.3%) in group B had postoperative dysphagia. When adjusted for follow-up times, there was no significant difference between the groups (p=0.94). Group B had more cases of recurrent heartburn, 10.7% vs. 3.6% (p=0.039), and more patients in this group were back on medications, 21.4% vs. 7.1% (p=0.05)

Conclusion: This retrospective study found equally low rate of dysphagia regardless of baseline esophageal motility. Preoperative esophageal dysmotility is therefore not a contraindication for laparoscopic Nissen fundoplication.

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LAPAROSCOPIC INTRAPERITONEAL CISPLATIN WITH REAL-TIME RT-PCR MONITORING OF FREE CANCER CELLS IN PATIENTS WITH SCIRRHUS GASTRIC CANCER, Shunichi Tsujitani MD, Kenji Fukuda MD, Hiroaki Saito MD, Shigeru Tatebe MD, Masahide Ikeguchi MD, Tottori University, Yonago, Japan

Introduction: The prognosis for patients with scirrhous gastric cancer (SGC) is extremely poor. To improve the patients' prognosis, laparoscopic intraperitoneal cisplatin (LIPC) was introduced for SGC. We analyzed whether LIPC reduced the number of free cancer cells estimated by real-time RT-PCR and improve the prognosis of patients with SGC.

Methods: LIPC included laparoscopic detection of peritoneal seeding, peritoneal washing cytology at the Douglas pouch and intraperitoneal administration of cisplatin at a dose of 50 mg/body with 1000 ml of saline. The drains were clamped for 1 hour after the administration. Additional 2 times of intraperitoneal cisplatin (same doses) were given through a drain placed into the Douglas pouch 2 and 4 days after LIPC. Total RNA was extracted from 50 ml of peritoneal wash from 12 SGC patients before and after LIPC.

Carcinoembryonic antigen (CEA) messenger RNA (mRNA) was used to identify the number of gastric cancer cells in peritoneal washes by the real-time RT-PCR method. The number of cancer cells in the peritoneal cavity was compared before and after LIPC treatment.

Results: The average number of cancer cells in the peritoneal cavity ranged from 9 to 7 x 100,000 before LIPC and from 0 to 1 x 100,000 after LIPC. The median survival time (MST) of 3 cases with more than 1 x 10,000 cells before LIPC was 7.3 months, whereas the MST of 9 cases with less than 1 x 10,000 cells before LIPC was 11.4 months. In 8 cases, more than 90% of the cancer cells were removed from the peritoneal cavity after LIPC. These 8 cases were named the LIPC effective group, and the remaining 4 cases were named the LIPC ineffective group. The MST of the LIPC effective group (9.9 months) was not different from that of the LIPC ineffective group (11.5 months).

Conclusion: The number of cancer cells before LIPC may correlate with survival period of patients with SGC. However, the prognostic benefits of effectiveness of LIPC for SGC patients remain unclear.



SAGES POSTER ABSTRACTS

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PREVALENCE OF BARRETT'S ESOPHAGUS IN PATIENTS WITH CHRONIC GERD REFERRED FOR SURGICAL OPINION, Sameena Uddin MD, Mehran Anvari PhD, Centre for Minimal Access Surgery, St. Joseph's Healthcare, McMaster University, Hamilton Ontario Canada

Background: The recent reports on prevalence of Barrett's mucosa in the GERD population suggest lower rates than earlier suspected. This may be in part due to visual reporting of Barrett's at endoscopy (EGD) rather than using systematic biopsy protocol. Diagnosis of Barrett's in patients undergoing laparoscopic fundoplication is important for both follow-up surveillance, as well as documenting the impact of surgery on this metaplastic change. In addition, the accuracy of detecting BE on diagnostic endoscopy is unknown.

Methods: We prospectively studied all GERD patients requiring long-term PPI therapy (>1 year) referred for surgical opinion over a 3 year period. All patients underwent confirmatory GERD testing (GERD Symptom Score and Global Rating Scale, Bernstein test, 24h pH test and manometry) as well as EGD. Endoscopic signs of BE were graded according to MUSE protocol and planned biopsies taken at 5 sites including cardia, squamocolumnar junction and distal esophagus. BE was defined as specialized intestinal metaplasia within columnar-lined epithelium.

Results: EGD was performed in 391 patients (mean age 45 +/- 12, female 50.6%). Sensitivity for detecting metaplasia visually was 25.6%, while the specificity on biopsy was 91.8%. The overall accuracy rate for detecting then biopsying BE was 85%. BE was present in 39 patients (10%) with GERD. Using multivariate analysis, significant risk factors included age greater than 60 (p=0.012), history of smoking (p=0.049) and positive 24hour pH testing (p=0.001). Severity of GERD symptoms was not a risk factor.

Conclusion: The prevalence of BE in patients with GERD referred for surgery is 10% on biopsy. Many patients with Barrett's may have normal endoscopy on visual inspection and the diagnosis of Barrett's will be missed unless a standard biopsy protocol is used routinely.

Esophageal/Gastric Surgery – P371

ACHALASIA IN OBESE PATIENTS; A COMPARATIVE STUDY, Nathaniel E Uecker MD, Prakash Gatta MD, Will Lockhart MD, Lee L Swanstrom, Legacy Health Systems

Objective: In the literature, there are few studies of obese achalasia patients. This chart review study compares 24 obese (BMI >30) patients with 104 non-obese (BMI <30) patients over several parameters—duration and severity of symptoms, pre-operative manometry, post-operative complaints and finally, weight loss or gain.

Methods: Chart review identified 128 patients (24 with BMI >30, 104 with BMI <30, 72 men, 56 women, median age 48, range 16-77) with symptoms of achalasia from 1995 to 2006. All patients included complained of dysphagia, all underwent Heller myotomy and partial fundoplication, and all were followed for at least three months after surgery. Patients with nutcracker esophagus or redo procedures were excluded. Duration of dysphagia was recorded as dictated in the consultation note. Pre-operative dysphagia, post-operative dysphagia, and post-operative reflux were graded 0 to 4 based on severity. Any Grade 2 or greater dysphagia or reflux three months after surgery was defined as failure of treatment. Weight changes were obtained by chart review.

Results: 1) Duration of symptoms was similar between groups. 2) Averaged severity of pre-operative dysphagia was also remarkably consistent (2.91±1.03 for obese and 2.85±1.07 for non-obese). 3) Vigorous achalasia was more prevalent in the obese group (62.5%). 4) BMI >30 patients had more numerous dysphagia failures (29.2% vs. 15.4%) but the groups had consistent reflux failures (25% vs. 24%). 5) BMI >30 patients had greater weight changes peri and post-operatively (10.2 lbs vs. 6.16 lbs), although this was not statistically significant. 6) None of the BMI >30 patients gained weight in the follow-up period. 7) Weight loss in the

obese population did not correlate with severity of post-operative dysphagia or reflux.

Conclusions: In comparing obese and non-obese achalasia patients, vigorous achalasia is clearly the more prevalent type of achalasia in the obese group and post-operative dysphagia a more significant concern. Weight loss in either group may be due to a combination of peri-operative pain, poor appetite and post-operative diarrhea, a frequent complaint. But when compared with the non-obese group, where both weight losses and gains were found, and coupled with lack of correlation between post-operative symptoms and weight loss, the possibility of further factors leading to post-operative weight loss must be entertained. Further study is required.

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ROLE OF ROUTINE INTRAOPERATIVE USAGE OF BOUGIE IN PREVENTING DYSPHAGIA FOLLOWING LAPAROSCOPIC NISSEN ROSSETTI'S FUNDOPLICATION - A PROSPECTIVE COMPARATIVE STUDY, P C Muniapalle, Y K S Viswanath, Department of General Surgery, The James Cook University Hospital, Middlesbrough, TS43BW, UK

Aim: Placement of a bougie across the gastro-oesophageal junction (GOJ) to guide the tightness of wrap has been a standard practice in laparoscopic Nissen - Rossetti's fundoplication (LNRF). There is anecdotal evidence to suggest that this practice decreases the incidence of postoperative dysphagia. We aim to evaluate this role of routinely placed of bougie during LNRF through this prospective comparative study.

Methods: All patients who underwent LNRF after clinical, endoscopic and manometric assessment over a period of four years were studied. Group 1 consists of 40 consecutive patients who had bougie placed across GOJ in the form of standard 12mm endoscope and Group 2 has 37 consecutive patients that did not have the endoscope placed intraoperatively. The operative procedure was standardised in all the patients and all of them were followed up over a total period of 4 years to observe the incidence of significant dysphagia (dysphagia score 2 or above).

Results: One patient from group 1 and two patients from group 2 have developed significant dysphagia in the long term (p>0.05). The patient in group 1 responded after 2 endoscopic dilations while revision surgery was needed to relieve dysphagia for two patients in group 2 (p>0.05). All three patients have shown low amplitude peristalsis with features of secondary oesophageal dysmotility on pre-operative manometry.

Conclusion: There is no evidence from this study to support the routine prophylactic placement of bougie during LNRF. Selective usage of bougie or partial fundoplication might be beneficial in the subgroup of patients with oesophageal dysmotility to ensure loose wrap and decrease the incidence of significant post operative dysphagia.

Esophageal/Gastric Surgery – P373

EFFECT OF BODY MASS INDEX (BMI) ON INTRA AND IMMEDIATE POSTOPERATIVE MORBIDITY FOLLOWING LAPAROSCOPIC NISSEN ROSSETTI'S FUNDOPLICATION, M Wong, P C Muniapalle, A Eltaybe, Y K S Viswanath, Dept. of General Surgery, The James Cook University Hospital, Middlesbrough, TS43BW, UK

BACKGROUND: Gastro-oesophageal reflux disease (GORD) is a common disorder in the Western world and obesity plays an aetiological role in the causation of GORD. Laparoscopic Nissen Rossetti's fundoplication (LNRF) is currently the most popular technique for the surgical treatment of GORD. It is well known that high BMI is associated with increased intraoperative and postoperative morbidity in open abdominal surgery. We evaluated in this study whether BMI adversely affect the intraoperative and immediate postoperative morbidity in patients undergoing LNRF. **METHODS:** 90 consecutive patients who underwent LNRF by a single surgeon over 4 year period were evaluated retrospectively. The body mass index (BMI) of the patients, operative time, duration of postoperative hospital stay before discharge and morbidity data in the immediate postopera-

tive period were collected from clinical notes/ letters/ hospital computers.

RESULTS: The patients fell into 3 categories based on the BMI: Group 1 (BMI \leq 25) - 27, group 2 (BMI 25 - 30) 41 and group 3 (BMI > 30) 22 patients. The mean operating time and postoperative stay are comparable between the three groups ($p > 0.05$). There were no intraoperative complications or major postoperative morbidity in any of these groups.

CONCLUSION: High BMI does not adversely influence the immediate outcome in GORD patients undergoing LNRF. Hence high BMI should not dissuade the laparoscopic surgeon to carry out LNRF in indicated severe GORD patients.

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LAPAROSCOPY-ASSISTED PYLORUS PRESERVING GASTRECTOMY WITH TRIANGLE END-TO-END ANASTOMOSIS.

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Introduction: As a function preserving surgery, we have performed laparoscopy-assisted pylorus preserving gastrectomy (LAPPG) for twelve patients with early gastric cancer since 2003. The purpose of this study is to demonstrate the technique and outcome of this procedure.

Methods: Twelve patients with early gastric cancer were enrolled in this study and have had LAPPG. Indication for this surgery is \leq T1N0 gastric tumor. We usually confirm negative sentinel lymph node (LN) metastasis intraoperatively, and omit #5 and #6 LN dissection. Using 5 trochairs, LN dissection was performed laparoscopically. Then through a mini-laparotomy, resection of stomach and end-to-end anastomosis was performed. For this anastomosis, three linear staplers were used. First, we inverted the posterior wall of the stomach making a base of the triangle, and make the linear stapler fire. Next, we closed the everted anterior wall using linear staplers twice.

Results: Twelve patients were treated with this method. There were no intraoperative complications. Blood loss was minimal. No anastomotic stenosis was observed. Post-operative dietary intake was enough and reflux of duodenal juice was minimal.

Conclusions: LAPPG with triangle anastomosis is a feasible technique for surgery to preserve pyloric function in the patients with early gastric cancer. Further follow up would be needed to confirm the curability of this treatment and preserved gastric functions.

Esophageal/Gastric Surgery – P375

GASTRIC PACEMAKER FOR MEDICALLY REFRACTORY GASTROPARESIS.

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Introduction: Gastroparesis is a chronic disease of gastric motility causing delayed emptying of the stomach. Symptoms include nausea, vomiting, electrolyte imbalances, early satiety, abdominal pain and malnutrition. This pseudoobstruction is associated with diabetes mellitus, vagus nerve injury, GERD and chronic disease. Management is typically achieved with diet modification and medication including prokinetics and anti-emetics. A minority of patients are refractory to diet modification and medications and experience unrelenting symptoms leading to weight loss and malnutrition. Gastric pacemakers (GP) were introduced in the 1960's as an option for refractory gastroparesis. A renewed interest in this technology in the past few years has prompted the FDA to grant humanitarian device status to GP for patient care and further research.

Methods: Data was gathered on all patients at a university affiliated teaching hospital who underwent gastric pacemaker placement from July 2005 until September 2006. Patient demographics including, age, weight, medications, prior treatments, diet modification and comorbid conditions were recorded. Indications for placement, surgical procedure, postoperative outcome, morbidity and mortality were also noted.

Results: Thirteen GP were placed during this time. Indications for placement were diabetic gastroparesis in 10 patients (77%) and idiopathic gastroparesis in 3 patients (23%). The average age was 50 (range 30-77). Eleven patients were female and two were male. The first five procedures were performed using an open technique and the remaining eight were placed laparoscopically. Five patients previously receiving nutrition via gastric feeding tubes had symptom resolution allowing removal of feeding tubes. Eight patients (62%) had complete resolution of symptoms, while an additional 5 (38%) had partial resolution of symptoms. No surgical mortality was noted. Surgical morbidity included 2/13 patients (15%), one wound infection and one with persistent pain at the stimulator site. Both complications resolved with generator relocation.

Conclusion: Medically refractory gastroparesis remains a difficult and frustrating condition for both patient and physician. GP placement is highly effective in managing patients with this problem and can be placed safely with minimal morbidity either through an open or laparoscopic technique.

Esophageal/Gastric Surgery – P376

CLINICAL EXPERIENCE WITH A SMALL OPENER (MULTI FLAP GATE) FOR LAPAROSCOPICALLY ASSISTED CANCER SURGERY.

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Objective Organ extraction and anastomosis in the event of laparoscopic digestive cancer surgery is performed in direct view from a small opening; an instrument is needed to re-insufflate the peritoneal cavity and perform laparoscopy again after anastomosis is complete. Various instruments are currently being developed, although the current situation is one in which there are no instruments with which a sufficient opening and laparoscopic manipulation afterwards can be smoothly performed. Thus, the authors jointly developed a small opener for laparoscopically assisted digestive cancer surgery (Multi Flap Gate : afterwards, MFG) intended for protection and effective opening of the peritoneal wound and simple re-insufflation in laparoscopically assisted colorectal cancer surgery with Sumitomo Bakelite. ?

Subjects and Methods The specifications of the MFG have been indicated. In addition, there is a small hole in the center and it can be used as a port through insertion of a cannula here. We have three type S, M, L of MFG. The MFG was used in 200 cases of laparoscopically assisted surgery for digestive cancer cases from March 1999 to August 2006. The length of the skin incision was 3-9 cm.

Results The MFG was easily attached in all cases and retraction strength was favorable. Damage to the MFG during surgical handling and trouble with regard to manipulation was not seen. The shape of the opening was almost square; extraction of organs and surgical manipulation in direct view were favorable. Gas leaks were also not noted during re-insufflation. In addition, no cases of postoperative wound infection or portsite recurrence were noted.

Conclusion The MFG has exceptional opening strength and is an optimal instrument for laparoscopically assisted colorectal cancer surgery that allows re-insufflation. A favorable surgical field was ensured by this instrument and laparoscopically assisted digestive cancer surgery can be performed; it was also useful for prevention of wound infection and cancer cell implantation. In the future, there are plans to perform further development of a converter and proceed with development of this instrument as an instrument that can be adapted for HALS use as well.

Flexible Endoscopy – P377

COLORECTAL POLYPS: LOCATION, SIZE, NUMBER, HISTOPATHOLOGY AND RISK OF CANCER.

Adem Akcakaya MD, Ismail Okan MD, Aytakin Coskun MD, Gurhan Bas MD, Mustafa Sahin MD, Vakif Gureba Training and Research Hospital, First Department of Surgery, Istanbul, Turkey

Objectives: A major aim of colonoscopy is the recognition and removal of premalignant polyps. Colonoscopy is highly sensitive at detecting colonic polyps. The aim of this study is to ascertain the differences of polyps? size, number,



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histopathology and the risk of cancer according to location.

Methods: We retrospectively evaluated 378 patients who underwent colonoscopy and detected polyps in our Surgical Endoscopy Unit during past five years. Endoscopic information included the number of polyps, location, size, macroscopic appearance, procedure for removal, histological features, and presence of atypia or malignancy. According to the size, polyps were divided into three groups: large (> 1 cm), small (6-10 mm), diminutive (<6 mm). To facilitate analysis, the polyps were classified according to their anatomic locations as such: the rectosigmoid area, descending colon, transverse colon, ascending colon and cecum.

Results: There were 244 men (64%) and 134 women (36%). The mean age was 55 ± 14(15-90) years. The distribution of polyps in colonic segments were as follows: 204 in rectosigmoid (54%), 66 in descending colon (18%), 36 in transverse colon (9.5%) and 10 in ascending colon-cecum (2.6%). While in 42 patients polyps involved at least two segments of colon (11%), polyps were scattered throughout whole colon in 20 patients (5.3%). Forty percent of patients had polyps with size < 6 mm. Only 29 % had polyps more than 10 mm in size. Solitary polyps were detected in 66.7 % of patients. More than half of the cases had neoplastic polyps (64.5%). While 21.4 % had dysplasia, only 9.7% had carcinoma (36 patients). Nearly half of the cases with carcinoma or dysplasia were solitary and located in the rectosigmoid area.

Conclusion: Colorectal polyps were usually solitary and located mostly in rectosigmoid area. Moreover dysplasia and cancer were most frequently detected in rectosigmoid colon polyps.

Flexible Endoscopy – P378

IDIOPATHIC DIFFUSE COLONIC VARICES: AN UNUSUAL CAUSE OF ANEMIA, Hisham Elhassan MD, Robert Sinnott DO, Larry Bardawil MD, Lehigh Valley Hospital

Introduction : Colonic varices are uncommon and they are usually segmental. The commonest cause is portal hypertension/ chronic liver disease. Colonic varices of the entire colon are even more uncommon. However recognition and management of the different presentations of this abnormality is very important.

Method : This is a case report of 78 year old female who was admitted with generalized weakness & fatigue, diagnosed with severe anemia. The Patient denied any gross bleeding. Upper endoscopy was normal, colonoscopy revealed extensive varices throughout the colon. Liver enzymes are normal. CT abd/pelvis showed diffuse colonic wall thickness.

Conclusion: Idiopathic diffuse colonic varices are very uncommon. Most of the reported cases in the literature presented as recurrent or massive bleeding. Colonoscopy is the most accurate method of diagnosis. Therapy is conservative and may require transfusions. massive bleeding may require surgical treatment. Pictures & radiologic films are available and to be submitted when requested.

Flexible Endoscopy – P379

ROUTINE PREOPERATIVE ENDOSCOPY PRIOR TO LAPAROSCOPIC ROUX-EN-Y BYPASS: IS IT NECESSARY? Wesley P Francis MD, William J Curtiss BS, John D Webber MD, Minimally Invasive section, Department of Surgery Wayne State University School of Medicine

Introduction The use of routine pre-operative endoscopy has been questioned in patients undergoing Laparoscopic Roux-en-Y gastric Bypass (LRYGB). The purpose of this study is to review our institutions policy of routine endoscopy prior to LRYGB and to determine whether it is justified.

Methods From November 2003 to July 2006 we retrospectively reviewed the charts of all patients who were potential candidates for LRYGB. All patients who had a screening Esophagogastroduodenoscopy (EGD) and biopsy for Helicobacter pylori performed were included in the study. Demographic data, including age and gender were collected. EGD reports were reviewed and any pathology identified

was documented. Any intervention as a result of the pathology identified was noted, including outcomes.

Results One hundred and seventy patients had routine EGD prior to undergoing LRYGB. There were 89% females and 11% males. The age range was 20 - 61 years. Hiatal hernias were found in 101 patients. These were characterized as small, medium and large and amounted to 43.6%, 47.5% and 8.9% respectively. Seventy one patients had varying degrees of esophagitis; Grade I - 65.5%, Grade II - 29.5% and Grade III - 5%. One patient had Barrett's epithelium and required medical therapy and surveillance EGD. One patient had an esophageal diverticulum that required surgical repair. There were four esophageal polyps and 1 ulcer. Acute gastric mucosal lesions (AGML) were present in 39.5% of patients. Mild to moderate antral gastritis accounted for 90%, whereas severe antral gastritis accounted for 10 % of AGML. Ten patients had ulcer disease, 4 gastric and 6 duodenal. Twelve percent of the population was positive for Helicobacter pylori and required medical therapy for eradication. There were 12 gastric polyps ,all benign. Two patients had duodenal polyps. One patient had a biopsy proven adenocarcinoma arising in a duodenal villous adenoma. This patient required a pancreaticoduodenectomy. **Conclusion** EGD prior to LRYGB identified significant pathology that required medical or surgical intervention. Although the yield may be low, pathology which contraindicated LRYGB was correctly identified and therefore justifies its use routinely.

Flexible Endoscopy – P380

CLINICAL EVALUATION AND MANAGEMENT OF CAUSTIC INJURY IN THE UPPER GASTROINTESTINAL TRACT IN 92 ADULT PATIENTS IN AN URBAN MEDICAL CENTER,

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BACKGROUND: Caustic ingestion is a challenging problem requiring emergency medical and sometimes surgical treatments. Ingestion of caustic materials causes a wide spectrum of injuries, and appropriate treatment varies with the severity and extent of injury. Early endoscopic evaluation provides the best initial assessment of the upper GI tract in those patients without obvious perforation. This retrospective study represents 92 adult caustic injury patients and their endoscopic evaluation, treatment, and outcome.

METHODS: From 1979-2006, 92 consecutive adult patients were admitted to our urban emergency hospital for ingestion of caustic materials. Every patient in this study underwent upper endoscopy to evaluate the injury. The results were graded from one to three, with three being the most severe. The same endoscopist was present for all cases and grade determinations. Treatment was based on the endoscopic grade.

RESULTS: Of the 92 patients, there were 59 men and 33 women with an average age of 36.9 years (range 17-81). Ingestion was a suicide attempt in 48 patients and accidental in 44 patients. There was no mucosal damage in 10 patients (11%). Of those with mucosal injury, 47 patients were grade 1 (51%), 24 were grade 2 (26%), and 11 were grade 3 (12%). The extent and severity of the injury varied according to the ingested materials. The ingestion of strong acid (n=15) or strong alkali (n=29) produced significantly more severe injury than bleach (n =25), detergent (n=13), and ammonia (n=4), which caused more mild injury. Twelve patients (13%) required operative treatments (10 grade 3 injuries and 2 grade 2 injuries). Procedures included six esophagectomies, three total gastrectomies, two partial gastrectomies, and one tracheostomy and jejunostomy tube. Conservative treatment (NPO, IVF/TPN, repeat endoscopy) on 22 patients (25%) with grade 2 injuries was successful and all 22 were discharged home without surgery. The overall mortality rate was 1.1% (1/92). There were no complications associated with the endoscopic procedure.

CONCLUSION: Upper gastrointestinal endoscopy for caustic ingestion should be performed early in patients not requiring immediate operation and can be performed safely. Though all grade 3 injuries in our study required surgery,



both grade 2 and 3 injuries can be treated conservatively. These patients usually require repeat endoscopy to ensure healing. The likelihood of requiring surgery for grade 3 injuries is, however, higher.

Flexible Endoscopy – P381

DECISION-MAKING PROCESS FOR SCREENING

COLONOSCOPY, M V Geana, T M Geiger MD, N J Rangnekar MD, G T Cameron, B W Miedema MD, University of Missouri, Departments of Journalism and General Surgery, Columbia MO

Introduction: Colonoscopy is currently underutilized as a screening technique for colon cancer. The purpose of this study is to use qualitative research techniques to analyze the decision-making process for screening colonoscopy.

Methods and Procedures: Screening colonoscopy is an innovation that has only been partially accepted by the population. A Penetration of Innovations model (Geana, 2006) has been developed that postulates that, when a decision resides with the individual, a change in attitude is needed before a change in behavior is seen. The model progresses from explanation (information gathering), to engaged (convinced of usefulness) to adaptation (overcoming barriers to using the innovation) and emphasizes the existence of two essential types of knowledge about the innovation: delivered (from experts) and created (from experience or inferential). Structured interviews were conducted with 16 patients that had undergone screening colonoscopy in the past 30 days. Each interview was analyzed before the next interview to provide categories for testing dimensions of the penetration of innovation model. A three step systematic procedure is then conducted using NVIVO software: developing a category, defining relationships among categories, and analyzing how category relationships compare with the penetration of innovation model.

Results: The informed decision for undergoing screening colonoscopy occurs in 3 major steps; a knowledge building period, a triggering event, and an active search for knowledge to overcome identified barriers to colonoscopy. The four main identified triggering events are age, doctor's recommendation, family history, and a personal medical event. In their decision process, patients progress from a passive attitude (I know something about screening colonoscopies), through a triggering event (I should have colonoscopy), to overcoming barriers (fear, cost, inertia) to schedule a colonoscopy.

Conclusions: Screening colonoscopy is consistent with the Penetration of Innovations model. Tailored public education, application of recognized triggers, and physician input in helping overcome specific barriers can increase the use of screening colonoscopy.

Flexible Endoscopy – P382

SCREENING ENDOSCOPY BEFORE BARIATRIC SURGERY: A

SERIES OF 452 PATIENTS, Mark Loewen MD, Jeanine Giovanni MD, Carlos Barba MD, St Francis Hospital & Medical Center

Introduction: The role of upper endoscopy (EGD) in morbidly obese patients prior to bariatric surgery is controversial. The purpose of this study was to determine the diagnostic yield and cost of routine EGD prior to bariatric surgery.

Methods: A consecutive series of 452 patients, who were otherwise cleared for bariatric surgery following a series of consultations, underwent routine EGD. All patients were interviewed before EGD regarding gastroesophageal symptoms. Findings were tabulated and analyzed. Small hiatal hernia was not considered a clinically relevant finding.

Results: Of 452 patients undergoing EGD, one had transient desaturation and was unable to complete the procedure. Of the remaining 451, 109 (24.2%) had abnormal findings. Gastritis was the most prevalent finding, being found in 62 patients (13.7%), of which only 6 were associated with *Helicobacter pylori* (H-pylori). Polyps were found in 20 (4.4%) patients, both gastric (14) and duodenal (6). Ulcer disease was found in 11 (2.4%), both gastric (3) and duodenal

(8); 2 of the gastric ulcers were found to contain H-pylori. There were 11 moderate hiatal hernias. Pre-procedure gastroesophageal reflux (GERD) was reported by 24 patients (5%), but GERD was not significantly related to hiatal hernia (HH) or non-HH findings. There were 5 patients with esophagitis, of whom one had undergone Barrett's metaplasia. A treatment change occurred in 78 patients: 69 were newly placed on proton pump inhibitors because of findings of inflammation and ulcers, and 9 were placed on triple therapy for H-pylori. Overall, 10 patients were delayed for surgery, 9 for H-pylori treatment and 1 to further work-up a moderate hiatal hernia for whom a gastric band was planned (the other patients with moderate hiatal hernias were planning to undergo gastric bypass). One patient had a finding of a large vessel in the fundus who had the gastric remnant staple line oversewn at the time of surgery.

Conclusions: In this consecutive series of 451 successful screening EGDs, there was a high (24%) yield of positive findings, leading to change in medical treatment in a significant (17%) number of patients. Upper endoscopy should be routinely performed preoperatively in bariatric patients.

Flexible Endoscopy – P383

TRANSABDOMINAL LESSER SAC FLEXIBLE PERITONEOSCOPY (LSFP): A NOVEL APPROACH FOR PANCREATIC BIOPSY

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INTRODUCTION: Pancreatic masses demand histologic confirmation for diagnosis to direct subsequent treatment, but available methods of pancreatic biopsy have limitations (e.g. minute needle sampling) and pose undesirable risks (e.g. open laparotomy with open biopsy), leading to our hypothesis that minimally invasive direct biopsy is feasible. Our group has performed successfully Lesser Sac Flexible Peritoneoscopy (LSFP) for pancreatic biopsy under direct visualization in a canine model.

METHODS: With animal use approved by the IACUC (Institutional Animal Care and Use Committee) of Michigan State University, 6 canines averaging 30kg were used as an animal model. All procedures were performed in the approved surgical teaching suite in the College of Veterinary Medicine, MSU. Under general anesthesia and after accomplishing pneumoperitoneum, a conventional flexible gastroscope was introduced into the abdominal cavity through a 10 mm port inserted supraumbilically with an auxiliary 10 mm port being placed in the right upper quadrant under direct visualization. The gastroscope (Olympus GIF 160) was advanced through the epiploic foramen (of Winslow) providing access to the lesser sac. From that location, the pancreas was directly inspected and biopsied. The animals were euthanized after the procedure.

RESULTS: On histological examination, five out of six specimens were confirmed to be pancreatic tissue. No complications were observed during the experiments and all the canines remained hemodynamically stable during the procedure. The continuous insufflation delivered from gastroscope proved insufficient to maintain adequate pneumoperitoneum within the lesser sac. The 10 mm Babcock used for gastric retraction through the auxiliary port greatly enhanced the visualization.

CONCLUSIONS: LSFP combines laparoscopic and flexible endoscopic techniques, representing a novel method of pancreatic tissue sampling under direct vision, which is performed in a safe and controlled manner. We believe LSFP may be better than CT or EUS-guided biopsy. This study demonstrated that this technique is feasible and safe in an animal model. LSFP for pancreatic biopsy has the potential to improve patient care and open new horizons for minimally invasive procedures of the lesser sac.



SAGES POSTER ABSTRACTS

Flexible Endoscopy – P384

ROLE OF FLEXIBLE ENDOSCOPY IN PENETRATING NECK TRAUMA, S Nijhawan MD, V Mathavan MD, N Ahmed MD, Dept. Of surgery, Huron Road Hospital/Cleveland Clinic Health System

Introduction: Historically, radiological contrast studies are the main stay in diagnosing oropharyngeal and esophageal injuries; these may be difficult in intubated patients and require transporting a critical ill patient to radiology suite. Flexible endoscopy may provide direct visualization at the bedside.

Method: The study, approved by IRB, was done in a busy trauma service with a high volume of penetrating trauma. All patients included in the study had penetrating injuries to the neck, with clinical suspicion of oropharyngeal or esophageal injuries, which had both EGD and Contrast study. Data was collected and compared for detection of injuries to oropharynx, esophagus and complications resulting from intervention.

Results: Total number of patients, N=12

	EGD	Barium Study
Oropharyng inj	3	0
Esophageal inj	1	1
Aspiration	0	1
Iatrogenic inj	0	0

*No missed injuries on 2-week follow-up. Esophageal injury was detected in same patient by both the studies.

Conclusions: Although limited due to the size of the study, our experience shows that endoscopy is comparable to radiological studies in detection of esophageal injuries. It may be superior in detecting oropharyngeal injuries, especially in intubated patients, as instilling contrast into esophagus bypasses oropharynx. Flexible endoscopy was also found to be convenient and safe.

Flexible Endoscopy – P385

ENDOSCOPIC PERCUTANEOUS TRANS-ESOPHAGEAL GASTRO-TUBING (E-PTEG) -FOR SIMPLER AND EASIER PROCEDURE-, Hideto Oishi MD, Noriyasu Shirotani MD, Department of Surgery, Division of Digestive and General Surgery, Yachiyo Medical Center, Tokyo Women's Medical University

In 1994, we developed a non-surgical esophagostomy called the percutaneous trans-esophageal gastro-tubing (PTEG) for the patient who had difficulty to create the percutaneous endoscopic gastrostomy (PEG). PTEG is the trans-esophageal tube placement for enteral nutrition and/or digestive tract decompression as well as PEG and is a non-vascular interventional technique using ultrasound and fluoroscopy with rupture free balloon (RFB). We performed in total of 165 conventional PTEG since 1994 and from 2003, we started endoscope assisted PTEG (EA-PTEG) to make sure the tube insertion with an endoscopic view. Using the endoscope, we treated another 28 patients with satisfied results and for wider acceptance of this innovative option with simpler and easier procedure we developed the endoscopic percutaneous trans-esophageal gastro-tubing (E-PTEG).

The aim of this presentation is to introduce E-PTEG and clarify its usefulness with early clinical experiences. To perform E-PTEG, we developed a needle holder pusher (NHP) to create the puncture site without ultrasound. NHP has a simple round shape like an ultrasound transducers and is made from 2 clear plastic blocks with a slit to hold the puncture needle. We performed E-PTEG using NHP for 11 patients and 5 patients could succeed without using ultrasound and fluoroscope. However, 6 out of 11 patients still required the ultrasound and/or fluoroscopic intervention other than endoscopy. Then we developed a double balloon over-tube RFB (DBOt-RFB) to puncture the cervical esophagus by transmitted light guide of an endoscope without ultrasound. Further evaluations are required, however, E-PTEG using NHP and DBOt-RFB might be the simplest and the easiest esophagostomy technique even for endoscopists like PEG procedure.

Flexible Endoscopy – P386

COLONOSCOPIC SURVEILLANCE AFTER POLIPECTOMY, Nicolas Rotholtz MD, Alexandra Mandry MD, Sandra Lencinas MD, Carlos Peczan MD, Gerardo Zanoni MD, Mariano Laporte MD, Daniel Cimmino MD, Colorectal Surgery Section. General Surgery Department and Endoscopy Department. Hospital Alemán de Buenos Aires. Argentina.

Introduction: Patients who have undergone colonoscopy and have had polypectomy are at increased risk of having new polyps in the future, and therefore might benefit from colonoscopic surveillance. The aim of this study was to evaluate the frequency of colonoscopic surveillance after polypectomy.

Methods and Procedures: From 1728 colonoscopies performed between January and December 2005, 194 were surveillance after polyps removal. 64 patients were excluded because there were few data regarding previous polypectomy. Finally 130 patients were evaluated. Patients were divided in two groups. Group 1 (G1): patients with no polyps at the colonoscopic control and Group 2 (G2): patients with polyps. Number, size, location and histological features of polyps identified at the first colonoscopy were assessed. Statistical analysis was performed by the chi-square test.

Results: 71 patients (54.6%) were included in G1 and 59 (45.4%) in G2. There were no differences in age and gender between the two groups. Polyps were detected in sigmoid colon (G1: 41.4% vs. G2: 30.1%; p= 0.12), rectum (G1: 15.1% vs. G2: 14.1%; p= 0.99) and right colon (G1: 21.2% vs. G2: 30.1%; p= 0.19). More polyps > 5 mm were found in Group 2 than Group 1 (33.5% vs. 15%; p= 0.004). There were more patients with 2 or more polyps resected in G2 (50.8% vs. 22.5%; p= 0.001). Mean polypectomy done per patient was significantly higher in G2 (1.79 vs. 1.33; p= 0.002).

There were no differences in the prevalence rates for hyperplastic polyps, adenomas and colorectal cancer between the groups. No difference was identified in the mean follow-up between the groups (31 vs. 25 months; p= 0.283).

Conclusion: Patients with two or more polyps, and with lesions greater than 5 mm have increased risk for having others polyps at the colonoscopic surveillance.

Flexible Endoscopy – P387

TRANS CHOLEDOCHODUODENOSTOMY ENDOSCOPIC MANAGEMENT OF A STRICTURE ASSOCIATED 2.5 CM. LEFT INTRA-HEPATIC DUCT STONE: A CASE REPORT. Ray Sarmiento MD, V.J. Villaflo MD, Gozar Duque MD, Vivencio Villaflo, Dagupan Endoscopic and Laparoscopic Surgery Center Inc., Dagupan Doctors Villaflo Memorial Hospital, Dagupan City, Philippines

Management of hepatolithiasis associated with biliary duct stricture has remained to be surgical. We are presenting non-conventional route for endoscopic management of this problem.

This is a 35 year old female who presents with cholangitis. ERCP showed the CBD to be dilated to ~1.0cm with a choledochoduodenostomy. The L Intrahepatic duct with a stricture of ~0.5 cm in length before it dilates to a diameter ~2.5 cm. distally. Inside was a 2.5 cm stone. The use of conventional ERCP accessories was not able to extract the L IHD stone.

The gastroscope (Olympus GIF-Q145) was used as a cholangioscope through the choledochoduodenostomy. The CBD accessed and the lumen of the IHDs visualized. The R IHD was normal. Pus and stone fragments was seen coming out from the L IHD. The scope was advanced beyond the strictured area. With direct visualization of the stone, it and was crushed into fragments by a dormia basket until all were extracted. The L IHD strictured segment was dilated with a CRE balloon dilator (Boston Scientific) with 1.8 cm largest diameter to approximate the size of the distal dilated portion. Two days post endoscopy the cholangitis resolved. The patient is well 1 and 3 months into the follow up. This cholangioscopic technique with direct visualizarion, lithotripsy and dilatation can be done as long as a direct access into the CBD is available. Long-term follow up of this patient is needed to asses the effectiveness of this modality.



Flexible Endoscopy – P388

COLORECTAL CANCER SCREENING: A REVIEW OF A COLONOSCOPY-BASED SCREENING PROGRAM IN NORTHEASTERN ONTARIO, Alex Omiccioli, Ravinder Singh MD, Susan G Hegge MD, Craig A McKinley MD, The Centre for Minimal Access Surgery (CMAS-McMaster University and CMASnorth-North Bay District Hospital)

Introduction: Colo-rectal cancer (CRC) is the second leading cause of death from cancer in Canada. In Northeastern Ontario the risk of developing CRC in males and females is 78.5/100,000 and 64/100,000 respectively. These rates are among the highest in the country. The goal of this study was to evaluate the results of a screening colonoscopy program implemented by two community surgeons who practice in Northeastern Ontario.

Methods: Between January 2004 and March 2006 a prospective study was performed on 552 patients who were referred by their family doctor for screening colonoscopy. In order to assess the utility of colonoscopy for a purely screening purpose, patients with signs/symptoms of CRC other than fecal occult blood positive stools were excluded from the study. In the remaining 462 patients, indications to perform colonoscopy were threefold: positive fecal occult blood test (OB+) with no family history of CRC (53 patients), age greater than 50 (Age>50) with no family history of CRC (213 patients) and positive family history of CRC in a first degree relative (FH+) (196 patients). Clinically significant findings were defined as adenomatous polyps or CRC as identified by pathological review.

Results: In the OB+ group there were clinically significant findings in 32.1% of patients (16 patients with adenomatous polyps (4 with high grade dysplasia) and 3 patients with CRC). In the Age > 50 group there were clinically significant findings in 15.5% of patients (31 patients with adenomatous polyps (5 with high grade dysplasia) and 2 patients with CRC). Finally, in the FH+ group there were clinically significant findings in 15.3% of patients (30 patients with adenomatous polyps).

Conclusion: The current recommendations strongly suggest screening colonoscopy be offered to any patient with a FH of CRC in a first degree relative. Given that in our series the clinical yield of screening colonoscopy in age > 50 patients is similar to clinical yield of screening colonoscopy in patients with a FH of CRC in a first degree relative, we believe that screening colonoscopy should be offered to all patients of age > 50 in Northeastern Ontario. OB stool testing remains a valuable interim screening tool for general practitioners in Northeastern Ontario. However, we believe that the high incidence of CRC in Northeastern Ontario is a serious public health issue and that a screening colonoscopy program should be developed for this region.

Flexible Endoscopy – P389

DIAGNOSING THE CAUSE OF CHRONIC ABDOMINAL PAIN AFTER GASTRIC BYPASS: IS ENDOSCOPY USEFUL?, Suthep Udomsawaengsup MD, Stacy Brethauer MD, Jeffrey Landers MD, Sam Rossi MD, Tracy Pitt DO, Vijaya Nirujogi MD, Silas Chikungwo MD, Matthew Metz MD, Valentine Nfonsam MD, Bipan Chand MD, Philip Schauer MD, The Cleveland Clinic Foundation, Cleveland

INTRODUCTION: Chronic abdominal pain is a common complaint after gastric bypass. Marginal ulcers and gastrojejunostomy strictures remain the most common causes. Endoscopy is a valuable test to diagnose these conditions, but patients with normal endoscopy present a challenge. The purpose of this study is to examine the utility of EGD in patients with chronic abdominal pain after Roux-en-Y gastric bypass (RYGB) and to determine what other testing was necessary to diagnose the cause of pain.

METHODS AND PROCEDURES: A retrospective review of patients who underwent EGD for chronic abdominal pain after RYGB was conducted. Patients with dysphagia were excluded. For patients with a normal EGD, additional testing and procedures were performed based on the patient's clinical course.

RESULTS: From July 2004 to June 2006, 67 patients presented with chronic abdominal pain after RYGB. 16 (24%) had a marginal ulcer and were treated medically. Fifty-one of the 67 patients (76%) had a normal EGD. Two patients were lost to follow-up. With a mean follow-up of 7 months, 17 patients improved with medical therapy and did not undergo further testing. Thirty-two patients had persistent pain and required additional evaluation. Of these, 14 have no source identified and 18 required operative intervention. Six patients had a biliary source for their pain. Four underwent cholecystectomy and two underwent transgastric ERCP, all with relief of their symptoms. Twelve patients underwent laparoscopic exploration. Seven had lysis of adhesions for partial bowel obstruction, four had a ventral hernia repair, and one patient had an internal hernia. Two patients (ventral hernia, lysis of adhesions) still persist with chronic pain.

CONCLUSION: Although endoscopy can be a useful test to diagnose common causes of pain after RYGB, patients with normal endoscopy should undergo further testing, including laparoscopy, to diagnose and treat their pain.

Flexible Endoscopy – P390

TITLE: THE TAILORING SIGMOIDOSCOPY SCREENING FOR COLORECTAL CANCER IN CHINESE PEOPLE(A RETROSPECTIVE STUDY ON 21 631 CASES) Hao Wang, Ronggui Meng, Chuangang Fu, Enda Yu, Wei Zhang, Lianjie Liu, Department of Colorectal Surgery, Changhai hospital, the Second Military Medical University, Shanghai, China 200433

INTRODUCTION: The retrospective study is examining the efficacy of the tailoring sigmoidoscopy screening for colorectal cancer in Chinese people.

METHODS AND PROCEDURES: The tailoring sigmoidoscopy screening means screening sigmoidoscopy which is used to identify patients with elevated risk of colorectal neoplasms firstly, then these patients with polyps in the sigmoid colon and rectum are referred for total colonoscopy and polypectomy. So a part of additional proximal cancer will be found, which can partly overcome the defect of sigmoidoscopy screening. There were 21 631 consecutive colonoscopies in our hospital from Jan 1998 to Dec 2002. Lesions in the sigmoid colon and rectum were taken as findings of FS(Flexible sigmoidoscopy). The incidence and distribution of colorectal cancer and polyps were analysed.

RESULTS: There were 21 631 consecutive colonoscopies in our hospital from Jan 1998 to Dec 2002. A total 759(3.5%) cases of primary colorectal cancer were diagnosed. Among these cases, 540 cases were located in the sigmoid colon and rectum, which should be found by the sigmoidoscopy directly. Among the remaining 219 cases of proximal colon cancer, the presence of coexisting polyps was found in 60(27.4%) cases and the coexisting polyps was located in the sigmoid colon and rectum in 46(21.0%) cases. If the 46 cases are included, there are 586(77.2%) cases of colorectal cancer being found by tailoring sigmoidoscopy screening.

CONCLUSION(S): The tailoring sigmoidoscopy screening is a good choice for colorectal cancer screening in Chinese people because the high incidence of the cancer in the sigmoid colon and rectum. The tailoring sigmoidoscopy screening can partly overcome the defect of sigmoidoscopy screening that it only examines a portion of the colon, at the same time, it solves the problems brought up by universal colonoscopy screening: cost, safety, resource constraints.

Hepatobiliary/Pancreatic Surgery – P391

SCHEDULED LAPAROSCOPIC CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS, Akihito Abe MD, Nobumi Tagaya PhD, Masashi Tachibana MD, Keiichi Kubota PhD, Second Department of Surgery, Dokkyo Medical University, Tochigi, Japan

Background: Laparoscopic treatments for acute cholecystitis have remained controversial. The aim of study is to evaluate the result of scheduled laparoscopic cholecystectomy for the patients with acute cholecystitis.

Materials and Methods: We experienced scheduled laparoscopic cholecystectomy for acute cholecystitis in 82 cases. Twenty-seven cases (32.9%) with preoperative percutaneous transhepatic gallbladder drainage or aspiration (PTGBD (A



group) were compared with 55 cases without PTGBD (A) (Non-PTGBD (A) group).

Results: The mean ages of PTGBD (A) and Non-PTGBD (A) groups were 61 and 54 years, respectively. There were no significant differences in gender, previous abdominal surgery and preoperative combined diseases. The mean period from onset to PTGBD (A) was 4.0 days. The mean period from onset to surgery, operation time, estimated blood loss and conversion to open laparotomy of PTGBD (A) and Non-PTGBD (A) groups were 27.4 and 24.5 days, 174 and 184 min, 115 and 143 ml, and 4 (15.4%) and 8 (14.5%) cases, respectively. There were no significant differences in intra- and postoperative complications, postoperative and total hospital stay. The patients with PTGBD (A) for severe acute cholecystitis provided the same outcome comparing with those of Non-PTGBD (A).

Conclusion: We concluded that PTGBD (A) for severe acute cholecystitis was useful to perform safe scheduled laparoscopic cholecystectomy.

Hepatobiliary/Pancreatic Surgery – P392

AVOIDING ANY ENERGY SOURCE FOR A SAFE & BETTER LAPAROSCOPIC CHOLECYSTECTOMY, B B Agarwal MS, M K Gupta MS, S Agarwal MS, K C Mahajan MS, Sir Ganga Ram Hospital & Lady Hardinge Medical College, India

Objectives? Assessing the health related quality of life after laparoscopic cholecystectomy performed without using any energy source.

Methods & Procedures? 93 consecutive, unselected patients of symptomatic cholelithiasis including acute cholecystitis, empyema, adhesions, post ERCP and with co-morbid conditions had cholecystectomy with standard Laparoscopy equipment without using any energy source. Health related quality of life was assessed incorporating Physical, Psychological & Work-performance parameters with the help of standard questionnaire.

Closed technique for creation of pneumoperitoneum (Carbon dioxide) and four port technique using a 5mm telescope was followed. Cholecystectomy was begun by sharp division of omental or visceral adhesions to gallbladder. The triangle of Calot was opened by cutting the cholecystoduodenal fold and dividing its anterosuperior and posteroinferior leaves. The peritoneal reflection from gall bladder to liver was cut with scissors along both margins of gallbladder fossa. Gallbladder was separated from liver by traction-counter traction and sharp dissection in the avascular plane identified in the loose areolar tissue. All procedures were video recorded.

Results? Better & smokeless endovision, lesser lens cleaning, reduced operative time. There was no biliary or visceral injury or any bleeding. Avoiding energy source spared the patients from unrecognizable biliary/vascular/visceral injury and molecular level insult. Patients were comfortable within 8 hours of surgery and discharged soon after except for those with co-morbidity. Their quality of life returned to pre-operative status within 72 hours of surgery.

Conclusions? Laparoscopic cholecystectomy can be performed safely without using any energy source with benefits to the patients quality of life. The operative room atmosphere and the surgical team is not subjected to the surgical smoke. Due to no possibility of combustion substitution of carbon dioxide seems feasible and needs to be explored.

Hepatobiliary/Pancreatic Surgery – P393

A PROPOSAL FOR SCORING SYSTEM TO PREDICT THE DIFFICULTY IN TREATMENT OF BILIARY CALCULI BY ERCP, Adem Akcakaya MD, Mustafa Sahin MD, Ismail Okan MD, Atilla Karakellepoglu MD, Vakif Gureba Training and Research Hospital, Istanbul, TURKEY

Aim: The extraction of stones in biliary tree by ERCP is challenging to endoscopists in some cases. Here we propose a scoring system for the prediction of the difficulty encountered during ERCP in the treatment of choledocholithiasis.

Methods: Between 2000-2005, the data corresponding to the

patients with choledocholithiasis who underwent ERCP was reviewed. To determine the difficulty of procedure; the size, number, localization of the stone, stone impaction and associated anatomical abnormalities were taken into consideration as variable parameters. Each parameter was assigned with a numeric value resembling the degree of difficulty. The sum of the assigned values was between the ranges of 1 to 10. Then the patients were stratified into two groups: Group 1, regarded as easy, consisted of patients whose sum of numeric parameters was between 1 and 5. Group 2, defined as difficult, contained patients whose sum was between 6 and 10.

Results: A total of 744 ERCPs were performed to 592 patients with choledocholithiasis. Group 1 consisted of 610 ERCP (82%), whereas Group 2 contained 134 ERCP (18%). The treatment modalities in Group 1 were as follows: Stone extraction in 559 patients (92%), lithotripsy in 30 cases (5%), stenting in 15 patients (2%), repeat ERCP and stent exchange in 6 patients (1%). In Group 2, 51 patients were treated with stone extraction (38%), 40 with lithotripsy (30%), 29 patients with stent placement (22%). Fourteen patients required repeat ERCP and stent exchange (10%). The most common complication in both groups was bleeding after ERCP. Group 2 had pancreatitis and basket impaction additionally. There was significant difference in scoring between groups ($p < 0.001$). The significant factors to be associated with difficulty were the content, size and localization of stones.

Conclusions: The scoring system could predict the difficulty during ERCP in treatment of patients with biliary calculi.

Hepatobiliary/Pancreatic Surgery – P394

INSULINOMA: IS LAPAROSCOPIC PANCREATECTOMY ONCOLOGICALLY SUPERIOR TO ROUTINE ENUCLEATION?, Yasir M Akmal MD, David G Sheldon MD, Geisinger Medical Center

Objective: To provocatively examine the role of laparoscopic distal pancreatectomy in the routine management of insulinoma.

Methods: An examination of two recent cases of pancreatic tail insulinoma managed laparoscopically at a rural tertiary referral center.

Results: Two patients with biochemical evidence of insulinoma and CT findings of enhancing pancreatic tail mass were managed with laparoscopic pancreatic tail resection with splenectomy. Both patients were found to have histologic features of malignancy. One patient had metastatic involvement of a regional lymph node; a second had histologic criteria for angioinvasion of the surrounding pancreatic parenchyma. Both lesions were otherwise bland neuroendocrine tumors of the islet cells with no features suggestive of malignancy. Neither patients had a perioperative complication.

Conclusions: Insulinoma is an uncommon neuroendocrine tumor of the pancreas, that is traditionally thought to be of benign histology and clinical course; therefore open enucleation has been the procedure of choice. Our recent experience raises the question of whether the true incidence of malignant insulinoma is under-reported secondary to the limited procedure being performed in the first place. If a concomitant pancreatic resection with insulinoma is done, routine examination of the pancreas/tumor interface and regional nodes can be performed. The fact that malignancy cannot be identified with simple enucleation, the standard of care, leads to the inference that a more oncologically aggressive procedure will identify more malignant insulinomas. With the advent of laparoscopic pancreatic resection safely being performed in experienced hands, a routine removal of normal pancreatic margins and regional nodes may lead to a change in the management paradigm of the characteristically benign insulinoma and is recommended based on our recent experience.



Hepatobiliary/Pancreatic Surgery – P395

SINISTROPOSITION: LEFT-SIDED GALLBLADDER TREATED BY 2 MM LAPAROSCOPIC CHOLECYSTECTOMY. A REPORT OF TWO CASES, Ziad Amr MD, Faris Al-Gebory MD, John Macoviak MD, Garth Davis MD, Robert Davis MD, Patrick R Reardon MD, Department of Surgery, The Methodist Hospital, Houston, Texas

Introduction: True left-sided gallbladder (LSG) is a very rare anatomic variant. We report two such cases treated by laparoscopic cholecystectomy (LC) with 2 mm instrumentation. Both cases were performed utilizing the dome-down technique.

Methods: A prospective database of all LC's performed by the senior author (PRR) has been maintained since 1991. A retrospective review of 1120 consecutive cases in this database revealed 2 cases of LSG. Clinical data queried included operative time (OT), estimated blood loss (EBL), length of stay (LOS), port size, position, and intraoperative and postoperative complications. The cases were initiated with a mid-line, supraumbilical, 2 mm port, as is our standard. A 10 mm port was then placed at the umbilicus. Viewing through a 30° 10 mm laparoscope, the left-sided position of the gallbladder was noted. A 2 mm left subcostal port was then placed, in a mirror image fashion to a standard LC port placement. Inspection of the area of the cystic duct revealed that the ductal anatomy was obscured by the gallbladder as it crossed over to the right side. The cholecystectomy was then completed in a dome-down fashion.

Results: Neither of the two cases was diagnosed preoperatively. Both cases were successfully completed utilizing 2 mm instrumentation and the dome-down technique. There was one male patient, age 63 and one female patient, age 47. Mean values, \pm standard deviation, were: OT = 75.5 ± 6.4 min; EBL = 37.5 ± 17.7 ml; LOS = 0.0 ± 0 days. One case required conversion of a 2 mm port to a 5 mm port because of a thickened gallbladder. The cystic duct entered the common bile duct on the right side in both patients. There were no intraoperative complications or complications within 30 days. The incidence of LSG in this series of 1120 consecutive cases of LC was 0.18%.

Conclusion: True LSG, or sinistroposition, is a very rare anatomic variant. The gallbladder is attached to segment IV of the liver and approaches the common bile duct from left to right, obscuring the cystic duct. The dome-down technique allows the gallbladder to be rotated to the right, exposing the cystic duct for safe completion of the operation. When this rare anatomic variation is encountered it can be safely treated laparoscopically and with the use of 2 mm instrumentation. The authors recommend using a dome-down technique to improve visualization of the cystic duct junction with the common bile duct, increasing the safety of the operation.

Hepatobiliary/Pancreatic Surgery – P396

THE ROLE OF PERITONEAL LAVAGE CYTOLOGY IN LOCALLY UNRESECTABLE PANCREATIC CANCER, Fru Bahiraei MD, L W Traverso MD, V Picozzi MD, Virginia Mason Medical Center

Peritoneal lavage cytology (PLC) is a controversial part of the AJCC staging system for staging pancreatic cancer. Conflicting reports suggest an important role of peritoneal cytology in the prognosis and management of pancreatic cancer. Focus has been on the resectable patient; however, the role of peritoneal cytology in locally unresectable patients, as determined by CT scan, is not known. We propose that Diagnostic Laparoscopy and PLC should be standard of care in patients with locally unresectable disease. Using a prospective database, we reviewed the records of 132 patients with locally unresectable pancreatic cancer and no evidence of distant metastasis. These patients underwent staging laparoscopy with peritoneal lavage cytology. In comparing patients with positive and negative cytology, survival is not statistically significant (p -value 0.29). The estimated median survival for the positive group is 12.3 months (95% CI = 10.1-17.3), and for the negative group it is 15.2 months (95% CI = 11.1-18.9). The associated relative risk of

death is 1.32x in patients with positive cytology, but this finding is not statistically significant. In addition, 38% of our patients were upstaged with positive cytology and spared radiotherapy.

The role of PLC in the diagnosis, treatment, and staging of pancreatic cancer remains poorly defined. We feel that PLC status is important in locally unresectable patients. We will discuss our findings and compare them to current studies exploring the key issue of how PLC can help guide the management of patients with pancreatic cancer.

Hepatobiliary/Pancreatic Surgery – P397

THE ROLE OF LAPAROSCOPY WITH LAPAROSCOPIC ULTRASOUND FOR STAGING OF PANCREATIC CANCER IN THE ERA OF MODERN ADVANCED IMAGING., Boris I Bronfine MD, Maurice E Arregui MD, Dept. of Surgery, St. Vincent Hospital, Indianapolis, IN, 46240

The goal of this study is to re-evaluate the role and the yield of staging laparoscopy (SL) with laparoscopic ultrasonography (LUS) in selecting patients with pancreatic cancer for pancreatoduodenectomy, considering the progress in quality of non-invasive imaging used for the same purpose.

METHODS: We retrospectively reviewed the data of patients with adenocarcinoma of the head of the pancreas, which were referred to our service as potential candidates for Whipple resection between Sept. 1999 and July 2006. After comprehensive assessment by dual phase fine cut CT, ultrasound and/or EUS all these patients had SL with LUS. The correlation between the results of imaging studies, conclusions at the staging laparoscopy and actual resectability at open exploration was reviewed.

RESULTS: The records of 40 consecutive patients with adenocarcinoma of the head of the pancreas were evaluated. Based on extensive imaging evaluation 35 of them were considered to be candidates for Whipple procedure. In five remaining cases the neoadjuvant therapy prior to a potential resection was suggested to downstage the local extent of the disease. All the patients then underwent routine SL with LUS. It revealed the unresectability in 4 out of 35 patients of the first group (11.4%), including one case of peritoneal carcinomatosis detected by SL alone, and three contraindications for resection found by LUS (5mm. hepatic metastasis; encasement of multiple vessels, and the involvement of celiac lymph nodes). The remaining 31 patients (88.6%) were classified as resectable; 30 of them had an open exploration and one patient (3.33%) was not resectable. The negative predictive value (in detecting unresectable cancers) was 85.2% for pre-operative imaging studies, 96.7% for staging laparoscopy combined with LUS and 85.3% for SL alone. The sensitivity of SL with LUS for the detection of contraindications to resection was 90%. Comparatively, the similar study from our institution in February 2000 has reported the negative predictive value of 74% for imaging modalities alone, 78% for laparoscopy alone, and 90% for SL with LUS. **CONCLUSION:** Current dual phase CT multislice scanning with fine cuts has improved ability to detect disease precluding respectability. Staging laparoscopy with LUS has a higher negative predictive value (96.7%) compared with CT (85.3%). It remains a useful approach for predicting respectability and avoiding unnecessary open exploration with its attending morbidity.

Hepatobiliary/Pancreatic Surgery – P398

COST-EFFICIENCY RATIO OF LAPAROSCOPIC CHOLEDOCHOLITHOTOMY, Sergio E Bustos MD, Pablo E Omelanczuk MD, Jorge A Nefa MD, Walther Minatti MD, Department of General Surgery, Hospital Italiano de Mendoza, Argentina. Lateral Este 1015 Guaymallén, Mendoza, Argentina

Objective: Nowadays, laparoscopic treatment of choledocholithiasis aims to be cost-effective without affecting quality. Cost efficiency is the equation between effectiveness and cost, and it is necessary to develop strategies to obtain the best economic outcomes.

To evaluate the effectiveness of laparoscopic resources for LP choledocholithotomy and its global cost.

Materials and method: Out of 335 LP explorations for choledocholithiasis, the effectiveness rate was determined for



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Transcystic and Choledochotomy access, as well as the ratio between intralaparoscopic endoscopy and conversion. To determine the global cost of laparoscopic surgery, four groups of economic factors were analyzed: Hospital stay with medication and analysis, Pharmacy expenses, Medical fees and Operating room expenses. The standard was 2 days of hospital stay, 2 operating room hours, and 1 radioscopy period (5 minutes). The cost of anesthesia and supplies was analyzed for the first two hours, and next the expenses of each procedure or conversion to LP surgery with one assistant were also analyzed.

Results: Effectiveness for Choledocholithotomy with TC access was 85% and for Choledochotomy 97.5%. Those cases in which a combined laparoendoscopic treatment was required, the success rate was 100% as well as when intrabdominal assistance was required.

Costs derived from: 60% surgical expenses (supplies, equipment-instruments, and general surgical expenses (staff, sterilization, electricity, air conditioning, etc.) The remaining 40% of expenses derived from hospital stay, medication, lab tests and medical fees.

Costs increased under certain conditions: adding procedures: starting transcystic and then converting to Choledochotomy, or converting from an initial Choledochotomy, assisting intrabdominally, or indicating postoperative endoscopy.

The operating time after two hours only increases 20% the cost of anesthesia. Routine IO Colangiography detected over 7 % of asymptomatic choledocholithiasis, thus avoiding residual lithiasis and making it cost efficient.

Conclusion: The most cost-efficient approach is Transcystic, next Choledochotomy with primary closure of the Common Bile Duct, and finally, intraoperative endoscopy. The key to reducing costs without affecting the quality of the procedure is to reduce surgical time, the number of associated procedures, hospital stay and an adequate use of resources.

Hepatobiliary/Pancreatic Surgery – P399

LAPAROSCOPIC COMMON BILE DUCT EXPLORATION AFTER PREVIOUS BILIARY TREE SURGERY, Kuo-Hsin Chen MD, Jen-Min Wu MD, Hen-Fu Lin MD, Li-Min Tseng MD, Hsin-An Chen MD, Shin-Hong Huang BA, Far-Eastern Memorial Hospital, Taipei, Taiwan

Background: The aim of this study was to evaluate the feasibility of laparoscopic common bile duct surgery in patients with a history of previous biliary tree procedure.

Laparoscopic approach to choledocholithiasis is an integrated part of minimally invasive treatment of biliary tree stones. Most series demonstrated high success rate even in patients after previous upper abdominal surgery. However, in patients with history of previous biliary tree surgery, the choices were limited. Laparoscopic approach in these patients may be limited by the adhesion caused by previous surgery and the anatomical landmarks may be obscured. Herein, we presented our initial experience of laparoscopic common bile duct exploration in patients after previous biliary tree surgery.

Methods: From Sep 2000 to May 2006, total 118 patients received laparoscopic CBD exploration at our hospital. Nineteen patients (total 20 procedures) have a history of previous biliary tree surgery, including laparoscopic cholecystectomy in 4, open cholecystectomy in 8, choledocholithotomy in 7 patients. There are 10 men and 9 women, aged from 49 to 87 years. Most patients received preoperative ERCP which failed to clear the common bile duct stones. Laparoscopic choledochotomy was the primary procedure. For patients with recurrence CBD stones, laparoscopic bilioenteric anastomosis was used to prevent further stone recurrence. Postoperative cholangiography was done in all patients with T-tube.

Results: Laparoscopic common bile duct exploration was successful in all patients without open conversion. The operation time ranged from 105 to 315 min. Hospital stay ranged from 3 days to 55 days. The longest stay happened in a dementia woman with ventilator dependence. The stone size ranged from 1 cm to 3 cm. No retained stone was

found in postoperative cholangiography. Recurrent CBD stones developed in two patients, however. One patient received further ERCP and the other received laparoscopic hepaticojejunostomy. Transient bile leakage developed in one patient which resolved gradually without intervention. Pneumonia developed in a woman with senile dementia. Pleural effusion was found in another woman which needed thoracentesis.

Conclusions: Laparoscopic common bile duct reexploration is feasible after previous biliary tree surgery. Laparoscopic choledochotomy is effective, however, in patients with recurrent CBD stones, bilioenteric anastomosis is necessary.

Hepatobiliary/Pancreatic Surgery – P400

EXPERIENCE WITH LAPAROSCOPIC DISTAL PANCREATECTOMY AT A TERTIARY CARE COMMUNITY TEACHING HOSPITAL, Shea Chia MD, Danielle Bischof BS, Quoc Huynh MD, Paul Sullivan MD, Lloyd Smith MD, Richard Hart MD, Department of Surgery, St. Joseph's Health Centre, Toronto, Canada.

Background. Laparoscopic pancreatic resection is increasingly utilized in the community setting for selected cases of distal pancreatic disease.

Methods. A retrospective review was carried out of all laparoscopic pancreatic resections carried out by 2 surgeons at a community teaching hospital in an urban centre over a 4-year period. 12 patient charts were identified for review. Data was collected on patient characteristics, tumour characteristics, procedure performed, pancreas-specific complications, major and minor complications, early and late outcome.

Results. Of the 12 patients reviewed, 11 of the cases were performed in the last 18 months. 10 patients had benign disease, 1 had an endocrine lesion of uncertain malignant potential, and 1 had known metastatic disease from a neuroendocrine primary. 8 had splenic preserving procedures. A single patient had an enucleation, 1 had a central segment pancreatectomy. Mean operating time was 168 min (SD +/- 47.5 min), mean operative blood loss was 195 ml (SD +/- 164 ml). Average LOS was 8.3 days (SD +/- 7.3 days). Of the uncomplicated patients, average LOS was 5.3 days (SD +/- 1.3 days). There were no deaths. 3 pancreatic duct leaks (25%) were identified, 2 (17%) of which were clinically significant. These 2 patients had an enucleation and a central segment excision. Both went on to have a completion distal pancreatectomy and splenectomy as an open procedure. All patients were satisfactory at follow up.

Discussion. Our study results are comparable to existing laparoscopy literature with respect to operative time, LOS and rate of complications. Clinically significant pancreatic duct leaks only occurred in the patients that did not undergo a formal distal pancreatectomy.

Hepatobiliary/Pancreatic Surgery – P401

RANDOMISED CLINICAL TRIAL OF LONGITUDINAL VERSUS TORSIONAL MODE ULTRASONIC SHEARS FOR LAPAROSCOPIC CHOLECYSTECTOMY, Siok S Ching MD, Abeezer I Sarela MS, Michael J McMahon PhD, Department of Surgery, Leeds General Infirmary, Leeds, United Kingdom.

Introduction: Ultrasonic shears are increasingly used in surgery for hemostatic cutting. Conventional ultrasonic shears such as the UltraCision Harmonic Scalpel (Ethicon Endo-Surgery) uses longitudinal mode (LM) vibration whilst the recently developed LOTUS system (SRA Developments Ltd.) uses torsional mode (TM) vibration. TM shears produce compressive force between the vibrating blade and the inactive jaw giving theoretical advantages for hemostasis. We compared TM with LM shears for laparoscopic cholecystectomy.

Methods: During 2003-2006, 91 patients undergoing elective laparoscopic cholecystectomy were pre-operatively randomised to either TM or LM shears. Operations were performed by a standard technique, with routine intra-operative cholangiography. Intra-operative events, such as failure in hemostasis and time taken for dissecting the gallbladder off the liver bed, were recorded. Post-operatively, a sample of



suctioned fluid was analysed for hemoglobin concentration [Hb]. Intra-operative blood loss was estimated by volume of suctioned fluid x [Hb]fluid / [Hb]blood. Mann-Whitney U Test and Fisher's Exact Test were used for statistical analyses.

Results: There were 21 men and 70 women, median age 51 years (range 18-81). Forty-five patients were randomized to TM shears and 46 patients to LM shears. Median intra-operative blood loss was 5.0 ml (IQR 1.4-15.1) with TM shears and 10.5 ml (IQR 2.6-27.4) with LM shears, $p = 0.19$. Median gallbladder dissection time was similar in both groups (15 min, IQR 10-27 vs. 19 min, IQR 10.5-29, $p = 0.45$). Other modalities of hemostasis (Surgicel or electrocautery) were required on 6 patients in the TM group compared with 10 patients in the LM group, $p = 0.41$. One patient in the LM group developed post-operative hemoperitoneum that required urgent laparoscopic re-exploration. There were no other major vascular, biliary or enteric complications. **Conclusion:** TM ultrasonic shears appear to be as effective as shears that utilize LM vibration. Blood loss in the TM group was half of that in the LM group. The results support the theoretical advantages of TM ultrasonic shears for hemostasis although statistical significance was not reached in this study.

Hepatobiliary/Pancreatic Surgery – P402

HAS THE MANAGEMENT OF GALLSTONE ILEUS CHANGED IN THE LAPAROSCOPIC ERA?, Benjamin L Clapp MD, Lizbeth Alarcon-Bernes MD, Morris Franklin MD, The University of Texas Health Sciences Center at Houston and the Texas Endosurgery Institute

Introduction: Gallstone ileus is a rare cause of small bowel obstruction in the elderly. We report two cases of gallstone ileus that were managed laparoscopically. With the advent of laparoscopic management of bowel obstruction becoming commonplace, should we change our management of gallstone ileus? We review the management in the pre-laparoscopic and current eras.

Case Series: We report the successful laparoscopic management of complete bowel obstructions in a 69 year old female and a 65 year old female, both with gallstone ileus.

Discussion: Older surgical literature indicates that a patient with gallstone ileus should be managed by laparotomy with enterotomy and removal of the offending gallstone or by segmental bowel resection. With the advent of laparoscopic surgery, multiple reports have illustrated the safety and efficacy of a laparoscopic approach.

Conclusion: Gallstone ileus is a rare cause of intestinal obstruction. The diagnosis of gallstone ileus should be entertained in the elderly. Laparoscopic management of gallstone ileus is feasible and safe in the hemodynamically stable patient and should be the preferred approach.

Hepatobiliary/Pancreatic Surgery – P403

LAPAROSCOPIC RFA IN THE COMMUNITY SETTING., M S Cohen DO, M E Arregui MD, Dept. of General Surgery St. Vincent Medical Center Indianapolis,

Purpose: To describe our experience with the efficacy of Laparoscopic Radiofrequency Ablation (LRFA) of hepatic malignancies in the community setting.

Methods: Data from 36 consecutive patients with hepatic malignancies from Sept. 1999 to May 2006 were retrospectively reviewed and compared with the literature to evaluate failure patterns, morbidity/mortality rates, and progression free survival. 19 male and 17 female patients from a single surgical service had laparoscopic ultrasound guided RFA. The number of lesions, size, and pathology, were compared. Patients were followed to assess treatment response, recurrence and complications. A literature search of Medline from 1999-2006 was performed to gather comparable studies.

Results: LRFA was used to treat lesions in all liver segments comprising 228 lesions in 36 patients. One patient had LRFA combined with open resection. The median lesion diameter was 2.5 cm (.5-13cm). Our average number of lesions per pt was 4.3(1-26). 29 (80.5%) patients had metastatic lesions. Of these 21 (72.4%) were colorectal cancer, 3 (10%) endocrine

cancer, 2 (6.8%) lung cancer, 1 (3.4%) duodenal cancer, 1 (3.4%) cervical cancer, and 1 (3.4%) was from a duodenal GIST. 7 (19%) patients had primary hepatic malignancy. 3(8.3%) patients suffered complications. This is compared to the 8.9% rate in a large meta-analysis of 95 published series. Success was defined as: 1.) Ablation of all visualized tumor at the time of surgery, and 2.) Findings at 6 month imaging (CT and or PET) confirming complete necrosis of target lesions. We report 28/36 patients had successful eradication of disease by LRFA. Of the remainder; 3 (8.3%) were lost to follow up, 1 (2.7%) developed extra-hepatic malignancy, 2 (5.5%) developed local recurrence, and 3 (8.3%) had a staged ablation of multiple lesions over several months. Our local recurrence rate per patient was 1(5.8%) for colorectal cancer and 4 (14%) overall measured at 12 months. This compares well with the 3.3-39 % recurrence rates of series with similar heterogeneous patients. At 12 months, 12/27 (44%) patients had no new lesions. At 18 months, 7/27 (26%) had no new lesions. At 24 months, 3/27 (11%) had no new lesions. 8 (29%) patients had a second RFA for new hepatic lesions. Of these, 2 were also for local recurrence. Of those having a second RFA, 7 survived for >24 months. 3 (11%) patients went on to a third RFA for new hepatic lesions, of these 1 also had local recurrence, and all survived for 12 or more months after third RFA. 19/36 (52%) remain alive, average survival is 21 months (1-72).

Conclusion: LRFA can be applied successfully in the community setting with results that compare favorably to published studies from university settings.

Hepatobiliary/Pancreatic Surgery – P404

LCBDE LESS RISKY TO PANCREAS THAN ERCP, Donald E Wenner MD, Jason M Degani MS, Paul R Whitwam MD, David M Turner MD, James C Rosser MD, Huining Kang PhD, Eastern New Mexico Medical Center, Center for Ambulatory Surgery and Endoscopy, University of New Mexico School of Medicine

Objectives: This study was undertaken to evaluate the safety and efficacy of LCBDE compared to ERCP. Special focus was placed on the post-operative incidence of pancreatitis after LCBDE in order to demonstrate that the procedure is less likely than ERCP to cause pancreatitis and associated morbidity and mortality.

Methods and Procedures: A comprehensive chart review was conducted on 129 consecutive patients undergoing LCBDE. The surgeons in this study are all proficient at LCBDE using a 2.8mm flexible choledochoscope and a multiple-channel instrument guide. Data on complication rates, morbidity, and mortality were analyzed for statistical significance. Clinical evidence and laboratory results including pre and post-operative amylase levels were analyzed to evaluate for the incidence of pancreatitis caused by the LCBDE procedure.

Results: No cases of clinical pancreatitis developed in any of these patients after the LCBDE procedure. The post LCBDE amylase was significantly lower than the pre-LCBDE amylase. 1 case of post-LCBDE pancreatitis was identified using diagnostic guidelines of serum amylase above 3 times normal, for a total incidence of 0.8% (95% confidence interval 0.02%-4.56%). This incidence is significantly less than the 7% incidence reported for ERCP (p -value = 0.0016).

Successful stone clearance was accomplished in 96% ($n=124$) of cases. 19 patients presented with gall stone pancreatitis prior to the LCBDE procedure. In none of these patients was the post LCBDE amylase level > pre op level. Major complications included a 2.3% incidence of bile leakage ($n=3$) and a 1.6% incidence of infection of a drain site ($n=2$). There was no mortality in this study.

Conclusions: LCBDE is found to be superior to ERCP in terms of complication rates, particularly that of post-operative pancreatitis. Because of the morbidity and mortality associated with pancreatitis, we conclude that LCBDE should be further investigated as a viable and potentially safer approach to the remediation of choledocholithiasis.



SAGES POSTER ABSTRACTS

Hepatobiliary/Pancreatic Surgery – P405

GALLBLADDER POLYPS: ULTRASOUND VERSUS PATHOLOGY REPORT CORRELATION., SERGIO DIAZ MD, CARLOS A LOPERA MD, ROGELIO MATA LLANA MD, JUAN D MARTINEZ MD, CAROLINA BRAVO MD, MAURICIO MORENO MD, INSTITUTO DE CIENCIAS DE LA SALUD CES. PROFAMILIA CLINIC.

When laparoscopic cholecystectomy (LC) is indicated for gallbladder polyps (GP) found on ultrasound (US), at the time of surgery a different diagnosis is frequently made. Since the decision to operate depends on the US findings we wanted to assess the accuracy of US for diagnosing GP. We retrospectively compared the results of preoperative US with those of the pathology report for patients undergoing LC. Between January 2004 and June 2005, 338 patients had LC at our institution. 228 patients were female and 50 were male. Indication for surgery was cholelithiasis in 95.3%, polyps in 3.3% and functional disorders in 1.4%. Among 11 patients diagnosed with gallbladder polyps on ultrasound only 1 was confirmed at pathology (3.3% vs 0.3%), five other patients diagnosed preoperatively only as cholelithiasis actually had polyps in the pathology report. The sensitivity and specificity of US for the diagnosis of GP was 16.7% and 97.8% respectively (PPV: 9.1% CI: 0.6-37.7 NPV: 98.5% CI: 96.7-99.4). We conclude that despite being an excellent tool for diagnosing cholelithiasis, US alone is not acceptable for GP because of its low sensitivity. Other diagnostic approaches are suggested

Hepatobiliary/Pancreatic Surgery – P406

EVALUATION OF POSITIVE PRESSURE PNEUMOPERITONEUM EFFECT ON LIVER ENZYMES FOLLOWING ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY, Arieh Eitan MD, Alexander Weiar MD, Amitai Bickel MD, Department of Surgery (1) and Urology (2), Western Galilee Hospital, Nahariya, Israel, and the Faculty of Medicine, Technion, Israel Institute of Technology, Haifa, Israel.

Background: Laparoscopic operations are usually associated with cardiovascular changes, as well as visceral perfusion, mainly attributed to the effects of CO₂ pneumoperitoneum (pp). Studies made on a small number of patients have demonstrated significant modifications in liver function tests (LFT) following laparoscopic cholecystectomy. According to our experience, those findings were not confirmed.

Aim: To assess prospectively LFT in large group of patients undergoing laparoscopic cholecystectomy.

Patients and methods: During a 7-year period (1999-2005), 1720 patients were scheduled for laparoscopic cholecystectomy. In 1190 of them (study group), the surgery was elective. Exclusion criteria for that group included acute cholecystitis, acute pancreatitis, pre-operative ERCP, and LFT abnormalities. The remaining 530 patients underwent surgery for acute cholecystitis. Liver function tests were evaluated preoperatively and 20-24 hours postoperatively. The patients underwent surgery in the supine reverse-Trendelenburg position, and the intra-abdominal PP pressure was set on 14 mmHg.

Results: The mean value of liver function tests and amylase were within normal limits, and did not increase significantly post-operatively (LDH: 237.7 to 281 IU; ALT: 37.6 to 39.6; AST: 44.8 to 45.1; T.Bilirubin: 0.65 to 0.54; Gamma GGT: 24.3 to 23.5 Alk. Phos: 55.2 to 55.5; Amylase: 48.9 to 48.1 IU). We observed post-operative mild enzyme increase in 40 patients (1 to 3 enzymes in each, 3.36%), only in 5 of whom, choledocholithiasis were found.

Conclusions: In contrary to previously published data, we have validated, in light of our large prospective study, that induction of CO₂ PP dose not deranged liver function enzyme functions. We suggest that liver enzymes will not serve as an indicator to adverse effects following PP induction. We concluded that the routine post-operative examination of LFT (in order to exclude choledocholithiasis etc.) is unnecessary, following elective and uncomplicated laparoscopic cholecystectomy.

Hepatobiliary/Pancreatic Surgery – P407

TRANSPERITONEAL VERSUS TRANSHEPATIC PERCUTANEOUS CHOLECYSTOSTOMY AS A NON-SURGICAL TREATMENT FOR ACUTE CHOLECYSTITIS, Arieh Eitan BA, Norman Loberant BA, Y Notes BA, Amitai Bickel MD, Department of Surgery and Invasive Radiology, Western Galilee Hospital, Nahariya, Rappaport Faculty of Medicine, Technion, Israel Institute of Technology, Haifa, Israel

Introduction: Percutaneous cholecystostomy (PC) has become an accepted procedure in patients with acute cholecystitis who are not candidates for cholecystectomy. The procedure is performed under local anesthesia under image guidance.

Objective: To determine whether there is any difference in clinical outcome of gallbladder drainage based on anatomic approach to the gallbladder, that is, transhepatic versus transperitoneal.

Patients and Methods: Our study enrolled 132 patients who underwent PC for acute cholecystitis, as a temporary or permanent substitution to surgery, from January 1995 to December 2004. The patients were divided into two matched groups.

Results: Regarding hospital course, there were 7 deaths in the transperitoneal group and 5 deaths in the transhepatic PC group, due to the patient's underlying condition (superimposed sepsis and multi-organ failure) and not attributed to PC. Mean time from PC to hospital discharge was 9 days in the transhepatic group and 7 days in the transperitoneal group (P=0.055). Fluoroscopic examination following placement of the catheter revealed similar percentages of contrast leaks. One patient in each group had clinical evidence of localized bile leak with peritoneal irritation. Clinical improvement following PC was noted in 92% of the transperitoneal group and 88% of the transhepatic group.

Conclusion: We found no significant difference between our two study groups concerning complication rate, mortality and clinical sequela. We conclude that the transperitoneal route for PC is at least as safe as the transhepatic route. The physician who performs PC should base his decision on the anatomic route according to his personal experience and the patients' medical condition.

Hepatobiliary/Pancreatic Surgery – P408

CONVERSION IN LAPAROSCOPIC CHOLECYSTECTOMY AFTER GASTRIC RESECTION: A 15 YEAR REVIEW, Kathy Hsu, MD C/O: Shannon A Fraser MD, Harvey Sigman MD, Sir Mortimer B. Davis Jewish General Hospital, McGill University

Background: Gastrectomy or truncal vagotomy is known to increase the incidence of cholelithiasis. Many of these patients will become symptomatic and the adhesions from their gastric resection may make laparoscopic cholecystectomy much more difficult.

Methods: We prospectively assessed the data for the 15 year cumulative laparoscopic cholecystectomy experience of one surgeon at a university teaching hospital with respect to conversion and post operative outcomes, with particular attention to patients having had previous gastric resection.

Results: Patients with previous gastrectomy had similar operative times (81.1 (45-120) minutes), a significantly higher conversion rate (64.2%, p < 0.01) and a significantly higher complication rate (35.7%, p < 0.05) than those patients who had had other previous upper abdominal surgery (73.2 (35-130) minutes, 25%, and 11.3% respectively) and those without previous abdominal surgery (66.5 (25-250) minutes, 2.7% and 4.5% respectively).

Conclusion: Pre-operative knowledge of the increased conversion rate and increased morbidity will inform surgical planning for both the surgeon and the patient.



Hepatobiliary/Pancreatic Surgery – P409

ONE HAND LIVER HANGING METHOD: AN EFFECTIVE TECHNIQUE TO CREATE A GOOD VISUAL FIELD IN THE LAPAROSCOPIC HEPATECTOMY, FUMIHIKO FUJITA

MD, Mitsuhsu Takatsuki MD, Susumu Eguchi MD, Hirota Tokai MD, Yuichiro Ito MD, Noritsugu Tsuneoka MD, Tamotsu Kuroki MD, Yoshitsugu Tajima MD, Takashi Kanematsu MD, Department of Surgery, Nagasaki University Graduate School of Biomedical Sciences

Introduction: Unlike laparoscopic cholecystectomy, laparoscopic hepatectomy has not been widely accepted because of its technical difficulties sometimes caused by intraoperative bleeding or poor visualization. To overwhelm these intraoperative troubles, we need to contrive some method to create a good view during the operation.

Objective: We propose our normal technique, one hand liver hanging method (OHLH), which can create a good visualization on a transection plane of the liver parenchyma during laparoscopic hepatectomy.

Patients: From January 1996 to June 2005, there were 10 laparoscopic hepatectomies for treatment of primary and metastatic neoplasm of liver carried out at our large community of teaching hospital. Eight out of the 10 patients had tumors located in left lateral segment, while the others had in lower segment of the right lobe.

Operative methods and results: Laparoscopic left lateral segmentectomy using OHLH was carried out in 4 patients. We usually use 4 or 5 trocars inserted into the insufflated abdominal cavity. In the beginning, the location of tumors is confirmed by laparoscopic ultrasonography, and the transecting line is decided and previously marked on the surface of the liver. After dividing the falciform ligament, a small hole is made on the coronary ligament that is located on the extended transecting line. A tape that one side was fixed on the abdominal wall is passed through the divided coronary ligament and positioned behind the posterior surface of the lateral segment. The hepatic parenchymal dissection begins with pulling up the other end of the tape by one hand. This technique plays an important role in lifting the liver to be resected. None of the patients required blood transfusion during or after the operation. The operative margin was negative in all patients and there was no operative mortality and morbidity.

Conclusion: Our OHLH method, using a tape which lifts the liver to be resected, provided better exposure, resulting in easy control of bleeding of the transection surface at the deep parenchyma of the liver. OHLH is a useful and effective technique in laparoscopic left lateral segmentectomy.

Hepatobiliary/Pancreatic Surgery – P410

THE PRESENT SITUATION OF LAPAROSCOPIC SURGERY FOR PANCREATIC DISEASE IN OUR INSTITUTION, SHOJI FUKUYAMA MD, KAZUHIKO SHIBUYA MD, MAKOTO SATO MD, SHIN-ICHI EGAWA MD, MICHIAKI UNNO MD, TOHOKU UNIVERSITY GRADUATE SCHOOL OF MEDICINE

[Background] Recently, indications of laparoscopic surgery have been spreading for various kinds of diseases. However, the number of laparoscopic surgery for pancreatic disease is still remarkably low compared to other abdominal diseases. The reason is considered that anatomy of the pancreas is rather complicated and highly trained surgeons are required to perform these operations because of the technical difficulties. We report summary of 17 cases of laparoscopic surgery for pancreatic disease that we experienced.

[Patient] From May 1998 to May 2006, a total of 17 patients underwent laparoscopic surgery for pancreatic disease at Tohoku University Hospital. Information regarding patient characteristics, preoperative workup, operative technique, complications, specimen features and clinical follow-up was collected and analyzed.

[Result] Of the 17 patients, 7 underwent enucleation, 4 underwent distal pancreatectomy (DP), 2 underwent cyst-gastrostomy (CG) and 4 underwent cystjejunostomy (CJ). The mean operation time was 339 minutes for enucleation, 322 minutes for DP, 322 minutes for CG and 203 minutes for CJ. Complications were 4 pancreatic fistulae and 1 postoper-

ative hemorrhage. Mean hospital stay was 27 days for enucleation, 19 days for DP and 19 days for CG and CJ.

[Conclusion] The operation time with complicated procedure tends to be longer, but regarding hospital stay, there is no difference among these operations. We will continue to perform laparoscopic surgery for pancreatic disease in order to collect the data and to confirm the safety and validity of these operations.

Hepatobiliary/Pancreatic Surgery – P411

LAPAROSCOPIC DISTAL PANCREATECTOMY, K FURUTA PhD, K TABASHI PhD, H KATGIRI PhD, K ISHII PhD, H TAKAHASHI PhD, M WATANABE PhD, Department of Surgery, KITASATO UNIVERSITY

INTRODUCTION: A laparoscopic approach to pancreatic disease is increasingly performed although its ultimate benefit is yet to be confirmed. Laparoscopic distal pancreatectomy with or without splenectomy is gradually gaining acceptance as an alternative to open resection in selected patients. The aim of this study is to report our initial institution experience with laparoscopic distal pancreatectomy in 13 patients.

METHODS: A retrospective review of database was carried out. From July.2004- September.2006, We performed 13 distal pancreatectomies by the laparoscopic approach. These 13 patients were included in the study with varyingly pre-operative diagnosis such as neuroendocrine tumors (4 patients), cystic lesions (5 patients), IPMT (3 patients), pancreatic cancer suspected tumor (1 patient). The median age was 63 years (33-74) with a female to male ratio of 5:8. In addition to 3 port, a hand port was placed in the midline to aid in dissection and the pancreas was divided with an endoscopic linear stapler.

RESULTS: Of the 13 patients, two were converted to an open procedure due to an uncertain adhesion and inadequate exposure.

The median operating time was 205 minutes (150-280) with a tumor size of 5cm (0.5-8).

The median time to resuming regular diet and converting to oral pain medications was 2.5 days and 4 days respectively. The length of stay was 10 days (5-15). These were no mortalities. Of the 9 patients that successfully underwent the procedure laparoscopically, and these were no morbidities.

With a median follow up of 13.0 months (1-20), 5 patients with a diagnosis of malignancy have no evidence of recurrent disease.

CONCLUSIONS: A minimally invasive approach to pancreatic disease is safe and technically feasible with acceptable morbidity. Further large series studies with longer follow up are necessary to determine the role of laparoscopic surgery in the treatment algorithm of management of pancreatic disease.

And endoscopic linear staplers were feasible and safe for pancreatic resection.

Hepatobiliary/Pancreatic Surgery – P412

IATROGENIC COMPLICATIONS DURING LAPAROSCOPIC CHOLECISTECTOMY AND SIMULTANEOUS ERCP: THE SAFETY OF THE RENDEZ-VOUS PROCEDURE IN 74 CONSECUTIVE CASES, La Greca Gaetano PhD, Di Blasi Michele MD, Barbagallo Francesco MD, Sofia Maria MD, Gagliardo Salvina MD, Latteri Saverio MD, Lombardo Rosario MD, Russello Domenico MD, Department of Surgical Sciences, Transplantation and Advanced Technologies, University of Catania, Cannizzaro Hospital, Via Messina 829, Catania 95126. Italy

Background: The management of patients affected by gallstones and common bile duct stones is still a challenge as there are different successful available options. An alternative to both sequential approach or totally laparoscopic treatments consists of the simultaneous laparo-endoscopic "Rendez-Vous" (RV) procedure which combines laparoscopic cholecystectomy, intra-operative cholangiography and endoscopic common bile duct clearance.

Method: The authors report their experience with the "Rendez-vous" in a group of 74 consecutive patients. The



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relevant technical features and the results concerning the effectiveness and the incidence of complications are analyzed especially concerning the incidence of post-procedural pancreatic damage directly related to intraoperative ERCP, ES and CBD clearance monitoring postoperatively amylase and lipase levels.

Results: The RV procedure was feasible in 72 patients (97,2%). The effectiveness of the procedure was 100% concerning the clearance of CBD. Minor morbidity affected 2,7% of the patients. The mean duration of the intra-operative endoscopic procedures was 16 minutes. Only one case of minor intra-operative complication occurred. 7 patients (9,4%) had increase of amylase levels after the RV but only (5,4%) had a pathologic increase. The main cause of pathologic increase of amylase levels was the retrograde transpapillary injection of the contrast medium. The mean postoperative hospital stay was 3.3 days. All the patients were symptoms free up to last 6 month's follow-up. Only in one patient (1,6%) an asymptomatic recurrence of a common bile duct stone was diagnosed

Conclusions: This collaboration between endoscopist and surgeons for the simultaneous laparo-endoscopic RV approach is related to a very high effectiveness that seems to be better than those reported in the literature for the other available treatment's options. This high effectiveness and the related low morbidity and the data form the literature suggests that the procedure is also extremely safe and therefore. The main factor of iatrogenic pancreatic damage evidenced as hyperamylasemia is strictly and significantly related to retrograde injection of the contrast medium that should anyway avoided. If the mandatory collaboration between surgeons and endoscopists is guaranteed, it can be an useful option for the patient, the surgeon, the endoscopist and the hospital.

Hepatobiliary/Pancreatic Surgery – P413

LAPAROSCOPIC CHOLECYSTECTOMY FOR SYMPTOMATIC BILIARY HYPERKINESIA, Reza A Gamagami MD, Silver Cross Hospital, Joliet, IL

Background: This study aimed to evaluate the pathologic and clinical outcome of patients with symptomatic biliary hyperkinesia, defined as the presence of classic biliary colic symptoms, without evidence of cholelithiasis with CCK-HIDA>75% following laparoscopic cholecystectomy.

Methods: Retrospective review of 1024 patients who underwent cholecystectomy by a single surgeon between 2000-2006, identified 20 patients with CCK-HIDA>75%. Follow up for symptom improvement was assessed by telephone interview. Pathology specimens were reviewed.

Results: Follow up was achieved in all patients. Mean follow up was 16 months with a range of 1 month to 33 months. 17 patients (85%) were improved or cured. In 2 of 3 patients who failed to improve, no reproduction of symptoms occurred at the time of CCK-HIDA, and histopathology revealed normal gallbladder findings. Pathology demonstrated chronic cholecystitis in 17 (85%), cholelithiasis in 1 (5%) and normal finding in 3 (15%).

Conclusion: Patients presenting with classic biliary colic in presence of normal gallbladder ultrasound with CCK-HIDA>75% with reproduction of symptoms should be considered for laparoscopic cholecystectomy. Improvement and cure can be achieved in at least 85% of patients.

Hepatobiliary/Pancreatic Surgery – P414

LAPAROSCOPIC CHOLECYSTECTOMY USING HARMONIC: NOT ONLY CLIPLESS, Roberta Gelmini MD, Alessia Andreotti MD, Chiara Franzoni MD, Nicola Quaranta MD, Massimo Saviano MD, Dept. of Surgery - University of Modena and Reggio Emilia - Italy

Background: Laparoscopic cholecystectomy is the gold standard treatment of gallstones. The ultrasonically activated scalpel (Harmonic Scalpel - Ethicon) may be used as sole instrument for both gallbladder dissection and section of cystic artery and duct with no need of further ligatures.

Methods: In a series of 30 consecutive patients, laparoscopic cholecystectomy was performed with Harmonic as sole instrument for dissection and section of cystic artery and

duct. In 4 patients an additional cystic duct ligature with clips was performed because of the large size of the duct (3 cases of associated common bile duct stones and 1 of gallbladder empyema). There were 20 females and 10 males and we have employed a four trocars technique. Indications were as follows: 17 simple gallstones, 3 common bile duct stones, 8 acute cholecystitis and 2 gallbladder empyema. In 8 cases associated procedures were performed.

Results: The mean operative time was of 72 minutes, intra-operative cholangiography was performed in 4 cases and common bile duct exploration in 3. A drainage was left in 16 patients. There were no conversions. No patients developed postoperative complications and the mean postoperative hospital stay was of 2,1 days.

Conclusions: Laparoscopic cholecystectomy performed with ultrasonically activated scalpel is feasible and effective. The advantages are represented by using a unique instrument both for dissection of the gallbladder from the hepatic bed and division of artery and duct. Furthermore, because of the minimal thermal dispersion, the use of Harmonic reduces the risk of injuries. The main limit of the procedure is represented by the cystic duct size: if more than 5 mm in diameter an additional ligature is necessary.

Hepatobiliary/Pancreatic Surgery – P415

LAPAROSCOPIC CHOLECYSTECTOMY (LC) FOR THE PATIENTS WITH ACUTE BILIARY PANCREATITIS, Ke Gong MD, Wenyue Zhang, Beijing Shijitan Hospital

Background: The treatment of acute biliary pancreatitis is still a subject of debate. Objective: The aim of this study was to evaluate the feasibility and the right time of LC for treatment of the patients with acute biliary pancreatitis.

Methods: A retrospective analysis of 21 patients with acute biliary pancreatitis who underwent LC between January 1999 and August 2003 was performed. Data collection included pre-operative, intra-operative and post-operative.

Results: Among the total 21 patients, 12 males and 9 females underwent LC surgery. They had a mean age of 61 years (range 28-76). All patients had a gallstone history. 12 patients were first acute biliary pancreatitis attack and the others were second or more third attack. All patients had abdominal pain, nausea, vomit, fever and 9 patients with jaundice. The serum and uric amylase of 21 patients were increased respectively 603.3 (+/°C) 451.34(IU/L)(Normal 80°C220 IU/L), 1933.4 (+/°C) 145.8(IU/L) (Normal 100°C1000 IU/L). The serum ALT of 18 patients were 111.1 (+/°C) 37.2(IU/L)(Normal 45 IU/L); The serum AST of 15 patients were 77.7 (+/°C) 14.5(IU/L) (Normal 35 IU/L); The serum TBIL of 11 patients were 41.7 (+/°C) 9.5 (u mol/L) (Normal 17u mol/L), the serum DBIL of these patients were 25.3 (+/°C) 5.8 (u mol/L) (Normal 11 u mol/L); Ultrasound or CT scan showed gallstone in all patients and pancreatic swell in 18 patients when all patients had an acute biliary pancreatitis attack. 21 cases underwent LC successfully and 11 cases were put the abdominal drainage after the patients had acute biliary pancreatitis 20 °C 40 day. The mean operative time was 70min (45min °C 120min). The amount of intra-operative bleeding was 60ml (30ml °C 200ml). 19 cases recovered without any complication. Two cases had acute biliary pancreatitis again after LC and were cured by medicine soon. The mean overall period of hospitalization was 7 days.

Conclusions: LC is feasible and safe for the patients with acute biliary pancreatitis. The right operative time is between 20 to 40 day following an attack of acute biliary pancreatitis, the serum amylase, ALT, AST and TBIL level are approximately normal and no common bile duct stone has been showed by ultrasound or CT scan.

Hepatobiliary/Pancreatic Surgery – P416

LAPAROSCOPIC LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA, Ho-Seong Han, Yoo-Seok Yoon, Department of Surgery, Seoul National University College of Medicine, Seoul, Korea

Aim: The aim of this study is to evaluate the role of laparoscopic liver resection in the treatment of HCC by reviewing our experiences of laparoscopic resection for HCC.

Methods: We retrospectively analyzed the clinical outcomes of 21 patients who had undergone laparoscopic liver resection for HCC among 70 cases of laparoscopic liver resection between May 2003 and February 2006.

Results: The patients were composed of 19 men and 2 women, with a mean age of 59.3 years. Operation procedure included 13 cases of tumorectomy, 3 cases of left lateral sectionectomy, 2 cases of left hepatectomy, 3 cases of right posterior sectionectomy, and 1 cases of right hepatectomy. Mean size of tumors was 2.9 cm, and mean distance of safety margin was 1.3 cm. Intraoperative transfusion was needed in 6 patients (28.6%) with a mean amount of 1.3 units. Mean postoperative hospital stay was 11.9 days. Postoperative complications developed in 6 cases (28.6%), all of which was improved by conservative management. However, there was no postoperative mortality. Recurrence was detected in 5 cases (19.0%) after a mean period of 13.5 months from operation, of which 3 cases had multiple recurrences.

Conclusion: Our experiences confirmed that laparoscopic resection for HCC was an effective and safe treatment. Therefore laparoscopic liver resection, although its long term results are necessary, is expected to be a useful treatment modality for HCC in terms that it is less invasive than open liver resection and offers complete removal of the lesion compared to non-operative managements.

Hepatobiliary/Pancreatic Surgery – P417

LAPAROSCOPIC ROUX-EN-Y CHOLEDOCHOJEJUNOSTOMY IN BENIGN BILIARY DISEASE, Ho-Seong Han MD, Yoo-Seok Yoon MD, Kwang-Sik Chun MD, Department of Surgery, Seoul National University College of Medicine, Seoul, Korea

Aim: Laparoscopic bilio-enteric bypass has been mainly performed as cholecystojejunostomy or choledochoduodenostomy. However, due to technical difficulties, few reports on laparoscopic Roux-en-Y choledochojejunostomy (LRYCJ) have been documented. Herein we present our experiences for LRYCJ for benign biliary disease.

Methods: We retrospectively analyzed the clinical outcome of 19 patients with benign biliary disease who had undergone LRYCJ in Seoul National University Bundang Hospital and Ewha Womans University Mokdong Hospital from February 1997 to June 2006. Except two laparoscopic assisted cases, all procedures were performed with totally laparoscopic methods.

Results: Indications were choledochal cyst in eleven patients, recurrent CBD stone in six and benign CBD stricture in two. The patients comprised nine men and ten women, with a mean age of 45 years. Mean operation time was 328.4 minutes. In one patient with type IVa choledochal cyst, laparoscopic left hemihepatectomy was done simultaneously. Postoperative complications occurred in 3 cases, including aspiration pneumonia, bile leakage and intraabdominal bleeding. Mean hospital stay was 10.8 days. After a mean follow-up duration of 27.5 months, three patients developed the anastomotic stricture, which were managed by radiologic intervention in two patients and revision of anastomosis in one patient.

Conclusion: Our experiences indicate that LRYCJ can be a feasible option in the treatment of the benign biliary disease, but more accumulation of data may be needed for evaluation of long-term outcome.

Hepatobiliary/Pancreatic Surgery – P418

LAPAROSCOPIC DISTAL PANCREATECTOMY WITH AN ATTEMPT TO PRESERVE SPLEEN AND ITS VESSELS, Ho-Seong Han MD, Yoo-Seok Yoon MD, Kwang-Sik Chun MD, Department of Surgery, Seoul National University College of Medicine, Seoul, Korea

Aims: Although an increasing number of reports on laparoscopic distal pancreatectomy for benign and borderline malignancy in the pancreas have recently been documented, it has not achieved worldwide acceptance yet. The aim of this study is to analyze our experiences of laparoscopic distal pancreatectomy and evaluate its usefulness.

Methods: Twenty-four patients underwent laparoscopic dis-

tal pancreatectomy from May 2000 to June 2006 by one surgeon team in Seoul National University Bundang Hospital and Ewha Womans University Mokdong Hospital. The preservation of splenic vessels and spleen was tried unless the tumor was very close to splenic vessels or malignancy was suspected in preoperative radiologic studies. We retrospectively analyzed of the clinical outcome of these 24 patients.

Results: There were eight men and sixteen women, with a mean age of 46.3 years. Indications were eighteen cystic neoplasm, two pseudocyst, two islet cell tumor, one lymphoepithelial cyst and one traumatic laceration. There was no conversion to open surgery. Splenic vessels and spleen were successfully preserved in twenty cases (83.3%). The mean operation time was 265.8 minutes and transfusion was not necessary. Mean size of the lesion was 4.4cm. Postoperative complications occurred in 5 cases (20.8%), including 3 intraabdominal fluid collections, 1 pancreatic fistula and 1 pleural effusion, which were improved by conservative management. The mean hospital stay was 10.9 days. **Conclusion:** Our experiences show that laparoscopic distal pancreatectomy is a relatively safe and useful option in the treatment of the benign or borderline malignant pancreatic disease.

Hepatobiliary/Pancreatic Surgery – P419

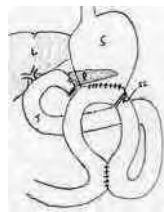
AN ALTERNATIVE RECONSTRUCTION AFTER PANCREATICOUDENECTOMY, Michael G Wayne DO, Irving A Jorge MD, Cabrini Medical Center

Pancreaticoduodenectomy is the procedure of choice for tumors of the head of the pancreas and periampullary tumors. Despite advances in both surgical technique and postoperative care, the procedure continues to carry a high morbidity rate. One of the most common morbidities is delayed gastric emptying (DGE) with rates of 15-40%. We decided to alter our reconstruction, due to 2 cases of prolonged DGE attempting to avoid this complication. All patients underwent a classic pancreaticoduodenectomy with an undivided roux-en-y technique used for reconstruction.

Methods We reviewed the charts of our last 13 Whipple procedures and evaluated them for complications, looking specifically for DGE. We compared this to our control group of 15 Whipple's performed with the standard reconstruction.

Results: There were no cases of delayed gastric emptying (0%). There was 1 wound infection (8%), 1 case of pneumonia (8%), and 1 case of bleeding from the gastrojejunal staple line (8%). The operative mortality was 0%.

Conclusions: Use of the undivided roux-en-y technique for reconstruction after Whipple procedure may decrease the incidence of DGE. It also has the added benefit of eliminating bile reflux gastritis.



Hepatobiliary/Pancreatic Surgery – P420

PREOPERATIVE EVALUATION OF THE CALOT TRIANGLE ANATOMY WITH THE 3-DIMENSIONAL CT IMAGE OF CHOLANGIOGRAM AND ANGIOGRAM COMPLEX (3D-DIC-CT-A) FOR THE SAFE LAPAROSCOPIC

CHOLECYSTECTOMY, Minoru Kakihara MD, Eiichi Sugasawa MD, Yoshiki Kajiwara MD, Yoshitaka Kiyota MD, Toshimichi Takigawa MD, Taichi Satou MD, Kiyoshi Nishiyama MD, Hideki Asakawa MD, Kazuo Hatsuse MD, Hidetaka Mochizuki MD, Department of Surgery, National Defense Medical College, Japan.

Introduction: Laparoscopic cholecystectomy is less invasive procedure than open cholecystectomy. But there still remain some complications such as injury to arteries and biliary



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systems. Especially, in cases with chronic fibrous inflammation, safe dissection and clear exposure at the Calot triangle is difficult, although it is essential for cholecystectomy. For the sake, we have been trying to figure out clear 3 dimensional (3D) images of the Calot triangle by 3D-DIC-CT-A pre-operatively.

Materials and Methods: For three months from June to August in 2006, we have succeeded to construct 3D images in 9 cases (5 cases without inflammation, 4 cases with chronic cholecystitis). Just after the drip infusion cholangiography (DIC), patients are transferred to the CT room. 3D-DIC-CT-A had been taken as follows; The applied CT system is AquilionTM 64 multislice CT (Toshiba Medical systems, 64-row Quantum detector). The software to make images is ZIOSTATION (ZIOSOFT, INC.).

The scan protocol is as follows; Pipe voltage is 120 KV and electric current is 400 mA. Turn speed of a signal bridge is 1 round per minute by 0.5 seconds, and photography condition is 64 lines of collection in 0.5 mm slice. For reconstruction, the image slice thickness is 0.5mm with reconfiguration space of 0.3mm, and quantum denoising filter is Toshiba original which reconfiguration function (factor) is 11. Contrasting procedure is as follows; as a vasodilatation agent, 2ml of alprostadiol (Palux inj.) is injected and contrasting is started 30 second later. A hundred ml of lomeprol (lomeron350) is injected 4ml/second as the contrast media, and 30ml of omophagia water is injected afterwards. ROI (region of interest) is set in the celiac artery and start photography 8 seconds after CT value reaches 120 HU.

Results: Cystic arteries and biliary systems at the Calot triangle were clearly identified in both groups in 3D images, and they were safely divided and clipped without any injuries even in the group with chronic inflammation.

Conclusions: Preoperative evaluation of arteries and biliary systems at the Calot triangle by 3D-DIC-CT-A is effective especially in cases with complicated chronic fibrous change.

Hepatobiliary/Pancreatic Surgery – P421

URGENT CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS? SHOULD THIS BE PERFORMED BY SPECIALIST CENTRES ONLY? Jim Khan, Ian Nordon, Saboor Ghauri MD, Charles Ranaboldo MD, Nicholas Carty MD, Salisbury District Hospital, Salisbury, UK

Introduction: Laparoscopic cholecystectomy has become the gold standard for treatment of symptomatic gall stone disease. However it place remains controversial in the management of acute cholecystitis due to a high reported incidence of bile leaks and conversion rate. Tertiary referral centres have reported good results. We present a series of cases after the introduction of an urgent cholecystectomy pathway in a district general hospital.

Methods: A practice of urgent cholecystectomy for acute cholecystitis was introduced by three consultant general surgeons. All prospective patients having an urgent laparoscopic cholecystectomy for acute cholecystitis, over a twelve month period were entered into a database. A dedicated ultrasound service was instituted to provide prompt diagnosis in these patients. Their demographic details, operative findings, laboratory results were recorded. Timing of ERCP, post operative complications and conversion rate and hospital stay were also noted.

Results: There were 64 patients in the study with a median age of 51 years (range 21-84). There were 27 males and 37 females. 03 patients had obstructive jaundice on admission. 11 patients had a pre op ERCP and 03 patients had on-table cholangiogram. There were no conversions. Post op ERCP was required in 06 patients. The median time interval between admission and operation was 3.5 days (range 2-7). There were 03 bile leaks but no CBD injury. There were no wound infections. One patient required re-operation for small bowel obstruction secondary to a port site hernia.

Conclusion: Urgent Laparoscopic Cholecystectomy for acute cholecystitis is a feasible treatment option in a DGH. A safe practice can be ensured by adherence to a care pathway and a multidisciplinary consultant delivered service. Urgent cholecystectomy service can be provided safely in a DGH with outcomes comparable to previously published literature.

Hepatobiliary/Pancreatic Surgery – P422

LAPAROSCOPIC SPLEEN-PRESERVING DISTAL PANCREATCTOMY FOR MUCINOUS CYSTIC NEOPLASM, Kee-Hwan Kim MD, Sang-Kwon Lee MD, Ji-Il Kim MD, Chang-Hyoek An MD, Jeong-Soo Kim MD, Keun-Woo Lim MD, Eung-Kook Kim MD, Department of Surgery, Uijeongbu St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Korea.

BACKGROUND: After splenectomy, many complications may occur. For example, there are changes in the peripheral blood count, infection, sepsis and even death. Therefore, many surgeons are attempting preservation of spleen in the lesion of distal pancreas during operation. Here, we described one case of a laparoscopic spleen-preserving distal pancreatectomy for mucinous cystic neoplasm. With increased familiarity with the laparoscopic anatomy of the pancreas and advances in minimally invasive techniques, surgeons have ventured further to operate on technically difficult cases such as pancreas cystic tumor that were until recently managed by laparotomy.

PATIENTS AND METHODS: We present our experience with one woman aged 34 years with cystic mass in the tail of the pancreas (about 4x4 cm) that was performed spleen-preserving laparoscopic distal pancreatectomy that preserved splenic vessels and hence splenic function.

RESULTS: The pathology was reported that the pancreatic mass was mucinous cystic neoplasm and the patient had an uneventful recovery, with no major morbidity. She was discharged by the 9th postoperative day.

CONCLUSION: Laparoscopic resection of pancreatic cystic neoplasm in adult patient is feasible. We feel that there is a considerable learning curve with the technique. Although long-term data are lack, we report that laparoscopic spleen-preserving distal pancreatectomy for mucinous cystic neoplasm may prevent complications of splenectomy and is safe and less invasive.

Hepatobiliary/Pancreatic Surgery – P423

LAPAROSCOPIC CHOLECYSTECTOMY BY COMBINED METHOD, Fumito Kuranishi PhD, Yoshinori Kuroda PhD, Toshio Noriyuki PhD, Masahiro Nakahara PhD, Toshikatsu Fukuda PhD, Yasuyo Ishizaki PhD, Yasuo Kawaguchi MD, Ryuichi Hotta MD, Etsushi Akimoto, MD, ONOMICHI GENERAL HOSPITAL

INTRODUCTION We have introduced laparoscopic cholecystectomy (LC) from 1992, and performed it about 900 cases. At the beginning, we have adopted pneumoperitoneum (8 mmHg, 8 liter/min), we have started combined method (pneumoperitoneum : 4 mmHg, 4 liter/min and abdominal wall lifting method) from 1993. Combined method -@enables to perform LC by low pressure. From the standpoint of body temperature (BT) we report the effect of combined method.

METHOD & OBJECT LC was undertaken in 879 patients from 1992 to 2005. We reviewed retrospectively these patients. We exclude 28 cases underwent combined operation (mastectomy etc.), 52 cases (open conversion), 18 cases (complication). We couldn't confirm the BT of 22 cases, so we also exclude them. BT change between pre and post operation was confirmed from the record of anesthesia. We divided them into three groups, BT increasing group A, BT no change group B and BT decreasing group C.

RESULT Between three groups (A, B & C) there was no significant difference about first walking, first flatus, intestinal murmur, first stool, laboratory data (WBC, CRP), pain killer usage, post operative hospital stay and oral intake. However in the Group C the degree of BT decrease showed significant difference between pneumoperitoneum (0.567 ± 0.33 ??) and combined method (0.447 ± 0.29 ??) (P < 0.01).

CONCLUSION Physiologically speaking post operative high BT may be better. No remarkable effect of post operative BT change was seen. This study suggest that from the standpoint of BT change, combined method is useful to lower the stress of long time operation, not only LC but also another laparoscopic surgery.

Hepatobiliary/Pancreatic Surgery – P424

ENDOSCOPIC ULTRASOUND EVALUATION OF PERI-AMPULLARY NEOPLASMS PREDICTS RESECTABILITY,

Margaret Lauerman BS, Mary DiGiorgi MPH, Aliye Bill BA, Stavros Stavropoulos MD, Peter Stevens MD, Beth Schrope MD, John Chabot MD, John Allendorf MD, Department of Surgery, Columbia University College of Physicians and Surgeons

Introduction: Endoscopic ultrasound (EUS) is frequently used preoperatively to evaluate the relationship of peri-ampullary malignancies to the mesenteric vessels and portal vein prior to surgical resection, and this study was conducted to evaluate the currently unclear role of EUS in a surgically eligible population. Our institution offers concomitant vascular resection during pancreatotomy, enabling us to compare EUS to intraoperative findings with respect to vascular invasion.

Methods and Procedures: Operative reports, EUS reports, and hospital records of all patients undergoing attempted resection of periampullary neoplasms at our institution over a three year period were reviewed, with vascular invasion status assessed both radiologically and intraoperatively. Patients that did not undergo surgical exploration were excluded. Fifty-seven patients were identified as eligible.

Results: The positive predictive value, negative predictive value, sensitivity, specificity, and accuracy were 55%, 83%, 43%, 88% and 77%, respectively for predicting vascular involvement, and 40%, 88%, 44%, 86% and 79%, respectively for determining the need for vascular resection.

Conclusions: EUS is an excellent pre-operative evaluation for excluding vascular invasion and identifying a majority of patients who do not necessitate vascular resection. This information facilitates preoperative planning and patient counseling at centers that offer concomitant vascular resection with pancreatotomy. Furthermore, EUS findings, in isolation, are inadequate to declare patients with periampullary lesions unresectable.

Hepatobiliary/Pancreatic Surgery – P425

SAFETY AND OUTCOMES OF 2 MM LAPAROSCOPIC CHOLECYSTECTOMY IN 837 CASES; THE NEXT EVOLUTION IN LAPAROSCOPIC CHOLECYSTECTOMY,

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Introduction: Cholecystectomy has advanced from primarily an open procedure to one that is primarily performed laparoscopically. The next step in the evolution of this procedure is diminishing the number and size of ports used. Just as with the last evolution, this one must occur without increased risks to the patient. This study of laparoscopic cholecystectomy (LC) compares operative time, length of stay, complications, conversions from two 2mm ports to adding a third 2 mm port, and conversion of 2 mm ports to larger ports.

Methods: This single surgeon cohort study includes consecutive LC's using 5 and 10 mm ports (Group I, 8/15/1990-6/30/1996) compared to consecutive LC's using 2 mm instrument ports (Group II, 7/1/1996-8/17/06). In both groups a 10 mm peri-umbilical camera port was used. Patient demographics, clinical characteristics and outcomes were collected prospectively and supplemented by medical record review for missing data.

Results: There were 279 patients in Group I and 837 patients in Group II. Group I patients were older (age 56 ± 18 vs. 53 ± 18 , $P = 0.008$), less likely to be obese (BMI 26.9 ± 5.5 vs. 29.2 ± 13.3 , $P=0.01$), less likely to have gallstone pancreatitis (1.8% vs. 5.3%, $P=0.01$), less likely to have common bile duct stones (0% vs. 2.5%, $P=0.008$) and had longer pre-operative length of stay (1.8 ± 5.3 vs. 1.0 ± 3 days, $P=0.002$) than group II patients. The two groups were not significantly different by gender (58% vs. 62% female, $P=0.21$), presence of cirrhosis (0.4% vs. 1.8%, $P=0.08$) or perforation of a gangrenous gallbladder (0% vs. 0.4%, $P=0.25$). There were 2 conversions to open cholecystectomy in group I (0.7% vs

0%, $P=0.06$). In 802 Group II patients with available port size data 262 (32.7%) were started and finished with two 2 mm ports, 336 (41.9%) required a third 2mm port, and a 5mm port was added or replaced a 2 mm port in 204 (25.4%). Operative time was not different (Group I 72 ± 61 minutes vs. 67 ± 44 minutes, $P=0.14$). Post-op length of stay was shorter in Group II (Group I 2.5 ± 3.5 days vs. 1.1 ± 3.2 days, $P<0.01$). There was no difference in procedure-related complications (Group I 3.1% vs. 3.2%, $P=0.92$). Non-procedure-related major complications were less frequent in Group II (0.8% vs. 2.5%, $P=0.03$). There were 2 deaths in Group I and none in Group II (0.7% vs. 0%, $P=0.06$).

Conclusions: LC with 2 mm instrument ports is safe and effective compared to LC using 2 or 3 larger (5 mm and 10 mm) instrument ports.

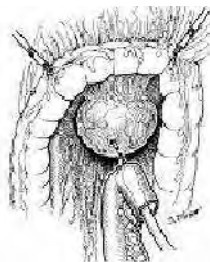
Hepatobiliary/Pancreatic Surgery – P426

LAPAROSCOPIC ROUX-EN-Y CYSTOJEJUNOSTOMY USING

A CIRCULAR STAPLER - A NOVEL TECHNIQUE,

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Background: Pancreatic pseudocysts are seen in up to 10% of patients after an episode of acute pancreatitis. Surgical management is the mainstay of treatment for pancreatic pseudocysts. Minimally invasive surgical management ranges from endoscopic therapy to laparoscopic drainage. Methods: 49 year old male with a 12.2 x 20 cm pancreatic pseudocyst underwent Roux-en-Y cystojejunostomy utilizing a 22 mm circular stapled anastomosis.



Results: The pseudocyst was successfully drained laparoscopically. There was one minor (UTI) postoperative complication. The patient was discharged home on POD 5. Repeat CT scan 4 months postoperatively showed complete resolution of the pancreatic pseudocyst.

Conclusions: Laparoscopic Roux-en-Y cystojejunostomy using a circular stapling device is a safe alternative for minimally invasive surgical management of pancreatic pseudocysts.

Hepatobiliary/Pancreatic Surgery – P427

LEAKS FOLLOWING LAPAROSCOPIC CHOLECYSTECTOMY,

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INTRODUCTION/OBJECTIVES: Laparoscopic cholecystectomy is the most common surgical procedures performed in the US. Bile leaks remain a significant cause of morbidity for patients undergoing this procedure. The aim of this study is to determine the incidence and sites of leaks after laparoscopic cholecystectomy

METHOD: Retrospective review of all laparoscopic cholecystectomy performed at our institution from January 2000 to August 2006.

RESULTS: Laparoscopic cholecystectomy was performed in 2936 patients with a leak rate of 0.5% (15 leaks /2936). The male to female ratio was 1:2. Most leaks occurred from the cystic duct stump (53%). Other sites of leaks were duct of Luschka (33%) while 13% were unspecified. Patients with leaks from duct of Luschka presented within the first 4 days after surgery while those with leaks from the cystic stump tend to present after the fourth post operative day. Patients with leaks and significant collection were discharged earlier when drained surgically than by CT guidance.

CONCLUSION: With increasing laparoscopic experience, leaks after laparoscopic cholecystectomy occur more from



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the cystic duct and duct of Luscka than from the CBD injury. Operative drainage of significant bile collection may be associated with shorter hospital stay than CT guided drainage

Hepatobiliary/Pancreatic Surgery – P428

LAPAROSCOPIC CBD EXPLORATION WITHOUT T-TUBE, I.S. Choi PhD, C.H. Park MD, Y.M. Ra MD, D.K. Go MD, D.S. Yoon MD, W.J. Choi MD, Department of Surgery, Konyang University Hospital

Purpose : Many modalities of common bile duct stones (CBDS) management evolved greatly for the past three decades. Among these techniques, Laparoscopic common bile duct exploration (LCBDE) is feasible and is becoming popular. LCBDE has traditionally been accompanied by T-tube drainage which has a 4.7-17.5% morbidity rate and increases hospital stay. Avoidance of T-tube drainage therefore should advantageously contribute to the ideal approach for LCBDE. Herein we are reporting the clinical outcomes in 57 patients who had undergone LCBDE without T-tube placement.

Methods : Patients with dilated ductal systems exceeding 10mm in diameter or with CBD stones larger than 10mm in diameter or patients who had failed treatment by EST were the indications for LCBDE in this study. Between March 2001 and August 2006, 57 patients with CBDS underwent this approach. The age ranges from 57 to 87 years with an average of 71 years in 23 males and 34 females. One via a trans-cystic and the other 56 patients via a transductal (via choledochotomy) approach was undertaken. In choledochotomy group, we adopted internal endobiliary stents in 18 patients and performed primary closure for choledochotomy. The other 38 patients who had external drainage such as, endoscopic nasobiliary drainage (ENBD), percutaneous transhepatic biliary drainage (PTBD), were treated by LCBDE with primary closure. Each patient selected by the criteria above underwent LCBDE without T-tube drainage and their clinical outcomes, operating time, the duration before diet start, hospital days and complications were analyzed.

Results : Because of impacted large CBDS and biliary stricture, there were 4 cases (7.0%) of open conversion. The mean operating time was 135 minutes (65~290 min.). The mean time to diet and hospital stay were 1.9 and 8.1 days. The rate of successful stone removal was 97.8%. The complication rate was 8.7% and there were no mortalities. In all, there was 5 complications included two pleural effusions, one subhepatic seroma, one retained stone and one bile leakage.

Conclusion : LCBDE without T-tube is a safe and feasible technique. Further study and assessment of internal endobiliary stents should be warranted.

Hepatobiliary/Pancreatic Surgery – P429

LAPAROSCOPIC CBD EXPLORATION WITH A LITTLE HELP FROM UROLOGISTS, Sonali P Rao MS, Prashanth P Rao MS, P P Rao, Mamata Hospital And Research Centre, Mumbai, India

Introduction: Single-stage laparoscopic treatment for patients with cholelithiasis and choledocholithiasis has gained wide acceptance because of the advantages offered in terms of improved patient comfort, reduced hospital stay and lower costs. Primary closure of the CBD over a biliary endoprosthesis further adds to these advantages and should be performed where feasible. We present some novel techniques of CBD exploration and closure using instruments at hand.

Methods: 45 patients over a six-year period underwent laparoscopic common bile duct exploration (LCBDE) for choledocholithiasis demonstrated preoperatively or intraoperatively. Various endoscopic instruments were used to visualize and extract the stones. These were a rigid ureteroscope, a flexible ureteroscope, a 5mm telescope along the side of a suction cannula and a standard flexible videocholedochoscope. Closure of the CBD was performed over a T-

tube in the initial 5 cases. A laparoscopic bilio-enteric bypass was performed for one patient with a 30 mm CBD stone and a 20 mm CBD. In one patient the CBD was closed primarily without any stenting. In the remaining 38 cases, the CBD was sutured over a double-pigtailed stent (6F and 16cm) used commonly in urological procedures. The stents were placed using a glide wire under fluoroscopic guidance with the proximal end in the common hepatic duct and distal end in the duodenum.

Results: With regard to the CBD exploration, complete stone clearance was achieved in 43 of 45 patients. Of the two patients with retained stones, one was treated by post-operative ERCP and the other by relaparoscopy, stone removal and closure over a T-tube. With regard to the methods used for biliary decompression, the D-J stent was found to be easy to insert and worked effectively with lower morbidity than a T-tube. In 32 patients, the stent was passed spontaneously with a mean time of 9 days. In 6 patients the stents had not passed by six weeks and were removed endoscopically.

Conclusion: LCBDE can be performed with a variety of endoscopic instruments. The lack of a sophisticated flexible videocholedochoscope need not necessarily be a deterrent to performing this procedure. Biliary decompression can be effectively achieved with a simple D-J stent which is inexpensive, avoids the morbidity of a T-tube and in most cases does away with the need for endoscopic removal.

Hepatobiliary/Pancreatic Surgery – P430

LATERAL DISSECTION TECHNIQUE: TOWARDS SAFER LAPAROSCOPIC CHOLECYSTECTOMY, Ibrahim A Salama MD, Hesham M Abdeldayem MD, Mahmed A Abuoshady MD, Samy a kashkosh MD, Amr mostufa MD, Steven D Schwaitzberg MD, Amr M Helmy MD, Department of Hepatobiliary surgery, National Liver Institute, Menouphya University, Shubin Elkom, Egypt 1Department of surgery, Cambridge Health Alliance, Cambridge, MA .

Background: Laparoscopic Cholecystectomy has been quickly accepted worldwide. However, the incidence of bile duct injuries seem to be high.

OBJECTIVE: to evaluate the efficacy and safety of lateral dissection technique during laparoscopic cholecystectomy.

METHODS: Between 1 October 1995 and 30 September 2005. 1.645 laparoscopic cholecystectomies were performed in National Liver Institute and Mahmoud hospital by using lateral Dissection technique. Keeping close to gall bladder wall, dissection start at a safety zone identified at the lateral edge of the gall bladder neck. The peritoneum at the lateral Side of Hartman pouch is opened from above down to the junction with the cyst duct. The base of the gall bladder is freed off the liver bed until a window above the hepatic pedicle is opened. Then with minimal dissection the cystic artery and the cystic duct are clipped.

RESULTS: Out of 1.645 cases of laparoscopic cholecystectomies performed by lateral dissection techniques there were no mortality. 279 cases (16.9%) were acute cholecystitis Eight (0.48%) had significant bile leak (5 from cystic duct stump and 3 from accessory duct at the liver bed) 2 managed conservatively, 3 treated by endoscopic stenting and surgery was mandatory in 3 cases. Intraoperative Cholangiography (IOC) was performed in 213(12.9%). Missed CBD stones in 4 cases (0.24%) all successfully treated endoscopically. There were no bile duct injuries among our series. Port site hernia in 11 cases (0.66%). Port site wound infection in 18 cases (1.09%). Hospitals stay (1-12 days). Four cases (0.24%) were converted to open (2 had severe adhesions and inflammation and 2 had intraoperative bleeding).

CONCLUSION: improving the safety of laparoscopic cholecystectomy can be achieved by starting dissection at a safety zone lateral to edge of the gall bladder with minimum dissection at triangle of Calot (Dangerous zone).

Key words: Lateral dissection- Safety zone-Laparoscopic cholecystectomy



Hepatobiliary/Pancreatic Surgery – P431

TIMING OF CHOLECYSTECTOMY AFTER ENDOSCOPIC SPHINCTEROTOMY FOR COMMON BILE DUCT STONES, A.H.W. Schiphorst MD, M.G.H. Besselink MD, D. Boerma PhD, R. Timmer PhD, M.J. Wiersema PhD, K.J. van Erpecum PhD, B. van Ramshorst PhD, St Antonius Hospital, Nieuwegein, the Netherlands

Introduction The goal of this study was to determine whether in patients with combined cholecystocholelithiasis, the timing of laparoscopic cholecystectomy (LC) after endoscopic sphincterotomy (ES), does affect the outcome of LC. According to the literature, conversion rate of LC after ES is as high as 20%, at least when performed after 6-8 weeks. It is hypothesized that early planned LC after ES reduces recurrent biliary symptoms and conversion rate.

Methods All patients who underwent LC after ES between 2001 and 2004 were evaluated. Recurrent biliary symptoms during waiting time for LC, conversion rate, postoperative complications and hospital stay were documented. Data were analyzed using the Student's t-test.

Results 167 consecutive patients (M:F=59:108, median age 54 years) were analyzed. The median interval between ES and LC was 7 weeks (IQR 2-13 weeks). During waiting time for LC, 33 patients (20%) had recurrent biliary symptoms. These consisted of cholecystitis (n=18, 11%), recurrent choledocholithiasis (n=9, 5%), cholangitis (n=4, 2%) and biliary pancreatitis (n=2, 1%). 15 of these patients underwent a second ERC. Median time between ES and development of recurrent complaints was 22 days (IQR 8-47 days). 76% of the biliary complications occurred more than 1 week after ES. Conversion to open cholecystectomy occurred in 13% of all patients. However in patients with recurrent complaints during the waiting period, conversion rate was 21% (versus 10% in uncomplicated patients; p=0.048). This concurred with a significant longer hospital stay (median 4 versus 2 days, p<0.001).

Conclusion In this study, during the waiting period for cholecystectomy after ES, 20% of all patients had recurrent biliary complaints. These recurrent complaints are associated with second ERC, a higher conversion rate and a significantly longer hospital stay. Presumably, earlier surgery after ES can prevent these negative results. A prospective randomized clinical trial has been initiated.

Hepatobiliary/Pancreatic Surgery – P432

LAPAROSCOPIC TREATMENT OF PANCREATIC TUMORS: A SINGLE-CENTER EXPERIENCE IN BRAZIL, Antonio L Macedo MD, Aureo L De Paula PhD, Vladimir Schraibman MD, Jaques Pinus MD, Albert Einstein Hospital, Brazil

The increasingly widespread use of minimally invasive surgery has allowed surgeons to exploit this approach for complex procedures, such as pancreatic resections, though its actual role outside simple operations remains debated. The purpose of this study was to evaluate the outcomes and feasibility of laparoscopic pancreatic surgery.

This is a study of 9 consecutive patients, 5 men and 4 women, with pancreatic tumors who were treated at our institution from 2004 to July 2006. All patients presented US, CT scan or MRI showing a pancreatic tumor and were good candidates for laparoscopic surgery. Preoperative diagnostic work-up, operating time, postoperative complication rate, length of hospital stay and clinical outcome were assessed.

RESULTS: Successful laparoscopic resection was performed in all patients: 9 distal pancreatectomies, among these latter 5 had spleen-preserving distal pancreatectomy. In 1 case a hand assisted port was used to close the main pancreatic duct. Mean operative time was 170 minutes. The median tumor size was 18 mm, and comprised: 3 mucinous neoplasms with free margins, 3 serous cystadenomas and 3 neuroendocrine tumors. Four complications were observed in this group (local non-infected collections) and the median hospital stay was 8 days. One patient died after 1 month due to an extensive bleeding from the gastroduodenal artery.

CONCLUSIONS: Laparoscopic approach proved to be feasible and safe, although the average operative time was longer and demanded good surgical skills as well as precise localization of the tumor and definition of its nature. Tumors located in the body or tail of the pancreas that are benign in nature can better benefit of laparoscopic approach.

Hepatobiliary/Pancreatic Surgery – P433

EXPERIENCE WITH NEEDLESCOPIC CHOLECYSTECTOMY IN 145 PATIENTS, Masashi Tachibana MD, Nobumi Tagaya PhD, Akihito Abe MD, Keiichi Kubota PhD, Second Department of Surgery, Dokkyo Medical University, Tochigi, Japan

Background: Laparoscopic cholecystectomy with needle-scope instruments has progressed. However, this refinement has several limitations to perform surgical procedure. We performed a consecutive study to evaluate the feasibility and safety of needlescopic cholecystectomy.

Materials and Methods: For 8 years we performed needlescopic cholecystectomy in 145 patients of cholecystolithiasis, gallbladder polyp or acalculus cholecystitis. There were 58 men and 87 women with a mean age of 51.8 years (range: 27-79). After creation of pneumoperitoneum, three 2-mm or 3-mm ports were placed at the right upper quadrant and one 12-mm port at the umbilicus. The operation was performed in two manners. The operator manipulated dissecting forceps, electrocautery, clipping, cutting and intraoperative cholangiography (IOC) in the left hand and 2-mm needlescope in the right hand during all procedures. The assistant manipulated two grasping forceps from the right subcostal ports. In the other, the operator manipulated two dissecting or grasping forceps under 10-mm laparoscope. The assistant manipulated grasping forceps from the right subcostal port and 10-mm laparoscope from the umbilical port. When performing clipping or cutting of cystic duct and artery, IOC and removal of gallbladder, 2-mm needlescope is moved from the umbilical port to the epigastric port. We evaluated the feasibility and safety of needlescope or fine-caliber instruments from operative results

Results: IOC was successfully performed in all patients. The conversion to standard laparoscopic cholecystectomy was required in 8 patients (5.5%) due to the difficulty of continuing procedure. The conversion to open laparotomy was required in one patient (0.7%) due to the existence of aberrant bile duct. The mean operative time was 88 min and postoperative hospital stay was 5.3 days. Postoperative complication was an intra-abdominal abscess in one patient requiring long postoperative hospital stay. No other major intra and postoperative complications were found.

Conclusion: The use of needlescope and fine-caliber instruments was feasible and safe to perform laparoscopic cholecystectomies with low morbidity and no mortality.

Hepatobiliary/Pancreatic Surgery – P434

INTERNAL BILIARY DRAINAGE; CHOLEDOCHODUODENOSTOMY OR SPHINCTEROPLASTY? Safwan A Taha MD, Hashim S Khayat MD, Akram A Hasan MD, University of Basrah College of Medicine

Objectives: Internal biliary drainage is the safety escape route that can save the day in a lot of biliary problems culminating in common bile duct (CBD) obstruction. This is a prospective study that was carried out to compare the two surgical alternatives to endoscopic sphincterotomy (ES) for CBD obstruction, namely choledochoduodenostomy and sphincteroplasty, where ES is unavailable, like it is here in IRAQ.

Methods and procedures: The study group involved 85 patients who were operated on by a team of three surgeons. All the operations entailed CBD exploration along with an additional drainage procedure. Patients were divided into two groups according to the type of drainage procedure: The first, sphincteroplasty, group (42 patients) and the second, Choledochoduodenostomy, group (43 patients). The explorations were carried out through either subcostal or right paramedian incisions. The former was primarily used for choledochoduodenostomy and the latter for transduode-



nal sphincteroplasty. Patients were followed up for 6 months postoperatively. The outcome was compared, in relation to each procedure, with regards to the postoperative course and its complications notably wound infection, pancreatitis and bile leak.

Results: Indications for drainage in the sphincteroplasty group were CBD stones, some of which presented with jaundice and/or cholangitis, dilated CBD, biliary-cutaneous fistula (consequent upon previous surgery), intrabiliary rupture of hepatic hydatid cysts and ampullary stenosis. In the Choledochoduodenostomy group, drainage was performed for CBD stones, with/without jaundice, dilated CBD, cholangitis, intrabiliary rupture of hepatic hydatid cysts and tumor of the pancreas. Wound infection occurred in 6 patients in the sphincteroplasty group (14.8%) compared to 3 (7%) in the Choledochoduodenostomy group. T-tubes were used in 11 patients, exclusively in the choledochoduodenostomy group, still, not a single case of pancreatitis was reported. The same observation was made regarding mortality. On the other hand, biliary leak occurred in 5 patients, all in the Choledochoduodenostomy group. It closed spontaneously with conservative treatment in 3 of them while the other 2 required re-exploration. One of them unfortunately died later.

Conclusion: In our experience, sphincteroplasty improves the postoperative course and gives fewer complications, notably with bile leak and is, therefore, preferred to choledochoduodenostomy.

Hepatobiliary/Pancreatic Surgery – P435

HAND-ASSISTED LAPAROSCOPIC SPLEEN-PRESERVING DISTAL PANCREATECTOMY, Kyoichi Takaori MD, Nobuhiko Tanigawa MD, Tomoyuki Agui MD, Mitsuhiko Iwamoto MD, Yoshiharu Miyamoto MD, Dept of Gastroenterological Surgery, Osaka Medical College

[Background] Benign or non-invasive lesions in the body-tail of the pancreas appear favorable indication for laparoscopic distal pancreatectomy. However, some cystic lesions of the pancreas, typically mucinous cystic neoplasms, are so large that it is difficult to handle these tumors by purely laparoscopic approach. We carried out hand-assisted laparoscopic spleen-preserving distal pancreatectomy (HALSPDP) in two young women with large cystic lesions of the pancreas. [Case No. 1] A woman in her twenties presented with a cystic lesions measuring 7cm in the pancreatic tail on CT. A diagnosis of mucinous cystic neoplasm was made and she underwent HALSPDP. A 7.5-cm midline incision was made and a hand port was inserted. One 12-mm trocar and two 5-mm trocars were placed. Dissection was carried out with LigaSure. The pancreas was transected with ENDO-GIA. Splenic artery and vein were preserved. Operative time was 300 min and estimated blood loss was 250 ml. [Case No. 2] A woman in her twenties suffered from upper abdominal pain after menstruation period. CT, MRI and ultrasound revealed a large cystic lesion measuring 12 cm in the body-tail of the pancreas. With a suspected diagnosis of endometriotic cyst, HALSPDP was indicated. A 7.5-cm transverse incision was made in the upper abdomen and a hand port was inserted. Three 5-mm trocars were placed and a 5-mm laparoscope was used. The pancreatic neck was transected with TL-60 through the hand-port wound. Splenic artery was preserved while splenic vein was resected en bloc because the cystic lesion adhered to adjacent tissues including the splenic vein. Operative time was 495 min and estimated blood loss was 650 ml. Postoperative course was uneventful without complication.

[Conclusion] HALSPDP was practicable in patients with large cystic lesions of the pancreas, who were satisfied with better cosmetic outcome as compared to open surgery.

Hepatobiliary/Pancreatic Surgery – P436

LAPAROSCOPIC SEGMENT III LIVER RESECTION FOR ISOLATED COLORECTAL METASTASIS: A DESCRIPTION OF TECHNIQUE, Janos Taller MD, Brett Langenberg DO, Jay Grove MD, Gordon Wisbach MD, Department of Surgery, Naval Medical Center, San Diego

Laparoscopic surgery is increasingly a viable approach for the treatment of both benign & malignant hepatic lesions. While the majority of studies have come from European institutions, publications from US centers are increasing. The objective of this case report is to demonstrate the feasibility and safety of a totally laparoscopic segmental liver resection at our institution.

Our patient is 64 y/o female with a T3N0M1 adenocarcinoma of the colon. 3 months prior to presentation, she underwent an open right colon resection for a cecal mass & core biopsy of a 2 cm solitary liver lesion. Her case was presented to our multidisciplinary tumor board which recommended segmental liver resection followed by adjuvant chemotherapy for best long-term survival. Pre-operative CT scan & PET imaging confirmed a single metastatic focus in segment III of the liver and the patient was offered a laparoscopic segment III liver resection.

In the supine position, pneumoperitoneum was achieved with Veress needle technique and insufflation pressure maintained at 12mmHg. 5 laparoscopic ports were placed. Moderate adhesiolysis & division of the falciform ligament were required to expose the upper abdominal field. Intraoperative US excluded any additional metastatic lesions. Electrocautery was used to score resection boundaries on the hepatic capsule and perform superficial parenchymal transection. Deeper dissection was completed by an ultrasonic dissector. Small biliary radicals and hepatic vessels were occluded with vascular clips while larger segmental hepatic veins were divided with an endoscopic stapler using 2.5mm loads. A portion of the anterior stomach, adherent to the tumor, was resected en bloc with the liver segment using the ultrasonic dissector. Operative time was 280 minutes and EBL was 250 mls. The patient was observed overnight in the ICU & transferred to the ward on POD#1. She was advanced to liquids on POD#3 & was discharged home on POD#5 tolerating a regular diet. There were no complications. Final pathology revealed complete excision of her metastasis with > 2cm margins.

Our report demonstrates that totally laparoscopic liver resection may be safely performed. While resection of left sided, small, peripheral lesions is technically easier to perform than right sided, larger lesions, continued development of technique will allow the application of laparoscopic resection to increasingly complex liver tumors. Further prospective evaluation is required.

Hepatobiliary/Pancreatic Surgery – P437

PANCREATIC FISTULA FOLLOWING LAPAROSCOPIC DISTAL PANCREATECTOMY- ENDOSTAPLER VERSUS SUTURE +/- FIBRIN SEALANT, craig j taylor MD, nicholas o'Rourke MD, leslie nathanson MD, george Hopkins MD, lan martin MD, laurent layani MD, michael ghusn MD, Royal Brisbane Hospital, Brisbane Queensland Australia

Background Pancreatic fistula (PF) is a frequent complication following laparoscopic distal pancreatectomy (LDP) that may be influenced by the management of the pancreatic stump. The ideal method of closing the pancreatic stump has not yet been determined.

Method The risk of PF according to various methods of stump closure was determined from a multi-centre retrospective study and a review of the published literature. Pancreatic fistula was defined as persistent lipase-rich drainage after 7 post-operative days, or the need for radiological drainage of a lipase-rich collection.

Results 46 consecutive LDP were performed between 1996 and 2006 in Brisbane Australia. The incidence PF following endostapled (30 cases) or sutured closure (16 cases) was 13% vs 19% respectively (p=0.43). The application of fibrin sealant to either the stapled (4) or sutured (8) stump, or oversewing the stapled stump (3), did not improve the risk



of PF (25%, 25%, 33% respectively). 13 papers involving 220 cases of LDP were identified from the literature. The overall incidence of PF was 15%, with a trend toward fewer leaks following stapled closure. A lack of consistency in PF definition was revealed and made comparison difficult.

Conclusion There is a trend toward fewer pancreatic fistula following stapled closure of the pancreatic stump in LDP. Fibrin sealant does not appear to confer additional benefit. A need exists for uniformity in the definition of PF when reporting results of LDP.

Hepatobiliary/Pancreatic Surgery – P438

EFFICACY OF FIBRIN SEALANT WITH OMENTAL PATCH IN DECREASING PANCREATIC FISTULA AFTER LAPAROSCOPIC DISTAL PANCREATECTOMY, Vic Velanovich MD, Ilan Rubinfeld MD, Henry Ford Hospital

Background: Both laparoscopic and open distal pancreatectomy have been plagued by pancreatic fistula despite different stump closure techniques. The purpose of this study was to determine if the use of a fibrin sealant with an omental patch will decrease pancreatic fistula formation after laparoscopic distal pancreatectomy.

Methods: Retrospective review of laparoscopic distal pancreatectomy patients treated with fibrin sealant and omental patch compared to historical controls. Patients who underwent laparoscopic distal pancreatectomy with treatment of the pancreatic stump with fibrin sealant and omental patch were compared to patients who did not receive such treatment. After completion of the resection, 5 cc of fibrin sealant was applied to the cut edge of the pancreatic remnant. Omentum was placed over the pancreatic remnant to adhere to the stump. A drain was placed over the omentum. CT scans were obtained on postoperative day #3 to determine if any fluid collection was present. A pancreatic leak was defined as any amylase-rich fluid found in the drain or a fluid collection next to the pancreatic stump.

Results: A total of 16 patients underwent laparoscopic distal pancreatectomy with fibrin sealant and omental patch, whereas 13 patients did not. There were no patients in the fibrin sealant group who developed a pancreatic leak, compare to 3 (23%) in the no sealant group (p=0.05)

Conclusion: Although retrospective using historical controls, this series suggests that the use of fibrin sealant may reduce the incidence of postoperative pancreatic leak after laparoscopic distal pancreatectomy.

Hepatobiliary/Pancreatic Surgery – P439

INCOMPLETE LAPAROSCOPIC CHOLECYSTECTOMY - A CAUSE OF CONCERN, Satpal S Virk, Sundip Sidhu, Ajit Sood, Dayanand Medical College & Hospital, Ludhiana, Punjab, India

During Laparoscopic Cholecystectomy (LC) stress is laid on the identification of cystic duct and infundibulum junction rather than on the junction of cystic duct and common bile duct, as was in open technique. This leads on inadvertent incomplete cholecystectomy which becomes symptomatic later.

We present five cases of incomplete cholecystectomies following LC. LC timing, presentation, investigations and demographic characteristics are given in the table.

Age/Sex	Interval	Presentation	Investigation
52/M	6 Years	Biliary colics	USG
60/M	3 Years	Biliary colics	CECT
45/F	2 Months	Jaundice	USG, ERCP
42/M	2 Years	Biliary Colics	USG
22/M	2 Days	Peritonitis	CECT

Clips far away from midline on the radiographs were seen. Three gall bladders were removed laparoscopically and in two patients by open technique because one had large associated bile duct stone and other was explored for pancreatic malignancy. Gall bladders were having well defined infundibulum and cystic duct. All patients had uneventful recovery. Histopathology revealed chronic cholecystitis except in one where it was xanthogranulomatous cholecystitis.

Staying away from common bile duct may reduce the incidence of bile duct injury but it may lead on to inadvertent incomplete cholecystectomy

Hepatobiliary/Pancreatic Surgery – P440

USE OF THE MULTIPLE INSTRUMENT GUIDE WITH 2.8 MM CHOLEDOCHOSCOPE TO REMEDIATE BILE DUCT STONES, Donald E Wenner MD, James C Rosser, Jr. MD, Paul R Whitwam MD, David M Turner MD, Jason M Degani MS, Roswell Regional Hospital, Eastern NM Medical Center

Objective: This study was designed to assess the use of the Multiple Instrument Guide and the 2.8 mm flexible choledochoscope in laparoscopic remediation of bile duct stones. The ultimate aim is to develop safe, practical and effective LCBDE techniques that are applicable to all cases of choledocholithiasis. A secondary objective was to evaluate the incidence of pancreatitis as a result of bile duct instrumentation following LCBDE.

Methods: All cases of choledocholithiasis that presented to our surgical team were addressed using laparoscopic techniques. The Multiple Instrument Guide and the 2.8 mm flexible choledochoscope were used in all but the simplest cases. Both trans-cystic duct and choledochotomy methods were used. Balloon catheters, stone baskets, and laser lithotripters were employed under choledochoscopic guidance.

Results: 101 patients with choledocholithiasis underwent LCBDE. In 45 patients trans-cystic techniques were used to clear stones from the bile duct and in 56 a choledochotomy technique was used. A trend toward greater success using trans-cystic techniques (63%) was observed in the second half of the study. 9 patients had a pre-operative ERCP, 4 of these patients had an intact gall bladder, and 5 had undergone previous LC. All of these cases were successfully cleared using laparoscopic techniques. 3 patients had retained stones after the LCBDE procedure for a success rate of 97%. No cases of pancreatitis resulting from the LCBDE procedure were identified on clinical grounds or by laboratory testing.

Conclusion: LC/LCBDE can successfully clear stones from the bile duct in virtually all cases, even those following unsuccessful ERCP and having previous LC. Pancreatitis as a result of the LCBDE procedure using these techniques was not observed. The Multiple Instrument guide and the 2.8 mm choledochoscope allow for a safe, practical and effective LCBDE procedure.

Hepatobiliary/Pancreatic Surgery – P441

THE RENDEZVOUS TECHNIQUE IN MANAGING CHOLEDOCHOLITHIASIS, Vaughn E Whittaker MD, Charles Fasanya MD, Sitaram Pillarisetty MD, College of Physicians and Surgeon Columbia University, Harlem

Common duct stones are present in 10-15% of patients having cholecystectomy. Common duct stones may be removed preoperatively by Endoscopic Retrograde Cholangiopancreatogram (ERCP) based on radiographic and biochemical evidence. Intra operative and post operative stone removal is possible by ERCP. We describe an intraoperative ERCP technique using the rendezvous method.

We report our experience using the technique over an eight (8) month period March 2005 to December 2005. Patients were selected based on preoperative biochemical and radiologic evidence confirming common duct stones. Others were selected based on cholangiogram demonstrating common duct stones. The ERCP was performed by a skilled surgical endoscopist (SP). Intraoperative Cholangiogram (IOC) was performed during Laparoscopic cholecystectomy (LC). If common duct stones were confirmed, we then passed a transcystic duct Glide® wire into the duodenum under fluoroscopic control. Duodenoscope was then passed into the duodenum and the guide wire exiting through the papilla was identified. Using the glide® wire localization an adequate sphincterotomy was performed and the stones were extracted from the common bile duct (CBD). We then irrigated the CBD with transcystic duct catheter and visualized the effluent endoscopically in the duodenum until the effluent was free of debris.

There were a total of eight (8) patients with six (6) undergoing laparoscopic cholecystectomy and two (2) having an



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open procedure. The patients had pathology varying from biliary pancreatitis two(2), common duct stones complicated by previous cholangitis one(1) and uncomplicated choledocholithiasis six(6). There was no failure of cannulation though one(1) case where the stone was impacted in the common duct required its opening and the guide wire passed through a choledochoscope.

In all cases the stones were removed and endoscopic sphincterotomy was achieved. The post operative course was uncomplicated during the immediate post operative period and several months after follow up. Common duct stones can be removed with a high degree of success by endoscopists skilled in performing ERCP intra operatively. The rendezvous technique can be performed both laparoscopically or open. Patients benefit from one procedure, though lengthened. It reduces the failure rate of stone extraction in ERCP. Surgeons are encouraged to learn ERCP.

Hepatobiliary/Pancreatic Surgery – P442

SIGNIFICANCE OF SONOGRAPHIC GALLBLADDER WALL THICKENING IN CHRONIC CHOLECYSTITIS, Howard

Youngworth MD, Adam Kopelan MD, Jeffery Laitin MD, Newark Beth Israel Medical Center, Newark, New Jersey.

Introduction: The purpose of this study is to evaluate if ultrasound (US) can accurately diagnose chronic cholecystitis (CC). Since the evolution of laparoscopic cholecystectomy, gallbladder (GB) surgery has become more prevalent with less complication. Hence, the US finding of GB wall thickening in CC maybe less evident as a consequence of this.

Methods: We retrospectively reviewed the medical, US and pathology reports of 62 patients who underwent cholecystectomy for biliary disease during a one year period.

Patients were excluded if US or pathology reports were not performed, incomplete or missing, contracted gallbladders, computerized tomography used instead of US, or cholecystectomy was performed for non-primary biliary disease. In addition, only those patients with pathologically proven cholecystitis were included in this study. Each case was reviewed based on pathological and US findings. GB walls greater than 0.3 cm on pathological reports was considered thickened. US wall thickening was graded as mild and moderate, corresponding to 0.4 - 0.5 cm and 0.5 - 0.6 cm, respectively. All ultrasounds were reviewed by two separate reviewers. Of the 62 patients initially reviewed, 39 patients met the criteria for the study.

Results: Of the 39 patients in the study, 82% had normal appearing gallbladder walls on US. Only 18% of the patients had thickened GB walls on US alone and 10% of the patients had GB walls greater than 3 mm on US and gross specimen.

Conclusion: This study demonstrates that US can not accurately diagnose CC. We found that only 18% of patients had GB wall thickening on US and only 57% of these patients had true GB wall thickening based on pathology. We attribute this discrepancy on 2 possible factors. One, the edema within the gallbladder could have leaked out prior to pathological examination. Or second, the time interval between US examination and cholecystectomy could have been enough to allow the regression of the GB wall due to resolving inflammation. Pathological evaluation of CC depends more on lymphocytes, plasma cell and macrophage infiltration, rather than GB wall thickness. GB wall thickness on US does not appear to be an accurate noninvasive technique for diagnosing patients with CC.

Hernia Surgery – P443

LAPAROSCOPIC TECHNIQUE OF MAYO'S REPAIR FOR VENTRAL HERNIA WITH MESHPLASTY, B B Agarwal, S

Agarwal, M K Gupta, V R Sagar, K C Mahajan, Sir Ganga Ram Hospital & Lady Hardinge Medical College, India

Objectives: Laparoscopic technique of Mayo's repair with meshplasty to decrease incidence of seroma formation

Method & procedures: Endoscopic surgery for ventral hernias has become a standard procedure. It now has universal acceptance except for a significant morbidity due to early or delayed seroma formation.

Seroma formation has been attributed to the redundant parietal tissues and the space left by the reduced hernial contents. Measures such as compression dressings; closure of the defect and obliteration of the space by tissue glues are being tried, with the compression to obliterate the space being most widely practiced. For the compression to be effective, a flat, solid contraposing structure is required, which can be provided by the musculofascial continuity obtained on closure of the defect. A transverse closure without any mass of strangulated tissues between the closing sutures is desirable which is easily achieved by double-breasted, 'pants over vest' repair. This principle first enunciated by Mayo in 1901 remains the gold standard for closure of ventral hernia defects till date. However Mayo's repair had high recurrence rates in open surgery hence we reinforced the repair with an onlay intraperitoneal mesh.

We have applied this principle to the endoscopic surgery for ventral hernias by closing the defect by Mayo's principle and reinforcing the repaired defect with an intraperitoneal onlay meshplasty. The sutures for Mayo's closure are passed through the lumen of a spinal needle placed transcutaneously through the margins of the defect. The suture thread is picked up by a loop made from thread passed through another spinal needle. Once all the sutures are passed, the double breasting is confirmed by the slide of the flaps in a 'pants over vest' manner as seen on endovision. The sutures are then tied and buried subcutaneously.

Results: 23 patients have undergone laparoscopic Mayo's repair with meshplasty. We have not encountered any patient with seroma formation during a minimum follow up of 4 months.

Conclusion: Laparoscopic technique of Mayo's repair for ventral hernia with meshplasty is safe and feasible means to improve the results specially seroma formation. We are following our patients for its any benefit on recurrence.

Hernia Surgery – P444

PROCESS IMPROVEMENT REDUCES INFECTION IN LAPAROSCOPIC VENTRAL HERNIA REPAIR, John D

Angstadt MD, Oliver Whipple MD, Memorial Health University Medical Center

Objective of the study: We have experienced some postoperative infection in our laparoscopic ventral hernia repairs with mesh. On March 1, 2005, our medical center implemented a process improvement program that streamlined preoperative antibiotic administration. The objective is to assess the impact of this program on infection rates following laparoscopic ventral hernia repair.

Methods and Procedures: This is a retrospective chart review of 144 laparoscopic ventral hernia repairs performed by a single surgeon between February 2002 and July 2006. All patients received the same preoperative antibiotic care and same postoperative care. All patients were followed in the surgeon's office after discharge. Infection was diagnosed with any erythema or induration over the seroma that required treatment. The process improvement program mandated a streamlined antibiotic administration process by the nurse anesthetist upon entering the OR room. For analysis procedures were separated into two groups: those procedures performed before March 1, 2005 and those procedures performed after March 1, 2005. Statistical analysis was performed with Fisher's t test.

Results: Eighty-four patients underwent surgery before March 1, 2005 and 60 patients underwent surgery after March 1, 2005.

	Pre-March	After March
Cases	84	60
Seromas	29 (30%)	16 (27%)
Infections	12 (14%)	2 (3%)

There was a statistically significant difference in infection rates ($p < 0.02$).

Conclusions: Preoperative antibiotic administration is widely accepted as appropriate for laparoscopic ventral hernia repair. The timing of administration is critical to insure proper blood levels of antibiotics. In our institution process improvement almost eliminated postoperative seroma infection following ventral hernia repair



Hernia Surgery – P445

LAPAROSCOPIC LUMBAR HERNIA REPAIR, Siddharth Bhende MD, Keyur Chavda MD, Ali Ghellai MD, Guthrie Clinic

Lumbar hernias are rare defects in the posterolateral abdominal wall that may be congenital or acquired. They can occur anywhere between the 12th rib and iliac crest. Many surgical techniques for repair of lumbar hernias have been described including primary repair, local tissue flaps and conventional open mesh repair. Despite the various available methods, no repair has been adopted as the most favorable surgical approach. The reasons for this include the difficulty in defining the fascial edges of the defect and weakness of surrounding tissue. Furthermore, the boundaries of lumbar hernias inevitably include a bony structure further contributing to the difficulty of the repair.

Laparoscopic lumbar hernia repair using a prosthetic mesh has become simple and logical by adopting maneuvers from the laparoscopic ventral hernia repair and modifying the technique to accommodate the anatomy of the lumbar hernia. Laparoscopy has afforded several advantages including reduced postoperative pain, decreased hospital stay and better cosmesis while accomplishing a complete reconstruction of the area.

We present a patient who underwent successful laparoscopic lumbar hernia repair with prosthetic mesh at a rural based community hospital. The patient had an uneventful postoperative course and was discharged on postoperative day two. Three month follow-up reveals the patient to be asymptomatic without any recurrence.

Hernia Surgery – P446

DIFFERENCES IN RECOVERY TIME AND POSTOPERATIVE PAIN AMONG HERNIA PATIENTS : A COMPARISON OF KEY-HOLE TYPES, ŞENOL CARILLI MD, BURCAK KABA OGLU MD, ZEYNEP DÖRTBUDAK* PhD, AYDIN ALPER MD, VKF AMERICAN HOSPITAL GENERAL SURGERY DEPARTMENT, *KOC UNIVERSITY SCHOOL OF HEALTH SCIENCES

This study aims to investigate differences -if any- in postop pain and recovery time among two different surgical mesh application techniques used in hernia operations in a private medical facility in Istanbul, Turkey. We have randomly selected 100 patient records from a total of 773 inguinal hernia patients, 50 lateral keyhole (LK) and 50 down keyhole (DK) mesh applications, according to pre-defined subject selection criteria. Mean age among the patients was 50.22 years (sd 13.66), a statistically significant difference between the two groups was observed (DK means 45.86, sd 13.31; LK means 54.74, sd 12.56). We analyzed associations between surgical technique (LK vs DK) and a number of variables including hernia type, time since previous hernias, post-surgical time for resuming daily activities (RDA) and resuming work (RW), postop complications, postop pain on day one and seven (VAS1, VAS7), and number of analgesic pills administered after surgery. Bi-variate analyses using χ^2 and t-testing revealed that VAS1, VAS7 and number of analgesic tablets taken by the patients post-surgery were not associated with mesh-slit type ($p > .05$). Pain scale results correlated positively with the number of analgesics taken by the patient ($r = .548, p = .01$). However variables related to resuming activity were significantly different between DK and LK. Mean days to RDA was 1.63 (sd 1.19) in the DK group and 2.63 (sd 1.51) in the LK group ($t = -3.56, p = .001$). Likewise, mean days for RW was 3.08 in DK (sd 1.80) as opposed to 5.38 (sd 2.44) in LK patients ($t = -4.67, p < .001$). The distribution of single/double hernias among LK and DK groups presented a significant difference ($\chi^2 = 10.61, p < .001$). We used keyhole type as a proxy for the number of tacks used during surgery, a variable expected to be related to postop pain. Preliminary analysis of the dataset shows a shorter recovery among DK patients, but not significantly reduced postop pain. We believe that this discrepancy between recovery time and postop pain may be attributable to a statistically significant difference in mean age between the two groups. Mean age in the LK group is higher. Consistent with this, it is often believed that pain perception may decrease

with age. The investigators aim to enlarge the random dataset to perform multivariate analysis of pain and recovery related variables, hernia types and number of tacks used while controlling for age, to explore the subject further.

Hernia Surgery – P447

MESH OUTCOMES AND REDO SURGERY AFTER LAPAROSCOPIC TREATMENT OF VENTRAL AND INCISIONAL HERNIA. EXPERIENCE OF 57 SECOND LOOKS., Elie Chelala MD, Y. Debaerdemacker MD, F. Charara MD, M. Dessily MD, J.L. Allé MD, Tivoli university hospital, La Louvière, Belgium

Introduction: This study discusses a minimally invasive approach by transabdominal fixation of an innovative composite mesh (Parietex®), associated to a musculofascial closure in moderate to large defects. This report aims to review the redo surgeries done after a large number of 537 LIVH. It demonstrates the minimal occurrence of the various complications encountered in intraperitoneal stapling (as major loop adhesion and mesh migration...) and redo surgery after LIVH.

Methods: All previous surgeries were performed laparoscopically with 3 trocars. All defects were closed before placement of the mesh, to avoid ultimately extrusion of the mesh and reduce the risk of seroma formation. In "second looks," the first trocar is always inserted on a lateral side externally to previous skin incisions of the transabdominal fixations. Meticulous adhesiolysis is undertaken by scissors and little coagulation in order to avoid damaging the mesh. If recurrence is observed, the defect is closed and a larger mesh of Parietex is implanted under the previous one with transparietal fixation by pulling the threads with the endoclose device.

Results: Between October 2000 and August 2006 2005, 537 ventral and incisional hernias were included in this study. Size of defect: 3-14 cm. Recurrences appeared in 10 cases (1.8%) from 3 to 36 months. With a mean follow up of 36 months, 420 over 537 (78 %) patients were controlled.

A "second look" has been obtained on 57 patients (10.6 %) from 3 to 36 months with "adhesion-free" for the majority (31), "Mueller I-II adhesion" of the omentum for others (22), and serosal adhesions easily cleavable for the rest (4). The absence of shrinking and wrinkling of the prosthesis in all these cases confirms its total peritonization of the anterior abdominal wall.

Conclusion: This suturing concept technique proves satisfactory both on the technical and the results fronts. The major difference and enhancement in the exposed method is highlighted by the absence of prosthesis migration and limited adhering side effects. It is an effective, safe and reproducible procedure, even so for redo surgery. Redo surgery after LIVH, could be applied with utmost care of unpredictable adhesion's risk on the midline. Adhesion risk is minimized with a lower rate of recurrency using the suturing concept and an efficient polyester protected mesh. Morbidity rate is low and mid-term outcomes are promising. Longer follow-up is mandatory.

Hernia Surgery – P448

TEP REPAIR- SIR GANGA RAM HOSPITAL APPROACH, PRADEEP CHOWBEY MS, Chairman - Minimal Access & Bariatric Surgery Centre, Sir Ganga Ram Hospital, New Delhi (India)

TEP hernia repair is a technically demanding procedure. Once well versed with the approach we have found it an efficient method for groin hernia repair. To make the procedure cost effective & prevent hernia recurrences, we have modified innovated to simplify the procedure. Patients are placed in supine position. A 10mm incision is made below the umbilicus on the affected side. The anterior rectus sheath is incised, muscle retracted laterally & blunt finger dissection done caudally posterior to the rectus muscle. A sterile finger glove is tied around the tip of the suction cannula with silk thread, which is gently pushed into a plane posterior to rectus muscle towards symphysis pubis. About 150-200cc of sterile saline is injected in the balloon & left for 3-5 minutes. After balloon deflation, the suction cannula is



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substituted by a blunt tip Hassan's cannula & space insufflated to a pressure of 15mmHg. A 30deg. scope is used. Two 5mm trocars are placed in midline, one just above the symphysis pubis & the other midway between the two. The dissection is started after identification of the pubic bone in midline. The entire posterior floor is dissected & the anatomical landmarks -inferior epigastric, iliac & gonadal vessels, vas deferens in males, round ligament of the uterus in females & nerves are identified. The lateral dissection is completed upon visualisation of psoas muscle. Any direct sac is dissected off the fascia transversalis. A small indirect hernia is easily mobilised from the cord structures & reduced. In cases of large sacs or in complete indirect hernia extending upto scrotum, the sac is divided just proximal to the internal ring & the distal sac is left behind. The edge of the peritoneum is pulled as far cephalad as possible, so that the mesh that placed on the posterior floor is covered by peritoneum, on desufflation. A standard polypropylene mesh (15x15cm) is used for each side. The mesh is rolled tightly upto 3/4th of its length & anchored with two catgut knots to prevent unfolding. The mesh is pushed into the preperitoneal space through the Hassan cannula & anchored with 2-3 tacks to the Cooper's ligament medially (ProTack®) through the mid port. After securing the mesh, the knots on the folded mesh are cut to unfold the mesh over the peritoneum i.e. floor. The mesh is placed to cover all the hernial defects (direct inguinal, indirect inguinal & femoral). The results will be evaluated & compared with other well established techniques.

Hernia Surgery – P449

LAPAROSCOPIC BIOLOGIC MESH REPAIR OR PROLENE MESH REPAIR, D S Edelman MD, Baptist Hospital of South Florida

Intro: Fibrin Glue to fix prolene mesh or extracellular matrix (ECM) biologic mesh during laparoscopic hernia repair was evaluated and compared over the past 6 months.

Methods: A retrospective review of patients operated upon during the same time period by the same surgeon and at the same institution were analyzed. A pre-peritoneal technique securing a 10 x 15 cm soft prolene mesh or an ECM mesh with fibrin glue was used. Occasionally, 4-6 tacks were needed to secure the mesh.

Results: 20 patients were collected in each group. ECM patients averaged 37 years (16-65) and Prolene averaged 51 years (26-72). Operative time averaged 30 minutes in both groups. ECM mesh was used in 24 indirect and 5 direct repairs. Tacks were needed in 2 instances. Prolene mesh was used in 16 indirect and 7 direct repairs. Tacks were needed in 8 instances. Patients were seen at 2 weeks, 8 weeks and 6 months. There were 3 patients in each group with mild, temporary groin pain. No recurrences were noted in either group.

Conclusion: The biologic extraellular matrix hernia repair with fibrin glue compared equally to soft prolene mesh repair using glue and an occasional tack. Long term follow up and a randomized-prospective trial comparing the 2 techniques are needed.

Hernia Surgery – P450

ROBOTIC ASSISTED VENTRAL HERNIA REPAIR—A FEASIBILITY STUDY, Barry N Gardiner MD, William Hamstra DO, Carol Alvord MS, San Ramon Regional Medical Center, San Ramon, California

OBJECTIVES: Adoption of laparoscopic ventral hernia repair has been limited by the severity of pain associated with transfascial sutures and hernia staples. This retrospective study tests the feasibility and consequences of eliminating these fixation techniques by suturing the mesh directly underneath the abdominal wall with robotic assistance.

METHODS: Between 10/05 through 8/06, 14 consecutive ventral/incisional hernias suitable for a standard laparoscopic approach were repaired with robotic assistance. A polypropylene mesh was used in each case, overlapping the edges of the defect by 3-5cm. The sole means of fixation was a continuous non-absorbable suture placed around the

periphery of the mesh. No transfascial sutures or clips were used for fixation of the mesh in any of these repairs. Length of stay and use of intravenous narcotics in this group (RA) were compared retrospectively to the previous 14 patients who had undergone conventional laparoscopic repair (LR) using transfascial sutures and staples. All p values are 2-sided by the Wilcoxon's rank sum test (due to skewed data distributions).

RESULTS: The two groups were well matched for age, sex, weight, and co-morbidities. The robotic approach was successfully completed in all 14 patients in the study group. Size of the implanted mesh was comparable between the two groups (RA median=300 cm²; LR=310 cm², p=0.70). Compared to conventional laparoscopy, however, operating times in the study group were longer (RA median=124 min.; LR=70 min., p=0.004), and length of stay was shorter (RA median=4 hrs.; LR=31 hrs., p=0.01). The need for parenteral narcotics (expressed as morphine equivalents in mgs.) was substantially different between the two groups: in the recovery room (RA median=9 mg.; LR=20 mg. p=0.02), following recovery room up to the time of discharge (RA median=0 mg.; LR=32mg., p=0.001).

CONCLUSIONS: Repairing ventral/incisional hernias with robotic assistance is feasible, although technically challenging. This approach eliminates the need for both transfascial sutures and hernia staples, reduces much of the pain associated with conventional laparoscopic repair, and significantly lowers length of stay. A larger, prospective randomized study is warranted to explore the advantages of this minimally invasive approach to ventral and incisional hernia repairs.

Hernia Surgery – P451

LAPAROSCOPIC PARASTOMAL HERNIA REPAIR, Kevin L Huguet MD, Elisabeth C McLemore MD, Kristi L Harold MD, Mayo Clinic Scottsdale

Background: Parastomal hernias represent a common complication of stoma creation. Surgical repair has traditionally been performed through an open technique with unacceptably high recurrence rates. Laparoscopic ventral hernia repair is widely accepted for the repair of incisional hernias. There is a limited experience with laparoscopic parastomal hernia repair.

Methods: A retrospective review of parastomal hernia repairs from January 2004 to August 2006 was performed. All hernias were repaired with mesh using the Sugarbaker or Keyhole technique. Patient demographics, operative time, mesh and fascial defect size, complications, length of hospitalization, and recurrence rates were recorded.

Results: Twenty patients underwent laparoscopic repair of parastomal hernias (9 urostomy, 6 ileostomy, and 5 colostomy). Mean defect size measured 130 cm² (range, 25 - 416cm²) and the mean mesh size was 440 cm² (range, 240 - 780 cm²). All repairs were successfully completed laparoscopically. Mean operative time was 210 mins (99-326 mins). Follow-up ranged from 1-17 months (mean, 4 months).

There have been no recurrences. There were 9 major post-operative complications. One patient required laparoscopic re-operation for obstruction of the urostomy. Two patients required mesh removal due to infection. Other complications included: C. difficile colitis (1), pneumonia (2), acute renal failure (1), surgical site infection (1), and 2 re-admissions for small bowel obstruction which resolved with conservative management.

Conclusions: Laparoscopic parastomal hernia repair is a feasible technique. There is a low incidence of recurrence in short term follow up.

Hernia Surgery – P452

LARGE HIATAL HERNIA WITH INCARCERATION OF THE OMENTUM MIMICKING A MEDIASTINAL TUMOR, Hitoshi

Idani MD, Shinichiro Watanabe MD, Hiroki Nojima MD, Masahiko Muro MD, Takashi Ishikawa MD, Tatsuoaki Ishii MD, Shinya Asami MD, Masanobu Maruyama MD, Shinichiro Kubo MD, Takashi Yoshioka MD, Hitoshi Kin MD, Department of Surgery, Fukuyama City Hospital

We present a rare case of large hiatal hernia with incarceration of the omentum mimicking a mediastinal tumor, which



was successfully treated by laparoscopic surgery. A 74-year-old woman presented to our hospital with a chief complaint of general fatigue. Chest X ray photo showed an abnormal shadow in the mediastinum. CT showed round low density area (5X5cm) in the mediastinum. Only a small hiatal hernia was observed by gastroesophagoduodenoscopy. No evidence of malignancy was detected by those examinations and the tumor was diagnosed as a lipoma of the mediastinum. However, the patient developed dysphagia and chest pain one year later. Enhanced CT showed enlargement of the tumor and fine blood vessels in the tumor, which was diagnosed as hiatal hernia with incaeceration of the omentum, then laparoscopic repair was performed. Laparoscopic view showed the omentum herniated into the thorax and completely covered the hiatus, by which the stomach was almost in normal position. The omentum was pulled out from the thorax and the hernia was repaired with modified Toupet fundoplication. Operation time was 142 min. The patient allowed a soft diet on the first POD and discharged on the seventh POD. The mediastinal tumor was disappeared after the surgery. Five months after the surgery, during her last visit to the outpatient department, she remained well and symptom free.

Hernia Surgery – P453

LAPAROSCOPIC LATERAL COMPONENT SEPARATION IN PATIENTS WITH INFECTED MESH, Judy Jin MD, Michael J Rosen MD, Case Medical Center, Case Western Reserve University, Department of Surgery, Cleveland, Ohio, USA

INTRODUCTION A single staged approach for resection of infected mesh, component separation, and definitive abdominal wall reconstruction has been successfully reported by our group. The extensive subcutaneous dissection and division of perforator vessels can result in skin flap necrosis and complex postoperative infections. We report our initial experience with a minimally invasive component separation during resection of infected prosthetic mesh.

METHOD Two patients with infected Composix mesh underwent surgical excision of the mesh. The resultant defect averaged 205 cm². A laparoscopic component separation was performed through a 10mm incision over the external oblique. The potential space between the internal and external oblique was created with a balloon dissector. The external oblique fascia was incised 2 cm lateral to the rectus from the costal margin to the inguinal ligament. The fascia was closed primarily with Alloderm underlay reinforcement.

RESULT The average operative time was 255 minutes and the bilateral laparoscopic component separations were performed in 45 minutes. Primary fascial closure was achieved in both patients. Both patients were discharged home on postoperative day 5 without complications. One patient developed a minor midline wound infection that did not involve the lateral compartments and was treated with local measures and resolved within three weeks. At two months follow up both patients are back to full activity without evidence of recurrence or infection.

CONCLUSION This preliminary experience demonstrates that laparoscopic component separation can be safely performed with excellent short term results. While wound infections are not uncommon in the resection of infected prosthetic material, the complexity of these infections are greatly reduced with a laparoscopic component separation.

Hernia Surgery – P454

A NOVEL REPAIR OF RECURRENT PERINEAL HERNIA, Ali F Mallat MD, Jessica D Lemmons MD, Pleas R Copas, Jr. MD, Hobart E Akin MD, University of Tennessee Medical Center

Background: Secondary Perineal Hernia (PH) is an incisional hernia caused by a protrusion of intraabdominal organs through a defect in the pelvic floor. This is a rare complication after abdominoperineal resection (APR), hysterectomy or other pelvic procedures. It is usually discovered within 1 year of surgery and occurs mostly in females.

Case presentation: Our patient is a 69 year old gentleman who presented with a large PH two years after an APR for low rectal cancer. Patient underwent a laparoscopic repair

where the Levator Ani Muscles (LAM) were approximated together. Unfortunately he had recurrence less than five month later and was treated by an open hernia mesh repair to be diagnosed six month later with a second recurrence. Due to significant LAM thinning and pelvic wall scarring, it was thought that LAM approximation along with mesh reinforcement would not provide enough perineal floor support.

Treatment and outcome: A Prolift® mesh was modified by sewing an additional piece of Ultrapro® mesh to widen it in its most narrow portion posteriorly. The arcus tendineus fascia pelvis (ATFP) was identified. The superficial strap of the anterior segment was passed medially through the obturator membrane, then through the obturator internus muscle approximately 1 cm from the prepubic end of the ATFP. The deep strap of the anterior segment emerged through the obturator internus muscle behind the ATFP, approximately 1 cm from the ischial spine. The Posterior Segment was positioned in the ischioanal fossa and secured by passage of the straps through the sacrospinous ligament and coccygeus muscles. The sacrospinous ligament was then sutured to the Prolene mesh for added lateral support. Patient recovered well without complication and has been PH free for 1 year.

Conclusion: The choice of the best approach in PH repair must take into account pelvic anatomy as well as the use of appropriate synthetic materials to provide support to the damaged pelvic floor.

Hernia Surgery – P455

OBTURATOR HERNIA; A MORE COMMON ENTITY IN THE LAPAROSCOPIC ERA? Arun A Mavanur MD, Scott J Ellner MD, Ibrahim M Daoud MD, Saint Francis Hospital / University of Connecticut

Objective: The incidence of obturator hernia is reported to be rare at about 0.1%. We present a single surgeon's experience with the presentation and laparoscopic approach to these hernias.

Methods and Procedures: A retrospective chart review was performed from 1992 to date. Details of patient demographics, symptoms and details of surgery were collected and analyzed.

Results: A total of 10 patients were identified to have an obturator hernia amongst the 2400 patients with herniae that underwent laparoscopic repair (incidence of 0.41%). All were female with a mean age of 58.5 years (range 15-93). None of our patients were diagnosed with an obturator hernia preoperatively, but were identified to have one at laparoscopy. 4 presented with recurrent hernia after a previous open repair, 3 with groin pain, and 3 with femoral hernia (1 incarcerated). 9 had TEP repairs. The patient with incarcerated femoral hernia had a TAP repair. No postoperative complications were encountered in our cohort. All except the patient with incarcerated femoral hernia were performed as day cases.

Conclusions: In our experience, obturator hernia is more common than reported in the literature. A laparoscopic approach allows easier intra-operative recognition of these hernias and is the probable explanation for the higher incidence in our study. These can be successfully repaired with either TEP or TAP repair.

Hernia Surgery – P456

A NOVEL APPROACH TO EXTRACTION OF INCARCERATED OMENTUM AND MESH INSERTION IN LAPAROSCOPIC VENTRAL HERNIA REPAIR, Kyle A Perry MD, Keith W Millikan MD, Jonathan A Myers MD, Rush University Medical Center

During laparoscopic ventral hernia repair (LVHR), it is not always possible to reduce incarcerated omentum through a tight defect and it may tear or require transection within the abdomen. This leaves an ischemic mass of tissue within the hernia sac which can cause pain, infection, or the appearance of hernia recurrence postoperatively. We describe a technique which allows extraction of any retained omentum within the hernia sac, mesh insertion, and laparoscopic completion of the procedure using only 5 mm trocars. After obtaining access to the abdomen with a 5 mm optical



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trocar in select patients, lysis of adhesions is performed as needed. When incarcerated omentum that cannot be safely reduced is discovered, it is transected at the level of the abdominal wall using electrocoagulation or ultrasonic dissection. At this point, we make a 2-3 cm skin incision overlying the retained omentum, open the hernia sac, and remove the amputated omentum. The rolled up piece of mesh utilized for the repair is then inserted through this opening. The hernia sac is closed with absorbable suture, allowing reinsufflation of the abdomen and completion of the laparoscopic repair.

The aforementioned method enables us to safely remove any retained omentum from the hernia sac and utilize the same incision for mesh insertion. We utilize only 5 mm trocars without the need for a larger port through which to place the mesh into the abdomen. This reduces the risk of postoperative trocar site hernias as the opening for mesh insertion is covered by the mesh after it is fixed in place. This technique may also decrease the need for conversion to open hernia repair by allowing an alternative approach to reduce incarcerated omentum.

Hernia Surgery – P457

TEP IN INCISIONAL AND VENTRAL HERNIA REPAIR, Bojan Radovanovic MD, Nenad Davidovic MD, Department of surgery General hospital Pozarevac

During last twenty years Rives-Stoppa repair has become standard for repair of incisional hernias. This approach offers good mesh position easy and chip way of fixation, and possibility of implantation of broad spectrum of meshes. Endoscopic retromuscular approach has same benefits and offers advantages of minimal invasive surgery. During last two and a half years we performed 28 operations using this approach. From April 2003 to September 2005 we performed 28 operations in selected cases. We operated patients with hernia diameter less than 10 cm. Patients with symptoms of chronic and acute incarceration were excluded, but some of operated patients had irreducible hernias. The age of patients was between 42 and 78 years. We had eight umbilical, five epigastric hernias. Incisional: eight after upper medial laparotomy, two after medial infraumbilical lap., two after lateral and three after supra and infraumbilical lap. We used lateral approach in all cases. Three ports on the level of semi lunar line. Ten mm for laparoscop, and two 5mm for working instruments. The trocars are inserted under the rectus muscle and working space is created by insufflations and blunt dissection. We closed peritoneum with continuous suture. After opposite retro muscular space is created we placed mesh of adequate size. Mesh was fixed with suture passer transcaneously in all corners. We always put a drain. There were no intraoperative complications. One conversion, (second case) with addition of small incision for correction of mesh position. Two recurrences. Asymmetric defect with inadequate overlapping of the mesh. There was no infection. Weary low postoperative pain and discomfort. Although we are still in the learning curve, we can say that this approach can be used in all cases of small and medium sized hernias. We can use broad spectrum of meshes, and fixations is easy and chip, and avoid complications connected with intra-abdominal position.

Hernia Surgery – P458

COMBINED LAPAROSCOPIC VENTRAL HERNIORRHAPHY WITH CHOLECYSTECTOMY USING ALLODERM TISSUE MATRIX, Michael Sawyer MD, Janice Strange, Darla Vardeman RN, Videoendoscopic Surgical Institute of Oklahoma and Great Plains Surgical Institute, Lawton, Oklahoma

A 57 year old man with a history of gallstone pancreatitis was referred for cholecystectomy. Physical examination demonstrated a large ventral hernia as well. The patient was counseled for laparoscopic cholecystectomy and ventral herniorrhaphy using Alloderm regenerative tissue matrix. The patient recovered uneventfully. He has had no postoperative complications at eight months of follow up. This is the first report of combined laparoscopic cholecystectomy with ventral herniorrhaphy using Alloderm tissue matrix.



Hernia Surgery – P459

LAPAROSCOPIC REPAIR OF FORAMEN OF MORGAGNI HERNIA IN A MORBIDLY OBESE PATIENT USING ALLODERM TISSUE MATRIX, Michael A Sawyer MD, Janice Strange, Darla Vardeman RN, Videoendoscopic Surgical Institute of Oklahoma and Great Plains Surgical Clinic, Lawton, Oklahoma

A 45 year old man with a BMI of 47.5 kg/m² presented with signs and symptoms of complete gastric outlet obstruction. Nasogastric tube decompression afforded significant relief of symptoms. Radiologic studies revealed a foramen of Morgagni hernia with incarceration of the distal stomach, pylorus and proximal duodenum and attendant gastric outlet obstruction. Using a four trocar array, adhesions were lysed, and the incarcerated contents were reduced. The defect was repaired with an Alloderm regenerative tissue matrix, secured with laparoscopic tacks. The patient recovered uneventfully. He was discharged on the third postoperative day in good condition, tolerating a regular diet. He is doing well and remains symptom free at nine months of postoperative follow up. This is the first reported case detailing laparoscopic repair of a foramen of Morgagni hernia in a morbidly obese patient using Alloderm regenerative tissue matrix.



Hernia Surgery – P460

CHANGES IN BLADDER PRESSURE IN MORBIDLY OBESE PATIENTS 1-YEAR AFTER GASTRIC BYPASS SURGERY, T M Schmelzer BA, B L Paton BA, W L Newcomb BA, W W Hope MD, J H Norton PhD, T S Kuwada MD, K S Gersin MD, B T Heniford MD, Carolinas Medical Center

Morbidly obese people have been shown to have elevated intraabdominal pressures, as measured though bladder pressure, when compared to people with a normal body mass index (BMI). We hypothesize that morbidly obese patients that experience weight loss after bariatric surgery will have decreases in their intraabdominal pressure.

This study is a prospective study in which morbidly obese patients scheduled to undergo bariatric surgery had their bladder pressures measured preoperatively while doing sixteen different maneuvers. The measurements were then repeated one year after their operation. Mean bladder pressure was compared for each patient at the two time periods using a paired t-test. A p-value of <0.05 was considered significant.

Four patients completed the two phases of the study. The mean weight loss for the 4 patients was 44.98 kg (±14.76) corresponding to a decrease in mean BMI from 44.52kg/m² (±3.49) to 29.09 kg/m² (±2.13). The mean bladder pressure decreased in all of 15 maneuvers performed. The changes in pressure were statistically significant in 7 of 15 maneuvers performed. These included coughing (p = 0.0007), abdominal crunch (p = 0.0004), standing (p = 0.01), sitting (p = 0.02), valsalva while standing (p = 0.0005), lifting 10 pounds (p =

0.01), and climbing stairs ($p = 0.0001$). The remaining maneuvers demonstrated decreased pressure postoperatively which trended towards significance. The percentage change in pressure for the various maneuvers ranged from -7.02% to -70.19%.

This study demonstrates that weight loss has an impact on intrabdominal pressure. We demonstrated significant decreases in pressure despite having a small study size. With continued enrollment in this study, we anticipate showing significant decreases in bladder pressures for all of the maneuvers we evaluate. Since it has been hypothesized that higher intra-abdominal pressures may increase the risk of hernia formation, this study suggests that weight loss may be a valuable method for prevention of hernia formation or recurrence in the morbidly obese patient population.

Hernia Surgery – P461

THE NOVEL USE OF DIAGNOSTIC LAPAROSCOPY IN AN INCARCERATED FEMORAL HERNIA, [Adam T Silverman MD](#), [Sandip Maru MD](#), [Mark Schwartz MD](#), Monmouth Medical Center

Femoral hernias account for only 2-8% of all hernias. Femoral hernias are more common in females with a preponderance of 4:1. The reason for this preponderance is the wider bone structure of the female pelvis. A typical presentation is an elderly frail female with a bulge in the groin. Patients can present with a varying array of complication sequela from irreducibility through intestinal obstruction to frank gangrene of strangulated bowel. The incidence of strangulation in femoral hernias is high at 40%. Femoral hernias can either be repaired via an open approach or laparoscopically. The authors present an interesting case of a female with an incarcerated femoral hernia that was repaired by an open procedure. To assess the viability of the bowel a diagnostic laparoscopy via the femoral canal was performed. The bowel was viable so a subsequent repair with mesh was performed. We present the literature utilizing diagnostic laparoscopy in hernia repairs and a novel approach in the evaluation of an incarcerated femoral hernia.

Hernia Surgery – P462

IS EXPLANTATION OF INFECTED MESH AFTER LAPAROSCOPIC VENTRAL HERNIA REPAIR THE ONLY ANSWER? [N E Terry MD](#), [Oliver C Whipple MD](#), [Carl R Boyd MD](#), [John D Angstadt MD](#), Memorial Health University Medical Center, Mercer University School of Medicine — Savannah Campus

Introduction: Laparoscopic ventral hernia repair has become the preferred technique for hernia repair in many institutions. Despite a significant decrease in the incidence of mesh infection with the laparoscopic approach, mesh infection remains a difficult problem that historically has demanded explantation of the mesh. We present a series of two cases that were managed initially without explantation of the mesh.

Methods: Parietex® dual mesh or Proceed® mesh were used in all of our ventral hernia repairs over the past two years. During that time, two patients developed mesh infections associated with a large abscess or exposed mesh. One was successfully managed without mesh explantation. One patient developed a bowel obstruction after laparoscopic ventral hernia repair. An incision was made through the mesh after an enterotomy, and the mesh was sewn closed. This patient went on to develop a wound infection that was treated open with exposed mesh. The wound granulated in and has remained closed for 12 months without further infection. The second patient developed a large intraabdominal abscess below the mesh 2 weeks after the laparoscopic ventral hernia repair. The abscess was treated with computed tomography scanning guided drainage. The cultures were positive for *E. coli*. A second collection anterior to the mesh was drained through an open incision. This patient had complete resolution of her leukocytosis and other symptoms for four weeks. She then developed cellulitis, and mesh explantation was performed.

Results: Both patients had resolution of fever, leukocytosis,

and all other symptoms, but only one of the two has completely cleared the infection. The mesh was salvaged in this particular case, without the need for removal and repeat hernia repair.

Conclusions: Despite minimally invasive techniques to repair ventral hernias, mesh infection still remains a complication often requiring a large incision with removal of the mesh. With the advent of the lower molecular weight prostheses, greater tissue ingrowth may allow mesh salvage in select cases. This case demonstrates the ability to manage this complication nonoperatively with the aid of intravenous antibiotics, abscess drainage, and close surveillance.

Hernia Surgery – P463

CHRONIC POSTERIOR SEROMA WITH NEOPERITONEUM FOLLOWING LAPAROSCOPIC VENTRAL HERNIA REPAIR: TREATMENT ALGORITHM, [Zurab Tsereteli MD](#), [Archana Ramaswamy MD](#), [Bruce Ramshaw MD](#), Department of General Surgery, University of Missouri-Columbia, Columbia, MO

Introduction: Laparoscopic ventral hernia repair is now widely performed. Seromas frequently occur following laparoscopic ventral hernia repair. Most seromas usually form anterior to the mesh and resolve with conservative management. In rare cases, some patients develop pseudo-neoperitoneum deep to the mesh which secretes fluids forming a collection. We present the group of 9 patients with delayed seroma posterior to mesh and a possible treatment algorithm for this situation.

Methods: All nine patients underwent laparoscopic ventral hernia repair with mesh the last 3 years. The patients developed persistent abdominal pain and/or abdominal wall mass between 1 month and 1 year postoperatively. CT scan revealed a fluid collection posterior to the mesh. Five patients presented with an asymptomatic mass and have been followed without any intervention. Three patients had severe symptoms and underwent laparoscopic exploration which demonstrated a large fluid collection posterior to the mesh bounded by a thick neoperitoneum. A small window was created in the neoperitoneum to allow for free drainage into the peritoneal cavity. They experienced significant improvement. One patient following two attempts of percutaneous drainage of posterior seroma underwent laparoscopic drainage in same fashion. Three weeks later the fluid reaccumulated with recurrence of symptoms, and following an attempt of replacement with a hydrophilic mesh, the patient required a biologic mesh.

Result: Based on this experience a treatment algorithm is presented for management of a persistent posterior seroma following laparoscopic ventral hernia repair. The first step is simple follow up without any intervention. Patients without improving symptoms should be considered for laparoscopic internal drainage of the fluid collection. The final option for patients who fail drainage procedure is mesh removal with or without new mesh placement.

Conclusion: Persistent seroma posterior to the mesh following laparoscopic ventral hernia repair is a rare problem. The above algorithm may help guide management of this complex situation.

Hernia Surgery – P464

TRANS ABDOMINAL PRE-PERITONEAL MESH (TAPP) REINFORCEMENT OF POSTERIOR LOWER ABDOMINAL WALL IN-PATIENTS WITH SPORTSMAN'S GROIN; IS IT WORTH-WHILE? [Y Viswanath MS](#), [C Munipalle MS](#), [James Cook University Hospital](#), Marton Road, Middlesbrough, Cleveland, UK

AIM; Management of groin pain in the absence of a clinically palpable hernia in young athletes is challenging to the attending surgeon. We evaluated the role of laparoscopic reinforcement of posterior abdominal wall through the Trans Abdominal Pre-Peritoneal (TAPP) route.

METHODS; All patients suspected to have Sportsman's groin after initial assessment by a musculo-skeletal specialist and failed conservative measures underwent TAPP reinforcement of lower abdominal wall using an non-absorbable



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mesh. All patients had plain radiology, Dynamic Ultrasound Scan of Groin and or MRI.

RESULTS Among a total of 20 patients who underwent TAPP mesh reinforcement over a period of 24 months, 12 (Group A) had bilateral and 8 had unilateral groin pathology. Four (20%) among 20 (Group B) had associated other pathology (adductor enthesopathy in three and one has osteitis pubis). Preinjury level of activity to 100% in all 17 athletes in-group A and 70% improvement in all four in-group B was attained within 6-8 weeks. One patient in group A and one in Group B developed recurrent symptoms after 12 months and subsequent investigations were unrevealing.

CONCLUSION TAPP mesh reinforcement in symptomatic athletes with Sportsman's groin should be considered as an option and the success rate in-patients with isolated groin pathology is higher than ones with multiple pathology.

Hernia Surgery – P465

LAPAROSCOPIC VERSUS OPEN COMPONENT SEPARATION: A COMPARATIVE ANALYSIS IN A PORCINE MODEL, Christina P Williams MD, Michael J Rosen MD, Judy Jin MD, McGee F Michael MD, Steve J Schomisch BS, Ponsky Jeffrey MD, Case Medical Center, Case Western Reserve University, Department of Surgery, Cleveland, Ohio, USA

Background: The ideal surgical treatment for complicated ventral hernias remains elusive. Traditional component separation provides local advancement of native tissue for tension free closure without prosthetic materials. This technique requires an extensive subcutaneous dissection with division of perforating vessels predisposing to skin flap necrosis and complicated wound infections. A minimally invasive component separation may decrease wound complication rates, however the adequacy of the myofascial advancement has not been studied.

Methods: Seven 20 kg pigs underwent bilateral laparoscopic component separation. A 10 mm incision was made lateral to the rectus abdominus muscle. The external oblique fascia was incised, and a dissecting balloon was inflated between the internal and external oblique muscles. Two additional ports were placed in the intermuscular space. The external oblique was incised from the costal margin to the inguinal ligament. The maximal abdominal wall advancement was recorded. A formal open component separation was then performed and maximal advancement 5cm superior and 5cm inferior to the umbilicus was recorded for comparison.

Results: The laparoscopic component separation was completed successfully in all animals in an average of 20 minutes per side. Laparoscopic component separation yielded 3.7cm (sd 1.0) of fascial advancement above the umbilicus, while 4.2cm (1.1) was obtained after open release. Below the umbilicus, laparoscopic release achieved 4.8cm (1.2) of advancement while 5.6cm (1.1) was gained after open release.

Conclusions: The minimally invasive component separation achieved 86% of the myofascial advancement as compared to a formal open release while avoiding the risks of skin necrosis, large wound infection, and seroma formation resulting from extensive subcutaneous dissection. Laparoscopic component separation should be considered the procedure of choice for providing local myofascial advancement flaps in repairing complicated ventral hernias.

Minimally Invasive Other – P466

VARICOCELECTOMY BY ENDOSCOPIC EXTRAPERITONEAL ROUTE (VEER), B B Agarwal MS, M K Gupta MS, S Agarwal MS, K C Mahajan MS, Sir Ganga Ram Hospital & Lady Hardinge Medical College, India

Aims : To perform safe Varicocelectomy endoscopically by extraperitoneal route.

Materials & Methods : From April 2004 to May 2005, 8 patients were operated for symptomatic varicocele. 6 of them had primary infertility with oligo-asthenospermia and 2 were advised surgery for scrotal pain. All of them had clinically manifest varicocele. Ultrasound and doppler were done to determine the testicular size and reflux velocity.

Laparoscopic ligation with division of testicular veins is widely accepted treatment for varicocele. Better endoscopic surgical understanding of extraperitoneal space has paralleled the evolution of totally extraperitoneal repair (TEP) for inguinal hernia. With our experience of TEP repair, we are now performing ligation and division of testicular veins close to deep inguinal ring, extraperitoneally. This not only avoids the violation of peritoneal cavity, but also ensures the venous disconnection in a more precise manner.

Results : There have been no recurrences after a mean follow up of 18 months. Semen parameters improved in all the 6 patients.

Conclusion : Varicocelectomy Endoscopically by Extraperitoneal Route (VEER) is a safe technique for symptomatic varicocele.

Minimally Invasive Other – P467

FLUOROSCOPY GUIDED LAPAROSCOPIC REMOVAL OF INGESTED FOREIGN BODY (SEWING NEEDLE) FROM THE ABDOMINAL CAVITY AFTER 9 YEARS AND TWO FAILED LAPAROTOMIES, RAMESH AGARWALLA MS, OM TANTIA MS, ILS MULTISPECIALITY CLINIC

Ingested foreign bodies pass out spontaneously with stool or are removed by endoscopic methods or surgically. In few cases, the foreign bodies cannot be removed and they lie in the abdominal cavity without any symptoms. We report a case where a sewing needle was accidentally ingested 9 years ago. The patient had 2 failed laparotomies at the district hospital for its removal. The patient was having non specific abdominal pain which she attributed to the needle in her abdomen.

She had developed severe anxiety as a result and had repeated admissions to the hospital for the same. The needle which had broken into two parts over a period of 9 years and had migrated out of gastrointestinal tract was removed by fluoroscopy guided laparoscopic surgery.

Minimally Invasive Other – P468

LAPAROSCOPIC PD CATHETER INSERTIONS Jannet Anderson RN, Wing So RN, Diane Watson MSc, Todd Penner MD, University Health Network - Toronto Western Hospital

Good placement of a catheter for peritoneal dialysis (PD) is of utmost importance for an individual undertaking PD for end stage renal disease (ESRD). Traditionally, PD catheter insertion was carried out by surgeons using an open insertion (OI) under general anesthesia (GA), which results in a blind placement and risk of bowel injuries and catheter misplacement. Commencing May 2006, PD catheters are inserted using a laparoscopic insertion (LI) method at UHN, Toronto Western Hospital, Toronto, Canada. LI has the benefits of direct visualization of placement, decreased trauma and immediate recognition of intra-abdominal adhesions. This paper reviews the experience of PD catheter insertions by one surgeon during 2006, with 15 OI and 15 LI PD catheters.

We utilize a 5mm VersaStep® dilator and cannula with radially expandable sleeve to insert a 5mm telescope, then a 7-8mm dilator and cannula with radially expandable sleeve to place the PD catheter (Quinton Swan Neck®) at the suitable site. Insufflation has been previously carried out by Carbon Dioxide (CO₂), which can be uncomfortable, thus used only with GA. We use Nitrous Oxide, which is not painful, and can be used with local anaesthetic (LA). Patients with ESRD are medically compromised so LA is preferable, provides faster recovery time and has potentially less risk.

We found 2 (13%) instances of catheter misplacement in the OI group, but none in the LI group. There were no immediate leaks in either group, however, there were 3 instances (20%) of late leak (after 2 weeks) in the LI group. In the OI group, there was one incident (7%) of wound abscess, and one incident (7%) of scrotal leak, which resulted in discontinuation of PD for both patients. Significantly, in the LI group, adhesions were visualized in 6 individuals (40%), and lysed in 4 (27%) of these cases, with two omentopexy carried out. Adhesions and omental wrapping are known complications, which can lead to peritoneal dialysis failure, thus

recognition and prophylactic treatment can have considerable benefit.

Laparoscopic PD catheter insertion under local anaesthetic has been shown to be efficient, and can provide prophylactic benefit, and is well accepted by patients requiring Peritoneal Dialysis.

Minimally Invasive Other – P469

PRE OPERATIVE ANGIOGRAPHIC SPENIC ARTERY EMBOLIZATION BEFORE LAPAROSCOPIC SPLENECTOMY FOR GIANT SPLEENS: IS IT OF ANY BENEFIT?, Barak Barzakai MD, Uri Rimon MD, Dan Rosin MD, Oded Zmora MD, Jihan Obeid MSc, Yaron Munz MD, Moshe Shabtai MD, Amram Ayalon MD, Department of Surgry and Transplantation, Sheba medical center, Tel Aviv university, Tel hashomer ,52621, Israel.

Objective: Preoperative splenic artery embolization is recommended before splenectomy for giant spleens, in order to reduce the intraoperative blood loss and the need for blood transfusion.

The goal of this study was to assess the possible benefit and safety of angiographic splenic artery embolization before laparoscopic splenectomy for giant spleens.

Methods and procedures: retrospective chart and computer data of patients who underwent preoperative angiographic splenic artery embolization prior to splenectomy in our department was collected.

Preoperative embolization was performed using both micro coils and gelatin sponge fragments, the morning of the operation.

Results: Between may 2001-May 2006, 20 patients underwent splenic artery embolization prior to splenectomy in our department.

In 7 patients laparoscopic approach was attempted, in 4 of them conversion to open approach was needed due to either bleeding or major difficulties during dissection. In 3 cases the laparoscopic approach was completed uneventfully.

The mean spleen weight was 1713 grams and the mean length of spleen was 23 cm.

The mean operative time, mean blood loss and mean volume of blood transfused were lower in the converted group (96 min. vs. 185 min; 267 cc vs. 350 cc; 167 cc vs. 427 cc).

The mean postoperative hospitalization was longer in the converted group (11 days vs. 4 days).

Among the converted group 3 patients developed post operative complications (pancreatic fistula, F.U.O, aspiration pneumonia), while in the laparoscopically completed group 1 patient developed post operative complications (thrombophlebitis).

No complications related to the embolization were recorded.

Conclusions: Although preoperative angiography is safe procedure and should be considered before open splenectomy for giant spleens, the benefit in laparoscopic splenectomy for giant spleens is doubtful as the conversion rate of such procedures in this cases is high (more than 50%), and puts under scrutiny the utility of laparoscopic splenectomy for giant spleens.

Minimally Invasive Other – P470

GALL STONE PANCREATITIS AFTER ROUX-EN-Y GASTRIC BYPASS: A TECHNIQUE OF LAP-ASSIST ERCP VIA THE GASTRIC REMNANT DURING LAPAROSCOPIC CHOLECYSTECTOMY, Steven J Binenbaum MD, Frank J Borao MD, Steven A Gorcey MD, Monmouth Medical Center, Long Branch, NJ

Roux-en-Y gastric bypass surgery eliminates access to the second portion of the duodenum during the upper endoscopy. An ERCP may be required in evaluation of patients with symptomatic choledocholithiasis after having had gastric bypass surgery. Laparoscopically assisted ERCP during laparoscopic cholecystectomy is a safe technique for accessing biliopancreatic limb via the gastric remnant.

We describe a technique of performing an ERCP during laparoscopic cholecystectomy in two patients who presented with gall stone pancreatitis after the Roux-en-Y gastric

bypass operation. The first patient was diagnosed with gall stone pancreatitis many years after the operation and the second only six months after surgery. An ERCP was performed using a 15 mm laparoscopic port via the gastric remnant. Following extraction of stones from the common bile duct and sphincterotomy, laparoscopic cholecystectomy was successfully carried out as planned.

An ERCP performed through one of the laparoscopic ports is a safe and easy alternative to preoperative access to gastric remnant using interventional radiology techniques. Lap-assist ERCP is a one stage procedure executed at the same time as laparoscopic cholecystectomy which spares the patient the expense and the risk of complications from additional preoperative testing.

Minimally Invasive Other – P471

THE USE OF ELECTROTHERMAL BIPOLAR VESSEL SEALING SYSTEM (LIGASURE?) IN MINIMALLY INVASIVE VIDEOASSISTED THYROID SURGERY, Gianlorenzo Dionigi, Luigi Boni PhD, Francesca Rovera, Veronica Bianchi, Patrizia Castano, Francesca Villa, Matteo Annoni, Department of Surgical Sciences, University of Insubria

Minimally invasive video-assisted thyroidectomy (MIVAT) has been practiced in our Department since 2005. It has some advantages over conventional surgery in terms of postoperative pain and cosmetic result. The aim of this study was to evaluate the use of the electrothermal bipolar vessel sealing system (Ligasure Precise, Valleylab, USA) on the performance of this procedure.

Between October 2005 and August 2006, 30 patients underwent MIVAT. The device was used for the last 13 operations. We compared this group of patients (LP) with a control group (CG) using Ultrasonic coagulating-dissection system (Ultracision CS-14C, EthiconEndo-Surgery, Cincinnati, USA) of 10 patients who had undergone MIVAT before the introduction of the LP. The following parameters were considered: age, gender, preoperative diagnosis, size of the lesion, type of operation (lobectomy or total thyroidectomy), incision length (at the start of the procedure and at the end), operative time, complication rate, and postoperative hospital stay.

RESULTS The two groups were well matched for age, gender, preoperative diagnosis, lesion size, and type of operation. The mean operative time and postoperative stay were for both lobectomy and total thyroidectomy not significant different. One patient in CG group experienced a transient recurrent nerve palsy. No cases required conversion to open surgery and none involved significant intraoperative complications. No patients complained of hypesthesia or paresthesia of the neck region or discomfort while swallowing 5 months after surgery. All patients were satisfied with the cosmetic results. As for the incision length (at the start of the procedure and at the end) there was not significant differences in the two groups.

This study showed that the utilization of the Ligasure for MIVAT is safe. Ligasure for MIVAT is feasible and provides excellent cosmetic results with a minimal degree of postoperative complaints. A reduction of the rates for such complications such as hypoparathyroidism and recurrent nerve injuries was not possible to demonstrate in the present study. Much larger series are needed for further evaluation of this instrument.

Minimally Invasive Other – P472

TROCHARLESS LAPAROSCOPIC CAPD CATHETER PLACEMENT. A 2 YEAR REVIEW OF A NEW TECHNIQUE, Esmond Chi MD, Jukes Namm MD, Michael Chi BA, Antonio Robles MD, Loma Linda University, Jerry L. Pettis VAMC

INTRODUCTION: We describe a new technique for placing laparoscopic continuous ambulatory peritoneal dialysis (CAPD) catheters for end stage renal disease without the use of trochars.

PROCEDURE: A 5 mm left periumbilical incision is made. The abdomen is insufflated to 14 mmHg using the veress needle. The same incision is extended 4 cm transversely into a muscle splitting incision to expose the posterior rec-



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tus abdominus fascia. Here a purse-string suture is placed. A 16-french Bard introducer peel-away catheter (cath#0601520) is inserted through the purse-string and manually guided into the pelvis. Through this catheter a 5 mm, peritoneoscope visualizes the pelvis by identifying the bladder, sigmoid and pelvic bones. The catheter held firmly in place, and the scope is removed. A 57 inch Quinton CAPD catheter (cath #5c4160) is placed through the peel-away catheter into the pelvis. The peel-away sheath is removed and the CAPD catheter is left in the pelvis. The external end of the CAPD catheter is brought through a separate stab incision 3 cm cephalad. One liter of dialysate is infused and immediately retrieved to confirm of the catheter's function and location.

RESULTS: 10 consecutive patients who underwent a laparoscopic CAPD catheter placement over a 2 year period were reviewed. The trocharless technique (TL) was used in 4 patients. The single trochar technique (ST) was used in 6 patients. The mean follow-up was 12.3 months. Operative time, catheter long and short term function (fx), complications and removal were compared with both groups (table 1).

CONCLUSION: The trocharless technique for placing CAPD catheters is safe and effective compared to the single trochar technique

	TL(n=4)	ST(n=6)
op time (min)	52	70
% short term fx	100	100
% long term fx	80	30
removed CAPD(%)	0	50
infection (%)	25	33

Minimally Invasive Other – P473

LAPAROSCOPIC REMOVAL OF A RETAINED LAPAROTOMY SPONGE - A CASE REPORT AND LITERATURE REVIEW, Ravi J Chokshi MD, Mohammed I Khan MD, Samer Sbayi MD, Derick Christian MD, St. Francis Medical Center

A dreaded complication of surgery is a retained sponge or instrument. It is estimated that there is at least one sponge or instrument left in the body for every 8,000 to 18,000 cases. The standard of care has been to subject the patient to a repeat laparotomy and removal of the foreign body. We present a case of a 63 year old morbidly obese male who underwent an open cholecystectomy for acute cholecystitis. Difficult dissection and the patient's size caused the case to be prolonged with extensive bleeding. During final sponge and instrument counts, the sponge count was incorrect. An extensive exploration combined with multiple abdominal films failed to show evidence of the missing sponge. A computed tomography the following morning demonstrated the sponge ribbon. Later the same day, the patient underwent a diagnostic laparoscopy with removal of the sponge. The patient's hospital course was unremarkable and was subsequently discharged on the third post-operative day. We suggest the use of laparoscopy for the removal of foreign bodies is successful and minimally invasive when compared to a laparotomy.

Minimally Invasive Other – P474

DIAPHRAGMATIC HERNIAS FOLLOWING SEQUENTIAL VENTRICULAR ASSIST DEVICE EXPLANTATION AND ORTHOTOPIC HEART TRANSPLANTATION: EARLY RESULTS OF LAPAROSCOPIC REPAIR WITH PTFE, Shawn S Groth MD, Bryan A Whitson MD, Kenneth K Liao MD, Rafael S Andrade MD, Michael A Maddaus MD, University of Minnesota Department of Surgery

Introduction: Patients who undergo orthotopic heart transplantation (OHT) following ventricular assist device (VAD) explanation are at an increased risk of developing diaphragmatic hernias. Traditionally, repair of these hernias has been performed through an open approach. The aim of this study was to evaluate the safety, post-operative length of stay (LOS), and short-term efficacy of laparoscopic repair of diaphragmatic hernias post-VAD explantation.

Methods and Procedures: Single institution retrospective review of patients who underwent laparoscopic post-VAD

diaphragmatic hernia repair. Using a prospectively-maintained data base, patient demographics, operative details, and results of early follow-up were collected and analyzed. Failure of the repair was defined by chest x-ray or CT evidence of recurrence.

Results: Between January 2004 and February 2006, four men, mean age of 46 years (range 18 to 65), underwent laparoscopic post-VAD diaphragmatic hernia repair. The mean time to presentation following OHT was 30.8 months (range 9 to 63). The mean size of the defect was 9.5 cm (range 6 to 15). Three of the hernias contained omentum. One hernia, the only one which required emergent repair, contained transverse colon. All repairs were completely performed laparoscopically. Because it would have resulted in significant tension due to the size of the defects, none of the hernias were repaired primarily. Instead, a PTFE patch was secured over each patient's defect with pledget-reinforced, braided, nonabsorbable, hand-sewn mattress sutures and was reinforced with laparoscopic tacking screws. The mean LOS was 2.3 days (range 1 to 4). There were no peri-operative complications. At a mean follow-up period of 15.5 months (range 6.5 to 31), there have been no recurrences.

Conclusions: This report, the only series of laparoscopic repair of diaphragmatic hernias which developed following VAD explantation, demonstrates that laparoscopic repair with PTFE can be performed with minimal morbidity, with a brief LOS, and with excellent short-term results.

Minimally Invasive Other – P475

EARLY RETURN TO PERITONEAL DIALYSIS FOLLOWING LAPAROSCOPIC REVISION OF MALFUNCTIONING CATHETERS, J Gutierrez MD, A. Ney MD, M Odland MD, C Richardson MD, HCMC

Introduction: Laparoscopic revision of Peritoneal Dialysis Catheters (PDC) is an accepted technique to identify and manage the common causes of malfunction. In our series the use of a two millimeter telescope and three millimeter ports allowed early return to dialysis following revision.

Methods: Between 2005-2006, eight patients underwent laparoscopic revision of PDC. Patient age, diagnosis and time to catheter revision were analyzed. In seven patients the PDC exit site was used to insufflate the abdomen, in one patient the catheter was plugged and the Veres technique was used for insufflation. All patients had a 2mm telescope placed, two patients had one additional 3mm port placed, six patients had 2 additional working ports placed. All patients had the PDC secured to the anterior abdominal wall to direct the catheter into the pelvis.

Results: All catheters were initially implanted using the open technique. Laparoscopic findings at time of revision were migration (four) and omental wrapping (four). Four patients started using their catheters two to seven days from revision and two patients in two weeks. Complications included a postoperative partial small bowel obstruction treated medically. This patient was unable to use the PD catheter secondary to pain and inadequate dialysis. One patient had chronic pain with peritoneal dialysis runs and asked to have the catheter removed. The remainder of the catheters continue to function.

Conclusion: Laparoscopy is highly effective in the management of peritoneal dialysis dysfunction. With the smaller ports early return to peritoneal dialysis is safe. None of our patients had port site leakage problems. Securing the catheter to the abdominal wall directed toward the pelvis has prevented catheter migration and omental plugging in our series. We recommend laparoscopic technique be used for revision of malfunctioning peritoneal dialysis catheters.

Minimally Invasive Other – P476

LAPAROSCOPIC SURGERY FOR PERSONS OF ADVANCED AGE, Ken Hagiwara MD, Minoru Matsuda MD, Motoo Yamagata MD, Shigeoki Hayashi MD, Tadatoshi Takayama MD, Division of Digestive Surgery, Nihon University school of Medicine

Introduction; the average life span of Japanese people is extending year and year, a person of advanced age is increasing. So, the opportunity of performing surgical oper-



ation for parson of advanced age will be increase. It is the important point of surgical operation for patient of advanced age to perform minimally invasive operation and to prevent of postoperative complication. We investigated on safety and feasibility of laparoscopic surgery for old age. Patient selection; Eighteen cases of gastrointestinal malignancies (include 10 cases of gastric cancer and 8 cases of colorectal cancer) were selected. the average of age was 85.1 y.o. (81-96). Male : female= 1:1, 2 cases of local resection except lymphadenectomy, 7 cases of distal gastrectomy, 1 case of total gastrectomy, 2 cases of ileocecal resection, 1 case of Rt. hemicolectomy, 2 cases of sigmoidectomy, and 3 cases of anterior resection.

The Performance Status (P.S.) before operation were grade 0= 1 case, grade 1= 5 cases, grade 2= 8 cases, grade 3= 2 cases and ASA were PS 1= 6 cases and PS 2= 12 cases. They have preoperative complication (11 cases of hypertension, 1 case of Diabetes, 1 case of cerebral infarction, 3 cases of renal failure, 2 cases of heart disease, 4 cases of anemia and 1 case of COPD)

Result; we performed operation laparoscopically in all cases. Average duration of operation is 194.5 min. Average blood loss is 117.5 ml. There is no intraoperative complication. One case of renal failure, 1 case of pneumonia and 1 case of pseudomembranous enterocolitis were observed as postoperative complication. All patient recovered and discharged by conservative therapy and average of hospital stay was 21.7days. As a result, laparoscopic procedure was able to perform safety in old age.

Conclusion; laparoscopic procedure is feasible and safety for parson of advanced age and some benefits were given the patients.

Minimally Invasive Other – P477

LAPAROSCOPIC APPENDECTOMY PERFORMED IN OUR INSTITUTION, Yuzo Hirata MD, Jiro Okiyama MD, Yasuhiro Imaoka MD, Chiaki Inokuchi MD, Inokuchi hospital

Methods Here we present the results of a study carried out on 83 patients diagnosed with pathologically confirmed appendicitis from January 2002 to June 2006 in our institution. Patients ages ranged from 11 to 81 and the male-female ratio was 51:32. They were divided into three different groups for surgery, with 22 patients undergoing laparoscopic surgery (LA group); 57 patients subject to open appendectomy (OA group); and 4 patients converted to open appendectomy (CO group). Following a post-operational examination for cancer, the extent of appendicitis in patients was then examined for this study.

Results We found no cases of superficial (S) inflammation in the LA group, although there were 9 phlegmonous (P), and 13 gangrenous cases (G). The OA group contained 5 cases of S, 34 cases of P, and 20 cases of G. Among the CO group there were 4 cases of G. Although we found that there was no difference in duration of surgery among P cases from either the LA or OA groups, we did find that significantly longer surgery was required for G cases from the LA group. Furthermore, three cases from the OA group were observed as suffering from wound infection, while there were no such cases in the LA group. Although there was no difference in the total number of hospitalized days required in either LA or OA groups, the period of admittance in the CO group was considerably longer than either of these two groups.

Conclusion An increase in the number of cases of laparoscopic appendectomy being performed has been accompanied by an improvement in surgical outcome. This technique can be seen as being particularly beneficial to the patient in terms of cosmetic considerations and a lack of complications. In the event of patients developing an intestinal obstruction or having a highly inflamed appendix, however, the subsequent difficulties encountered in performing laparoscopic manipulation means that it is extremely important to consider an intraoperative change to open appendectomy.

Minimally Invasive Other – P478

A CASE OF KAPAROSCOPIC PERSISTENT URACHAL RESECTION, K Ishii MD, K Katagiri MD, Y Takahashi MD, K Itabashi MD, K Furuta MD, M Watanabe MD, KITASATO University

A 23-year-old female with persistent urachal with lower abdominal pain is reported.

She had this episode from the period of elemental school student and had at the period of senior high school and 21-year-old. She searched disease with a similar symptom in internet and suspected persistent urachal. At admission, a induration was palpated in the midline of her lower abdomen. We approached with laparoscopic operation. Three ports was inserted in abdominal cavity at left lateral abdomen. A fold of urachal in lower abdomen was searched and excised with laparoscopic operation. The cut-end near the bladder was ligated with a endoloop. After operation, She had no symptom with no complication. As 6 months after operation, it is uneventful.

Laparoscopic persistent urachal resection is feasible and safty operation.

Minimally Invasive Other – P479

GEOGRAPHIC VARIATION IN ADOPTION OF LAPAROSCOPIC CHOLECYSTECTOMY, Jason A Kemp MD, Samuel R G. Finlayson MD, Dartmouth-Hitchcock Medical Center

Introduction: For many general surgeons, the professional isolation of rural practice serves as an obstacle to the adoption of new techniques. Whether this obstacle impeded the dissemination of laparoscopy in rural settings is not known.

Methods: Using the Healthcare Cost and Utilization Project Nationwide Inpatient Sample, American Hospital Association data, and Rural-Urban Commuting Codes, we identified all laparoscopic and open cholecystectomy procedures performed in rural and urban hospitals for each year from 1988 to 1997. We then examined the trends in adoption of laparoscopic cholecystectomy in rural versus urban hospitals.

Results: 4,683,343 cholecystectomies were performed nationwide from 1988 to 1997. Overall, the proportion of procedures done laparoscopically increased from 2.9% to 81.9% for elective cholecystectomy, and from 1.1% to 71.8% for urgent cholecystectomy. The proportion of elective procedures done laparoscopically increased sharply from 1990 to 1992 from 2.9% to 73.7% and remained high for both rural and urban areas, with negligible difference in timing of adoption. Use of the laparoscopic approach for urgent cholecystectomy increased sharply from 1990 to 1992 (1.1% to 55.4%), and since 1992, has continued to increase steadily in both rural and urban areas (to 69.6% and 74.0% respectively). These trends were not substantially different across geographic regions of the US.

Conclusions: Although very small differences in the use of laparoscopy in rural vs. urban settings are evident, the timing and rate at which rural surgeons adopted laparoscopic cholecystectomy mirrored that of urban surgeons from 1988 to 1997. These data suggest that most rural surgeons managed to learn and adopt the laparoscopic approach to cholecystectomy despite the obstacle of professional isolation.

Minimally Invasive Other – P480

TITLE: LAPAROSCOPIC PLACEMENT OF AN ABSORBABLE MESH TO PROTECT SMALL BOWEL DURING PELVIC RADIOTHERAPY. F M Kiernan MD, M Joyce MD, C K Byrnes MD, N Davarinos MD, P Thirion MD, P Neary MD, F B Keane MD, Division of Colorectal Surgery , Department of General and Vascular Surgery, Adelaide and Meath Hospital, Tallaght, Dublin 24 , and Department of Radiation / Oncology St Lukes Hospital, Rathgar, Dublin 6, Ireland

Introduction: Radiotherapy has significantly improved the outcome for patients with pelvic malignancies. The response to treatment is dose dependent but the presence of small bowel in the radiation field is a limiting factor. Intestinal slings have been developed to suspend the bowel above the pelvis facilitating the delivery of radiation thus improving the potential for oncological cure. These have traditionally been inserted using an open technique. We herein



SAGES POSTER ABSTRACTS

describe the placement of a mesh using a minimally invasive technique.

Methods: The medical reports of three patients, who were diagnosed with prostate cancer, were reviewed. Pre-radiotherapy Cat Scans identified small bowel in the radiation field. The 3 patients had small bowel extracted from the pelvis with the insertion of an absorbable mesh using a minimally invasive technique. Patients were rescanned following radiotherapy.

Results: There were no complications from laparoscopic mesh placement, and elevation of small bowel from the pelvis. All patients were discharged surgically within 48 hours. All patients received the optimal dose of radiotherapy (70 Gy) with a check CT scan confirming dissolution of the mesh at 6 weeks.

Conclusion: Elevation of the small bowel from the pelvis allows dose escalation of radiation, and improved survival from pelvic malignancies. This case series indicates that the use of laparoscopic surgery for mesh placement is feasible. In addition the early recovery and minimal morbidity from the laparoscopic approach allows early initiation of radiotherapy in contrast to an open technique. The use of an absorbable mesh reduces potential for mesh associated complications.

Minimally Invasive Other - P481

A "REVIVED" TESTICLE DURING LAPAROSCOPIC INGUINAL HERNIA REPAIR: A DIFFICULT INTRAOPERATIVE DECISION !, Gaetano La Greca PhD, Saverio Latteri MD, Francesco Barbagallo MD, Salvina Gagliardo MD, Emanuele Grasso MD, Maria Sofia MD, Domenico Russello MD, Department of Surgical Sciences, Transplantation and Advanced Technologies University of Catania, Cannizzaro Hospital,

Intraoperative surprises are not so rare and every surgeon is trained to overcome different problems and choose the best solution for the patient and for himself. These unexpected "surprises" are mostly related to unknown diseases, anatomic abnormalities or particular technical problems sometimes also extremely difficult to solve. This report concerns about a common case of a 44 years old male patient who was operated laparoscopically for the third recurrence of a left inguinal hernia in which however the intraoperative surprise was unique. The patient was father of two sons (24 and 21 years) and had been operated 20 years prior because of left inguinal hernia. The patient referred, and physical examination confirmed it, that the left testicle was removed by the surgeon because of intraoperative complication during that first operation. The patient had other two operation for recurrence of left inguinal hernia and also an operation for right inguinal hernia. During the laparoscopic hernia repair (TAP) the "surprise" was the following. Inside the abdomen, just near the inner inguinal ring and laterally to the hernial sac a normal testicle was found. This "surprise" carried relevant discussion between surgeons and the called urologists concerning medical, legal and psychological problems. These relevant legal problems were also related to the need to respect the privacy and to the difficult decision to maintain or resect the testicle that resulted normal at intraoperative US. The problems were related also to the fact that patient's girl-friend was young and did not had children but was also not legally married and also that the real function of the right testicle was unknown. The team decided to save the "revived" testicle gently preparing the spermatic cord and performing an orchidopexy. The technique for the hernia repair had to be modified. The day after surgery the patient was informed of the singular situation and also about his increased oncological risk due to the fact that the "revived" testicle was for 20 years intraabdominal. The patient was extremely happy to have again two testicle and refused the proposed orchiectomy accepting anyway a follow-up. The case is in our opinion really singular and interesting for different technical, surgical, legal, psychological and ethical aspect.

Minimally Invasive Other - P482

FAREWELL TO MCBURNEY'S INCISION: SHOULD LAPAROSCOPIC APPENDECTOMY BE THE GOLD STANDARD FOR APPENDICITIS?, Peter Lalor MD, Samuel Szomstein MD, Raul J Rosenthal MD, Cleveland Clinic Florida

Background: Appendicitis can be treated successfully by open or laparoscopic appendectomy. In the era of minimally invasive surgery, laparoscopic appendectomy is arguably a better procedure when assessing wound complications, technical feasibility, and diagnostic advantages. Open appendectomy via traditional McBurney's incision may not be the optimal treatment for appendicitis. The aim of this study was to examine the standardized laparoscopic treatment of all cases of appendicitis by a minimally invasive-trained surgeon.

Methods: We retrospectively studied 125 consecutive patients undergoing laparoscopic appendectomy by a single surgeon between July 17, 2001 and August 21, 2006. All patients that presented with suspected appendicitis clinically or radiologically were surgically treated by the laparoscopic approach. Intraoperative findings and postoperative complications were reviewed.

Results: Of the 125 patients who underwent laparoscopic appendectomy for appendicitis, 100% of patients were successfully treated with a minimally invasive surgical approach without a single conversion to an open procedure. 11% (n=14) of patients had a perforated appendix, 5% (n=6) had gangrenous appendicitis, and 2% (n=3) had abscesses. Morbidity including wound infection, ileus, and abscess was 17% (n=21). There were no major complications and no re-operations for any reason. 11% (n=14) of patients had a normal appendix at operation. Length of stay averaged 2.4 days for all patients.

Conclusions: Although the literature has not shown a statistical advantage to laparoscopic versus open appendectomy, at our institution laparoscopic appendectomy is the gold standard for the treatment of appendicitis. Since conversion from laparoscopy indicates mid-line laparotomy, open appendectomy via McBurney's incision appears obsolete.

Minimally Invasive Other - P483

MANAGEMENT OF CHOLEDOCHOLITHIASIS AMONG THE UNITED STATES ARMY GENERAL SURGEONS, Sukhyung Lee MD, Kyle N Remick MD, John P Schriver MD, William Beaumont Army Medical Center, El Paso, TX, USA

BACKGROUND: Laparoscopic cholecystectomy is the procedure of choice for removal of the diseased gallbladder, but controversy exists over various treatment methods for choledocholithiasis suspected preoperatively or discovered during surgery. The goal of this study is to determine if continuity in the diagnosis and treatment of choledocholithiasis exists among the United States (US) Army general surgeons.

METHODS: Web based survey was sent out to the US Army general surgeons to address the indications for pre-operative Endoscopic Retrograde Cholangiopancreatography (ERCP), laparoscopic intra-operative cholangiogram (IOC), and laparoscopic common bile duct exploration (LCBDE).

RESULTS: Forty six surgeons with average age of 44.35 years (Min 33 to Max 63) and average years in practice of 10.4 years responded to our web survey. Ninety two percent (36/39) of the US Army general surgeons perform selective pre-operative ERCP versus 8 percent (3/39) that do not perform pre-operative ERCP. ERCP services are available to all but one surgeon (25 at the same hospital and 16 by referral out of 42 responses). All but one surgeon perform selective IOC. Only one surgeon performs routine IOC. Fifty two percent of the surgeons (22/42) perform LCBDE. Average age, LCBDE training during residency, and laparoscopic training during residency did not differ between the group of surgeons who performs LCBDE and do not perform LCBDE. Some of the reasons for not performing LCBDE are lack of experience (11/20) and the availability of instrumentation (4/20).

CONCLUSIONS: Selective pre-operative ERCP and IOC are the preferred methods of managing choledocholithiasis among the US Army General Surgeons. Fifty two percent of the US Army General Surgeons do not perform LCBDE due to the lack of experience and the availability of instrumentation.



Minimally Invasive Other – P484

IS COMPLETING A LAPAROSCOPIC FELLOWSHIP AFTER RESIDENCY WORTHWHILE?, Rockson C Liu MD, CK Chang MD, Thomas Rolle MD, Kaiser Permanente Medical Center, Walnut Creek, CA

BACKGROUND: Many residents seek laparoscopic fellowship training to overcome the steep learning curve associated with advanced laparoscopic procedures. Few studies have documented the impact of laparoscopic fellowship training on a surgeon's 1st year in practice. This study details the experience of a single surgeon (RCL) who completed a 1 year advanced laparoscopic digestive fellowship (80% bariatric) after finishing residency.

METHODS: A prospective case log of the lead author's 1st year cases in a community hospital was reviewed. A total of 224 cases were performed as primary surgeon, of which 141 (63%) cases were laparoscopic. Of these laparoscopic cases, 65 (46%) were complex (defined as not appendectomy, cholecystectomy or diagnostic). Seven types of minimally invasive procedures, totaling 15 cases -- esophagectomy, splenic artery aneurysm resection, distal pancreatectomy, gastrojejunostomy, liver resection, SLiC, transcystic biliary stenting, and adrenalectomy -- were performed for the 1st time at the hospital, thus avoiding the need for open surgery or outside referral. In all complex laparoscopic cases, there was 1 (1.5%) conversion during a laparoscopic sigmoid colectomy for diverticulitis. There were no mortalities and 2 (3%) major complications of bleeding after laparoscopic colectomy requiring re-exploration. An additional 37 complex laparoscopic cases, mostly laparoscopic colectomies (19) and low anterior resections (5) were performed as teaching assistant.

CONCLUSION: Formal post-residency laparoscopic fellowship training provides a rapid means of foundation building and skills acquisition for a broad range of advanced laparoscopic operations. The impact of fellowship training is immediately evident in the 1st year of practice.

Minimally Invasive Other – P485

LAPAROSCOPIC MECKEL'S DIVERTICULECTOMY IN PATIENT WITH MECKEL'S DIVERTICULUM COMPLICATED BY SMALL BOWEL OBSTRUCTION: A CASE REPORT, Sopark Manasnayakorn MD, Chadin Tharavej MD, Department of Surgery, Faculty of Medicine, Chulalongkorn University, Bangkok, THAILAND

Intestinal obstruction caused by Meckel's diverticulum is rare and is usually associated with the fibrous cord attached between the diverticulum and the abdominal wall. We report herein the intestinal obstruction caused by an internal herniation of the distal ileum through the loop formed by an adhesion between the inflamed diverticulum and the ileal mesentery.

A Case report: A 15 year-old male presented with a clinical of intermittent intestinal obstruction. The patient had no previous abdominal surgery. On physical examination, no visible hernia was detected. Acute abdomen series revealed dilated small bowel loops. CT scan of the abdomen showed multiple dilated small bowel loops with collapsed distal ileum without any identifiable cause. Diagnostic laparoscopy demonstrated an internal herniation of distal ileum through the loop formed by an adhesion between the inflamed Meckel's diverticulum and the ileal mesentery. The authors proceeded to laparoscopic Meckel's diverticulectomy with Endo GIA 45-2.5mm (Tyco Healthcare). Postoperative course was uneventful. The oral intake was started on the following day and he was discharged from the hospital on the 3rd postoperative day.

Conclusion: Laparoscopy may serve as a useful diagnostic tool in patients with intestinal obstruction without previous abdominal surgery. Furthermore, the cause of intestinal obstruction, for example that associated with Meckel's diverticulum, can be successfully managed laparoscopically.

Minimally Invasive Other – P486

HIRING PRACTICES IN MINIMALLY INVASIVE SURGERY: A NATIONAL SURVEY OF SURGICAL CHAIRS, Guillaume Martel MD, Eric C Poulin MD, Joseph Mamazza MD, Robin P Boushey MD, Department of Surgery, Minimally Invasive Surgery Group, The Ottawa Hospital, University of Ottawa, Ottawa, ON, Canada

INTRODUCTION: An increasing number of surgical departments emphasize advanced minimally invasive surgery (MIS) within their institution. The objective of this study was to qualify the status of MIS within academic surgical programs, and to quantify its growing importance with respect to surgical hirings.

METHODS: A questionnaire was mailed to surgery department chairs and general surgery division heads at all 16 Canadian academic institutions. Non-responders were identified and contacted directly. Data pertaining to MIS were collected, including demographics, perceptions of MIS, and hiring data.

RESULTS: Overall, 77% of chairs responded (n=23/30), with representation from 94% of departments (n=15/16). Among surveyed chairs, 91% intend to increase the importance of MIS at their institution within 5 years, of which 90% intend to do so with new hirings. Networking (74%) and retaining one's graduates (87%) were cited most frequently as recruitment strategies in hiring new MIS surgeons. Among hiring goals, strengthening the division, strengthening subspecialties, research, and education were considered important or extremely important by >90% of chairs. Strengthening MIS was considered important or extremely important by 59% of chairs. Within 5 years, chairs intend to hire a median of 4 general surgeons, of which 51% will have formal MIS training. In comparison, over the last 10 years, significantly fewer new recruits (26%, p<0.001) had formal MIS training. Chairs (>90%) considered formal MIS fellowship, MIS fellowship plus a second fellowship, and proctorship to be adequate or completely adequate training for advanced MIS. Residency training (48%), week-end/long courses (65%), and self-teaching (74%) were considered inadequate training. Lack of OR time and costs/resources issues were considered most limiting in hiring new MIS surgeons.

CONCLUSIONS: Minimally invasive surgery is growing in importance within academic surgical departments, but it remains an intermediate priority for chairs and recruiters. It does not appear to substitute for traditional hiring goals. Formal MIS training appears important in recruiting new surgeons, while traditional training methods are considered inadequate.

Minimally Invasive Other – P487

SEROMASCOPEY: NON-ANATOMIC SPACE EXPLORATION WITH LAPAROSCOPE, VINEY K MATHAVAN MD, JOHN GUSZ MD, Robinson Memorial Hospital, Ohio

Abstract: The advent of Minimally Invasive Surgery has allowed access into body cavities with similar to superior results when compared to traditional open surgery. Heretofore, the overwhelming majority of reported procedures dealt with access into, and maneuvers in defined anatomic spaces. We are introducing a new thought process in that we used a video telescope to diagnose and treat a chronic condition in a non-anatomic space.

Case History: A 49-year-old morbidly obese male with an enormously thick abdominal wall presented with a non-healing abdominal wound subsequent to infected mesh removal after a hernia repair. Local probing in the office revealed a long subcutaneous tract and no foreign body.

Operative Procedure: Under minimal intravenous sedation, the midline wound was examined. The small 3-4 mm hole was probed. It extended approximately 6-8 cm inferiorly and terminated in the subcutaneous tissue. A 5mm trocar was advanced through the hole and a video telescope was inserted. The anterior abdominal wound was insufflated to a low pressure and its contents visualized. The tract terminated in a large cavity anterior to the fascia. The cavity contained mostly healthy granulation tissue. A strand of knotted prolene suture with white fibrous material caught in the



interstices of the suture was seen at the base. The camera was removed and an irrigator was used to copiously lavage the cavity. The camera was reinserted, a Kelly clamp was introduced into the cavity via a counter-incision and the suture was grasped. The suture was brought through the incision and was incised and removed. There was white foreign material, (cotton swab) caught in the suture. The wound was irrigated, cleaned and dressed. After this wound and sinus tract completely healed. At three years there is no evidence of recurrence.

Discussion: The uses of video telescopes are numerous. The use of a laparoscope in the exploration of a seroma cavity has not been reported. Here in was an example of the use of laparoscopic instruments and skills for non-anatomic space exploration (seromascopy). The technique is quick, relatively easy for a surgeon with basic laparoscopic skills and requires minimal sedation. This application allowed us to treat the condition expeditiously. If it is not helpful, standard open technique is not jeopardized. The choledochoscope may be used as an alternative to blind probing of suture sinuses.

Minimally Invasive Other – P488

LAPAROSCOPIC ASSISTED VENTRICULOPERITONEAL SHUNT EXPERIENCE IN URBAN CENTER, Kellie McFarlin MD, John Webber MD, Wayne State University Department of Surgery

Introduction: Several techniques have been described for laparoscopic assisted ventriculoperitoneal (VP) and lumbar peritoneal (LP) shunt placement. Single port placement with a Seldinger catheter and mini-laparoscopy with a 2mm laparoscope have been described for uncomplicated abdomens. This study reviews all lap assisted shunt cases in an urban hospital applying a two to three port technique.

Methods: All cases of laparoscopic assisted VP and LP shunts were reviewed from Harper University Hospital from January 2004 to August 2006. All procedures were performed by single general surgeon with neurosurgery department staff. A total of 30 cases were performed. 24 patients underwent VP shunt placement and 6 had LP shunt placement, ages 17 to 84. An umbilical port was placed followed by left upper quadrant and/or left lower quadrant ports under direct visualization. Alternative port placement was directed by previous abdominal surgery, scars from prior shunt revision or patient position (i.e. lumbar shunts).

Results: All cases had successful catheter placement and no intra-abdominal injury. 33% of patients had previous abdominal surgery or morbid obesity. Lysis of adhesions to facilitate optimal catheter placement was required in 30% cases. The indication for surgery in 23% cases was for distal shunt revision.

Discussion: Laparoscopy assisted VP and LP shunt insertion maintains the advantage of direct visualization for optimal catheter placement and function assessment during the procedure. Our technique of using two to three ports added no additional complications and was necessary to optimize catheter positioning in a complicated abdomen. This technique is applicable to most urban centers with a high volume of complex patients transferred to a tertiary care center for either shunt revision or malfunction.

Minimally Invasive Other – P489

A NOVEL TECHNIQUE FOR BILATERAL LAPAROSCOPIC ADRENALECTOMY, Matthew A Metz MD, Walter L Pegoli MD, Luke O Schoeniger MD, University of Rochester

Laparoscopic adrenalectomy is described in the literature as a procedure performed through either a lateral decubitus or a posterior exposure. These techniques, while extremely effective, are cumbersome in patients requiring bilateral adrenalectomy. We describe a trans-peritoneal approach to both adrenals. The left adrenal gland is accessed through a window in the mesentery, inferior to the pancreas, and lateral to the inferior mesenteric vein. The procedure is performed entirely with the patient in a supine position, thereby eliminating the need for re-positioning.

Two patients: An obese six-year-old with adrenogenital syndrome, and an eighteen-year-old with congenital adrenal

hyperplasia underwent bilateral laparoscopic adrenalectomy using this technique. Operative time was ~270 minutes, respectively, and estimated blood loss was less than 50 cc for each patient.

Minimally Invasive Other – P490

FUNDUS-FIRST LAPAROSCOPIC CHOLECYSTECTOMY IS SAFE AND REDUCES THE CONVERSION RATE., Shahram Nazari MD, Semira Mousavi khosroushahi MD, Abolfazl Jamal-Abbasi MD, Mohammad Ali Mohammadzadeh MD, Department of General and Laparoscopic Surgery, Milad Hospital, Tehran, Iran.

Summary

OBJECTIVES: Laparoscopic cholecystectomy (LC) is the "gold standard" in surgical management of symptomatic cholelithiasis. Isolation of the cystic duct is the first dangerous technique in laparoscopic cholecystectomy. Nearly all of the laparoscopic surgeons are now popular with standard laparoscopic cholecystectomy, in which dissection begins at Calot's triangle. In conventional open cholecystectomy, the fundus-down approach is a well recognized safe procedure during difficult cholecystectomies because it minimizes the risks of damage to the structures in or around Calot's triangle. In spite of this, fundus-first dissection (FFD) is not widely practiced in LCs.

METHODS: The purpose of this study is to evaluate the facility of FFD in difficult LCs. The study included 500 patients treated over 25 months. The inclusion criterion was the presence of ultrasound proven gallstones. Patients were excluded from the study if there was evidence of common bile duct stones, or carcinoma of the gallbladder. The great majority were difficult cases, so we also reviewed the safety aspects of this approach and evaluated whether the fundus-first technique can prevent conversion in difficult cases.

RESULTS: The fundus-first approach was started in 35 patients; 30 procedures were completed laparoscopically. Five of the cases were further converted to open surgery. The mean operative time was 95-130 minutes (mean 112.5), which is significantly greater than conventional laparoscopic standard cholecystectomy (range 20-40 minutes, mean 30). Fundus-first laparoscopic cholecystectomy (FFLC) was performed without immediate or late complications.

CONCLUSION: FFLC appears to be safe procedure, and has the potential to reduce the conversion rate in difficult cases and may decrease the risk of injury to bile ducts.

RECOMMENDATION: FFLC could be started in difficult LCs. The surgeon should have adequate laparoscopic experience. If in spite of FFD, the anatomy of Calot's triangle is still obscure, he must convert to open exploration to prevent bile duct injuries.

Minimally Invasive Other – P491

LAPAROSCOPIC RESECTION OF GIST, WHEN MIGHT IT NOT BE APPROPRIATE?, Gary P Neale MD, Ajay Upadhyay MD, George Kazantsev MD, Rupert Horoupian MD, Steven Stanten MD, Arthur Stanten MD, Alta Bates Summit Medical Center, Oakland, California

Background: Gastrointestinal stromal tumors (GIST) are rare tumors of the GI tract. Modern surgery is moving towards increased application of laparoscopy in abdominal surgery. We present here our surgical experience with GIST and the manner in which the surgery was performed.

Methods: Retrospective chart review of all patients diagnosed with GIST between April 2003 and June 2006 for a private surgical group. Patients were identified by an electronic search of Department of Pathology records. Charts were reviewed for presenting complaint, pre-operative work up, operation performed, outcome, and length of stay.

Results: Fifteen patients underwent surgery during this period. The location of these GIST included one in the distal esophagus, eleven in the stomach, one in the small bowel, one in the rectum and one 17.5 cm tumor in the pelvis of indeterminate origin. Seven (46%) were 10cm in size or larger. Patients ranged in age from 33 to 83, and tumor size was from 1 to 22.7cm. Nine surgeries were performed open, two laparoscopic, two robotic, one laparoscopic assisted and one trans anal. Discharge was from 3 to 41 days after surgery.



Conclusions: While GIST may be operated upon laparoscopically, many of the patients in our series had a tumor of such a size that would preclude them from receiving the benefits of minimal invasive surgery, particularly when considering specimen removal. We conclude minimal invasive surgery has a role, but is not to be the goal for every patient diagnosed with GIST.

Minimally Invasive Other – P492

BILATERAL PNEUMOTHORACES FOLLOWING ERCP AND SPHINCTEROTOMY, Haridimos Markogiannakis

MD, Konstantinos G Toutouzas PhD, Nikolaos Pararas PhD, Andreas Romanos PhD, Dimitrios Theodorou PhD, Ioannis Bramis PhD, 1st Department of Propaedeutic Surgery, Hippocrates Hospital, Athens Medical School, University of Athens, Athens, Greece

Objective: An extremely rare case of bilateral pneumothoraces following ERCP with endoscopic sphincterotomy is reported.

Case report: A 56-year-old woman was admitted to our department due to acute cholangitis. The patient presented with right upper quadrant pain, fever, chills, and vomiting of 24 hours duration. Clinical examination revealed jaundice and right upper quadrant tenderness with guarding but no rigidity or rebound. Chest x-ray on admission was normal. Blood tests revealed leukocytosis and elevation of α -GT, ALP, and bilirubin levels. Abdominal ultrasound demonstrated cholelithiasis along with two large stones in a dilated common bile duct. At ERCP, dilatation of the common bile duct and two common bile duct calculi were confirmed. Endoscopic sphincterotomy was performed and the stones were extracted. Post-sphincterotomy cholangiogram showed no extravasation of contrast. Over the ensuing 20 minutes, the patient developed marked subcutaneous emphysema with crepitus extending to the neck, upper abdominal pain, and shortness of breath. Clinical examination demonstrated tachycardia, tachypnoea, decreased oxygen saturation, bilaterally diminished breath sounds, mild abdominal distension and epigastric tenderness without peritoneal signs. Radiograph of the chest and abdomen revealed bilateral pneumothoraces, pneumomediastinum, subcutaneous emphysema, pneumoperitoneum, and free air in the retroperitoneum. Bilateral chest tubes were placed and the patient was managed with nasogastric suction and broad-spectrum antibiotics. Esophagogram and upper gastrointestinal series demonstrated no extravasation of contrast. Chest and abdominal CT, performed on the next day, revealed subcutaneous emphysema, pneumomediastinum, pneumoperitoneum along with free retroperitoneal air. Neither any intra-abdominal or retroperitoneal fluid collection or abscess nor contrast extravasation from the gastrointestinal tract was demonstrated. Liver function tests were normalized on the 2nd post-ERCP day while resolution of bilateral pneumothoraces was confirmed on chest x-ray on the 4th day and both chest tubes were removed. The patient had an uneventful recovery and was discharged on the 10th day.

Conclusion: Bilateral pneumothoraces is a very rare complication of ERCP/endoscopic sphincterotomy. Despite the dramatic physical and radiographic findings, the patient responded to early treatment and conservative management with a favourable outcome.

Minimally Invasive Other – P493

LAPAROSCOPIC APPROACH OF MATURE SOLID TERATOMA OF FALLOPIAN TUBE: CASE REPORT, Valentina Ratkajec

MD, Josip Bakovic MD, Toni Kolak PhD, Igor Stipancic PhD, Zeljko Busic PhD, Petar Marusic MSc, Department of abdominal surgery, University Hospital Dubrava

Introduction: We report a laparoscopic resection of mature solid teratoma arising in the fallopian tube. The mass was noted on MSCT prior to surgery for a mature cystic teratoma. The incidence of a mature solid teratoma of the fallopian tube is extremely low.

Case report: A 43-year-old nulligravida female, was seen at the emergency room because of worsening right lower quadrant abdominal pain, nausea and vomiting.

The physical examination showed tenderness on palpation of the right lower abdominal quadrant with rebound tenderness and a freely movable mass in cecoascendens projection. Bowel sounds were hypoactive. Preoperative laboratory data showed microcytic anemia, serum concentration of cancer markers CA 19-9 were increased (79.6) and CA 125 (9.40) were within normal limits. No leukocytosis was noted. High resolution ultrasound examination was inconclusive. First MSCT revealed inhomogeneous tumor (size 9, 5 x 11 cm) with calcification and sharp border to surrounding structures on the right side of lower abdomen. Colonoscopy findings did not reveal any pathology. Repeated MSCT scan showed tumor on the opposite side. Preoperatively, we considered that these findings represented acute abdomen due to probable bowel obstruction caused by small intestine tumor. The patient was taken to surgery, and the abdominal cavity was laparoscopically explored. Laparoscopy demonstrated a solid-appearing mass, approximately 10 - 11 cm in diameter, located in the ampullary segment of the right fallopian tube. Teratoma was attached by a pedicle to the tubal mucosa. Laparoscopic excision was performed, and the mass of the right fallopian tube and right ovary were resected. Pathology revealed mature cystic teratoma of the fallopian tube. The patient improved and was discharged 2 days after surgery.

Conclusion: Laparoscopic teratoma treatment in emergency condition combines two major advantages of laparoscopy: it is highly valuable in achieving the diagnosis when other diagnostic modalities don't give us clear picture in resolving the problem; laparoscopy approach presents the last frontier in teratoma treatment and is more acceptable method in comparison with classical surgery.

Minimally Invasive Other – P494

LAPAROSCOPIC PLACEMENT OF VENTRICULOPERITONEAL SHUNT CATHETERS USING MODIFIED SELDINGER TECHNIQUE, Michael Sawyer MD, Janice Strange, Darla Vardeman RN, David Pagnanelli MD, Videoendoscopic Surgical Institute of Oklahoma and Great Plains Surgical Institute, Lawton, Oklahoma

Introduction: Ventriculoperitoneal (VP) shunts are employed to treat hydrocephalus, or increased intracranial pressure. The abdominal terminus of the shunt is typically placed via a relatively large incision and dissection to expose the peritoneum. This is invasive and affords limited visualization of the peritoneal cavity.

Methods: We have placed six VP shunts using a modified Seldinger technique with a single trocar. Abdominal access is obtained with a 5 mm trocar at the umbilicus. The abdomen is insufflated to 15 mm Hg with CO₂. A separate 5 mm abdominal skin incision is made to tunnel the shunt catheter inferiorly onto the abdomen. An 18 gauge needle and guide wire are passed into the abdomen via this incision. The needle is withdrawn and a peel-away catheter - introducer set is placed into the peritoneal cavity over the guidewire. It is used to advance the catheter into any desired location in the abdomen under direct visualization.

Results: This approach has been uniformly successful. Operative trauma and scarring are minimized. Patients recover rapidly with minimum discomfort. All catheters are functioning well at a mean of 9 months' postoperative follow up. There have been no wound infections or other post-operative complications.

Conclusions: Laparoscopic placement of VP shunt catheters using a modified Seldinger technique offers several advantages over open approaches. This should be the preferred technique for placement of such catheters.

Conclusions: Laparoscopic placement of VP shunt catheters using a modified Seldinger technique offers several advantages over open approaches. This should be the preferred technique for placement of such catheters.

Minimally Invasive Other – P495

UNINSURED PATIENTS ARE OFFERED LAPAROSCOPIC HERNIA REPAIR LESS OFTEN, Susanna H Shin MD, Rebecca C

Britt MD, Eastern Virginia Medical School, Department of Surgery, Norfolk, Virginia, USA

Introduction: Laparoscopic hernia repair has become more common as increasing data has shown a shorter hospital stay (LOS) and an earlier return to work. The uninsured patient population at our institution is evaluated and sched-



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uled for surgery at a resident-run clinic. We hypothesized that the uninsured population was offered laparoscopic repair (LAP) less often than the private insured population. **Methods:** A retrospective chart review was performed of patients undergoing hernia repair (incisional (VHR) and inguinal (IHR)) on a single general surgery service. The patients included insured patients seen by attending surgeons at their private office and uninsured patients seen at the resident-run clinic. Data collected included age, gender, type of hernia, LAP vs Open (OP) repair, LOS and post-operative complications, including recurrence.

Results: From 7/02-6/06, 244 patients were scheduled to undergo elective hernia repair. 227 subjects had full records available for review. Subjects were then separated into insured (INS, n=177) and uninsured (UN, n=50) populations. These cohorts were similar in mean age (INS=48.5yrs, UN=44.7yrs, p=0.12) and male gender (INS=71.2%, UN=70%, p=0.87). A significantly greater proportion of the insured population underwent laparoscopic repair (INS=37.9%, UN=20%, p=0.02). The OP (n=150) and LAP cohorts (n=77) were similar in mean age (OP=46.6yrs, LAP=49.4yrs, p=0.20), male gender (OP=72.7%, LAP=67.5%, p=0.42) and rate of post-operative complications (OP=10%, LAP=14.3%, p=0.34). The LOS between those VHR subjects that underwent OP vs LAP (OP=1.4days, LAP=1.8days, p=0.23) was not significantly different.

Conclusions: In our practice, the uninsured patient population is offered minimally invasive surgery less often than the insured. Given that this patient population can ill afford the lost wages from missed work, an effort must be made to educate surgical residents on indications for laparoscopic hernia repair so the uninsured will be offered the same care as the insured.

Minimally Invasive Other – P496

PARTIAL CHOLECYSTECTOMY FOR MIRIZZI SYNDROME: A MINIMALLY INVASIVE APPROACH, Enrique M Sta.Ana MD, Uthaiiah Kokkalera MD, Josh Felsher MD, Richard A Perugini MD, Demetrius E Litwin MD, John J Kelly MD, University of Massachusetts School of Medicine

Introduction: Mirizzi Syndrome is an uncommon complication of longstanding cholelithiasis resulting in compression of the common hepatic duct by either chronic inflammation or an impacted stone in the cystic duct. The inflammation engendered by chronic gallstone impaction in the gallbladder neck may distort the biliary anatomy, thereby making dissection in Calot's triangle perilous. Treatment of Mirizzi's Syndrome involves removal of the impacted stones, partial cholecystectomy and wide drainage, with repair or bypass of the biliary tree rarely necessary. As a result of the chronic inflammatory changes of the anatomy and the technical demand of the procedure, many authors have advocated an open traditional approach. We present two cases of Mirizzi's Syndrome which were successfully managed laparoscopically.

Methods: This is a series of two patients, a 77 year old male and a 47 year old female. Both presented acutely with jaundice and signs of cholangitis. The first also had a cholecystocolonic fistula. Laparoscopic partial cholecystectomy was performed following successful stabilization with endoscopic retrograde cholangiopancreatography and placement of a biliary stent.

Results: Both individuals were managed initially with ERCP, placement of biliary stent, and a course of antibiotics. After intervals of 12 and 8 weeks, respectively, they underwent laparoscopic partial cholecystectomy. The first patient also underwent takedown of cholecystocolonic fistula. Both patients did well postoperatively.

Conclusion: Mirizzi Syndrome is an uncommon disorder requiring a high degree of suspicion. ERCP is a valuable tool for both diagnosis and as an adjunct to treatment. In experienced hands, laparoscopic partial cholecystectomy is a technically feasible and safe approach.

Minimally Invasive Other – P497

A CASE PRESENTATION: PNEUMATOSIS INTESTINALIS, Naizy Selim MD, Benjamin H Stone MD, University of Kansas Medical Center

Objective: We describe the utilization of laparoscopy and intraperitoneal to-air drain placement in a patient whose CT scan revealed massive pneumatosis intestinalis (PI), pneumoperitoneum, and pneumomediastinum.

Methods: A 22 year old female presented with recurrent acute abdominal pain, abdominal distention, pneumoperitoneum, and pneumomediastinum.



Exploratory laparoscopy demonstrated intraperitoneal air with no evidence of bowel perforation or ischemia. Diffuse PI was noted throughout the bowel wall. An open to-air suction drain was placed in the peritoneal cavity providing peritoneal decompression. **Results:** Resolution of both pneumoperitoneum and pneumomediastinum was observed in the early postoperative period. The intraperitoneal drain was removed prior to discharge from the hospital. The patient was followed for one year postoperatively without evidence of complications or further manifestations of PI. **Conclusions:** Although a rare disease, laparoscopic exploration with open-to-air venting of the abdomen may provide an efficient diagnostic and therapeutic intervention in symptomatic patients presenting with pneumatosis intestinalis

Minimally Invasive Other – P498

LAPAROSCOPIC CYST EXCISION AND SPLENOPEXY FOR HEMORRHAGIC SPLENIC PSEUDOCYST AND WANDERING SPLEEN, Christy M Lawson MD, Ali F Mallat MD, Matthew L Mancini MD, University of Tennessee, Knoxville

Wandering spleen is a rare diagnosis, especially when found in conjunction with a splenic pseudocyst. We describe here a 19 year old female who developed a subcapsular hematoma during an episode of mononucleosis, subsequently developing a large pseudocyst and wandering spleen. She was treated with laparoscopic cyst excision and splenopexy with good result. A review of current literature suggests that laparoscopic splenopexy achieves similar results as splenectomy with less adverse outcomes in patients with wandering spleen.



Minimally Invasive Other – P499

BILIARY INJURIES IN LAPAROSCOPIC CHOLECYSTECTOMY - AN EXPERIENCE OF 13305 OPERATIONS, Om Tantia MS, S. K. Bandyopadhyay MS, S Khanna MS, B Sen DO, ILS Multispeciality Clinic

Biliary injuries at Laparoscopic Cholecystectomy (LC) is a complication better avoided than treated . Our retrospective study analyzes Biliary complications (BC) in 13305 LC over 14 years by a single surgical team. The data was stored in a M.S Excel based software. Out of 52 cases of BC, 32 were detected per operatively and 20 post operatively. Of the per operative Bile Duct Injuries (BDI) 6 were complete transec-



tions (5 treated by Choledochojejunostomy (CJ) and 1 by primary T-tube repair (TTR) on conversion), 11 Lateral BDI (2 treated by Lap CJ, 1 by open CJ, 5 Lap TTR, 1 open TTR while 2 with suture repair of which 1 was converted) and 15 cases of Sectoral duct / Duct of Luschka injuries. Total 23 BDIs were managed Laparoscopically while 9 were converted to open surgery. 20 cases of BC were detected post-operatively of which 6 had Bilioma (treated with USG guided aspiration), 4 had Biliary Peritonitis requiring re laparoscopy followed by ERCP and biliary stenting while 10 patients had persistent Biliary leak requiring ERCP stenting. There was no mortality related to BC in the series. 3 injuries occurred in the first 100 LC's, 17 in the first 500 and 24 in the first 1000.

The oral presentation highlights the video clippings of mechanism of different BC involving all spectrum, the ways and means of detection and subsequent management of the injuries.

Minimally Invasive Other – P500

LAPAROSCOPIC VERSUS OPEN APPENDECTOMY IN PREGNANCY: INFLUENCE ON MATERNAL AND FETAL OUTCOMES, Maxim Petrov MD, Matthew J Sheldon BA, Ashley H Vernon MD, Stanley W Ashley MD, David C Brooks MD, Ali Tavakkolizadeh MD, Brigham and Women's Hospital

Background: There has been significant debate regarding the safety of laparoscopy in pregnant women. The increased intra-abdominal pressure is thought to result in impaired fetal circulation, fetal acidosis and possibly adverse fetal outcomes. Appendectomy is the commonest non-obstetric surgical procedure in pregnancy. We investigated the outcome of laparoscopic appendectomy (LA) in pregnancy and compared it to open appendectomy (OA).

Methods: A retrospective chart review of all pregnant women who underwent an appendectomy between January 1997 and January 2006, at Brigham and Women's hospital. Primary study end points were maternal and fetal outcomes. Institutional approval was received for the research project. Data were compared using Fischer's exact test.

Results: We identified 86 pregnant women who fulfilled our criteria. There were no differences between the 2 groups in terms of maternal age, gestational age, and trimester at operation (Table 1).

	OA	LA
Total no of Pts	72	14
First Trimester	30	6
Second Trimester	25	3
Third trimester	17	5

LA was attempted in 14 cases, with one conversion to open surgery (conversion rate=7%). There were no maternal deaths. Overall, 6% of pregnancies were lost, with no significant difference between the two groups (5.5% for OA vs. 7% for LA, $p>0.05$). There was one fetal loss in the third trimester (29 weeks) in the open group. There was one neonatal death. This baby was delivered at 32 weeks, but died of sepsis and respiratory distress. The length of post-operative hospital stay was similar between the 2 groups (3.6 days vs. 3.6 days, $p>0.05$).

Conclusions: Our data demonstrates no difference between LA and OA in terms of our primary end points of maternal and fetal outcomes. Although LA seems to be a safe procedure in pregnancy, it does not offer a significant advantage in terms of length of hospital stay.

Minimally Invasive Other – P501

MODIFIED OPEN TECHNIQUE FOR MINIMALLY INVASIVE ENDOSCOPIC SURGERY, Daniel B Wool MD, Jonathan A Myers MD, Keith W Millikan MD, Rush University Medical Center

Obtaining access to the peritoneal cavity during laparoscopic surgery can be achieved in a variety of ways. Options include the use of a Veress needle, optical trocar, and the open technique with a Hasson or balloon tip trocar. The open technique allows direct visualization of trocar insertion which potentially reduces vascular and visceral injuries. However, this technique has been criticized for not achieving

a tight seal with escape of pneumoperitoneum and because additional time is needed to secure abdominal closure at the end of the case. We describe an alternative open method which utilizes a pursestring suture to address these concerns.

A small skin incision is made and the fascia is exposed. A pursestring of absorbable suture is placed through the fascia and an incision is made in the center. A standard trocar sheath is inserted under direct vision into the peritoneal cavity. The pursestring is then tightened around the trocar with a Rommel catheter and pneumoperitoneum is established. Upon completion of the surgery, the sheath is removed and the pursestring suture is tied to close the fascia. No additional sutures are necessary to reapproximate the fascial defect.

This modified open technique has the advantage of keeping the fascial defect smaller than alternative open techniques while maintaining a tight seal for pneumoperitoneum. It can be used both for laparoscopic and thoracoscopic access using any size trocar. This method also allows rapid closure of the fascial defect at the end of the case.

NOTES (Natural Orifice Transluminal Endoscopic Su – P502

THE PHYSIOLOGIC EFFECTS OF NOTES IN A PORCINE MODEL: COMPARISON WITH STANDARD LAPAROSCOPY, Juliane Bingener MD, John Winston MD, Vicky Haines MS, Joel Michalek PhD, Kent Van Sickle MD, Arup Saha MD, Peter Lopez MD, Wayne Schwesinger MD, UTHSCSA

Background: The NOTES technique has been established as feasible and is thought to be less invasive by eliminating abdominal incisions. It is unclear if the technique is truly less invasive than the current standard. We hypothesized that during pneumoperitoneum with manually regulated air pressure insufflation (NOTES) cardiopulmonary parameters would show greater hemodynamic instability compared to pressure regulated CO2 insufflation (laparoscopy).

Methods: 12 pigs were assigned to standard laparoscopy or NOTES with permuted block randomization. Each group underwent 90 minutes of diagnostic peritoneoscopy by the respective access technique. Cardiopulmonary parameters were recorded in 2.5 minute intervals using invasive monitors feeding into a data recorder. Treatments were contrasted on the mean outcome using a repeated measures linear model with an autoregressive order one autocovariance structure.

Results: All 12 experiments were successfully completed. Transient respiratory compromise resulted in 2 in the laparoscopy and 1 in the endoscopy group. The systolic blood pressure (Sbp) and diastolic blood pressure (Dbp) remained at baseline in the laparoscopic group compared to decreasing pressures in the NOTES group. The bladder pressure and the endtidal CO2 (ETCO2) were significantly higher in the standard laparoscopy group.

Variable	Avg mean diff	SE	p-value
Sbp (mmHg)	14	2.8	<0.001
Dbp	19	1.4	<0.001
Bladder press	7	0.8	<0.001
ETCO2	10	3.1	0.002

Conclusion: Significant cardiopulmonary differences were encountered between the Notes and laparoscopic group. However no clear evidence of detrimental changes was encountered so far.

NOTES (Natural Orifice Transluminal Endoscopic Su – P503

PERCUTANEOUS ENDOSCOPIC ASSISTED SURGERY: A FEASIBILITY STUDY OF NOVEL APPROACHES TO GERD AND WEIGHT LOSS, Royd Fukumoto MD, Julio Teixeira MD, St Luke's Roosevelt Hospital Center, Columbia University

Objective: This review examines the feasibility of a novel approach of endoluminal surgery for weight loss and the treatment of GERD. Both procedures were designed as minimally invasive methods of treating GERD and morbid obesity. Predicted populations eligible for these approaches are



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patients who are medically unstable for traditional laparoscopic or open anti-reflux and weight loss procedures.

Methods: Each of three dogs underwent a successful anti-reflux procedure and modified vertical banded gastroplasty. Access to the gastric cavity was provided by endoscopic visualization and percutaneous instrument access via one trans-abdominal port. The anti-reflux procedure consisted of internal plication of the gastro-esophageal junction using modified Belsley Mark IV type sutures. The weight loss procedure consisted of the creation of a gastric mucosal tunnel.

Results: Both procedures were successfully completed in each of three dogs.

Conclusions: Both anti-reflux and weight loss procedures were feasible in an animal model. Percutaneous endoscopic assisted access to the gastric cavity was easily performed, and all operations were completed as planned.

NOTES (Natural Orifice Transluminal Endoscopic Su – P504

MAGNETOCOLONOSCOPY, ASHOK JAGANATHAN, RAKHSITH HOSPITAL, MAGNETOCOLONOSCOPY

It is used to take photograph, video of the colon and also to ablate polyps using laser

STRUCTURAL COMPONENTS Internal electromagnets inside the cylinder, camera, Light emitting diodes, Laser Wire supply to magnetocolonoscopy in its posterior end to feed camera, laser, diodes, External electromagnets mounted on robotic arm outside human body, Joystick for physician to direct movements, Computer system to control current flow and movement, Monitor to visualize camera output

DESCRIPTION Fed up with the large tube like colonoscopy, pain and discomfort. Now there is a small cylindrical structure with blunted anterior and posterior ends. The anterior end consists of a camera, laser and light emitting diodes. The cylinder consists of electromagnetic coils in its anterior, posterior and its sides. The current passing through these coils are individually controlled by a sophisticated computer software.

The colon is washed with enema and a long catheter with an inflatable balloon in its tip is passed through the anus till it reaches the ileocaecal valve region, inflate it so that it seals the ileocaecal region. Then fill the lumen of the colon with saline to dilate it. Pass the magnetocolonoscopy in to the colon through the anus and seal the anal opening with water tight anal cap

Now the internal electromagnets are activated by passing electric current through it. Electromagnets that are fixed and moved on a robotic arm are placed on the external surface of the body when these external magnets are activated and moved on a robotic arm both its polarity and its movement will guide and direct the magnetocolonoscopy inside the colon

Magnetocolonoscopy can be moved and made to take photograph, video of the colon also the in-built laser can be used to destroy any polyp or other growths in the colon

ADVANTAGE: 1-Small and no discomfort unlike tube colonoscopy 2-guided and controlled unlike capsule endoscopy 3-inbuilt camera and light source 4-inbuilt laser for polypectomy

NOTES (Natural Orifice Transluminal Endoscopic Su – P505

FEASIBILITY OF ENDOSCOPIC TRANSGASTRIC DISTAL PANCREATECTOMY (ETDP), Kai Matthes MD, Tony E Yusuf MD, Mari Mino-Kenudson MD, David W Rattner MD, William R Brugge MD, Gastrointestinal Unit, Department of Surgery, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

BACKGROUND: Benign pancreatic tumors including cystadenomas and neuroendocrine tumors are often managed with surgical partial pancreatectomy. The aim was to develop an endoscopic minimally-invasive resection technique for removal of localized pancreatic tissue.

METHODS: Using an endoscopic transgastric approach,

resection of the pancreatic tail was performed in six pigs. All animals were sacrificed after completion of the procedure. The endpoints of this study were technical feasibility and occurrence of complications such as bleeding or perforation.

RESULTS: Six Yorkshire breed pigs underwent endoscopy with a double-channel gastroscope. The procedure took on average 77.3 (SD 18.9) minutes. A mean gastric incision of 15.7 (SD 2.0) mm was performed with a needle knife to gain access to the peritoneal cavity. An Endoloop was placed on the distal part of the pancreas. The pancreatic tail was transected (< 3 minutes) using a 27 mm monopolar electrocautery snare with cutting current (see figure). 1-3 hemoclips were placed on the pancreatic stump. 3-4 hemoclips were used to close the stomach incision. The average maximum diameter of the pancreatic specimens was 23.3 mm. A second resection was performed in 2 animals (max. diameter 18.7 mm), and a third resection in 1 animal (max. diameter 8.0 mm). There was one complication, an episode of bleeding from a splenic laceration resulting in the loss of 250cc of blood.

CONCLUSIONS: For the first time, we demonstrated the technical feasibility of endoscopic transgastric distal pancreatectomy (ETDP). This technique could be considered as a minimally invasive alternative to surgical resection in patients with pancreatic tail tumors.

NOTES (Natural Orifice Transluminal Endoscopic Su – P506

A SURVEY OF ATTITUDES TOWARDS "NOTES" PROCEDURES AMONG POTENTIAL BARIATRIC PATIENTS, Eric K Osborne DO, Michael A Shear MS, Andrew B Lederman MD, E. Matthew Ritter MD, Robert D Fanelli MD, Surgical Specialists of Western New England, P.C., and Berkshire Medical Center

Introduction: A survey was used to investigate the attitudes of patients considering bariatric surgery towards Natural Orifice Transluminal Endoscopic Surgery (NOTES).

Methods: A 9 section, 72 question survey was randomly distributed to attendees at an informational seminar about bariatric surgery; 43 surveys were completed. Responses were in the form of a 5-point Likert scale or yes/no as appropriate. Statistical significance was defined as $p < 0.05$ by 2-tailed t-test.

Results: Subjects reported familiarity with laparoscopic and open surgery, but had significantly less knowledge of NOTES. When subjects were asked to rank by order of preference methods for generic organ removal procedures the clearly preferred method was laparoscopy; open surgery was significantly less preferred, and NOTES was seen as the least preferable technique. When respondents were asked their opinion of the acceptability of different access orifices and techniques, laparoscopic surgery was significantly more accepted than any other technique. Open surgery was significantly more accepted than any NOTES orifices except for oral NOTES; NOTES by the oral route trended towards being accepted better than all other NOTES routes, but only reached significance compared to the nasal route. There was no significant difference between acceptability of other NOTES routes. Respondents were then asked what routes they would find acceptable for various operations on themselves. The acceptance of NOTES procedures in this question depended strongly on the distance from the entry site to the target organ; for example, foregut procedures (e.g. for weight loss or GERD) were well accepted by the oral route but not other routes. Similarly, NOTES GYN procedures were well accepted when trans-vaginal. Respondents expressed a tolerance for the same level of risk in NOTES as in current surgical methods, but no tolerance for increased risk despite expecting increased benefits.

Conclusion: NOTES will be accepted by bariatric patients, especially by the PO route. There is no tolerance for higher risk or worse outcomes regardless of the expected benefits of NOTES.



NOTES (Natural Orifice Transluminal Endoscopic Su – P507)

ENDOSCOPY-ASSISTED LAPAROSCOPIC TRANSLUMINAL RESECTION OF A GE JUNCTION TUMOR: A CASE REPORT, MORRIS E FRANKLIN JR MD, GUILLERMO PORTILLO MD, MATTHEW E SHEPHERD MD, JORGE M TREVINO MD, TEXAS ENDOSURGERY INSTITUTE

BACKGROUND: Endoscopic management of intraluminal pathology of the gastrointestinal tract is increasing in popularity. Despite this trend, some lesions are not amenable to endoscopic therapy. Endoscopy-assisted laparoscopic transluminal resection is a novel alternative to conventional surgery for intraluminal pathology that is not amenable to endoscopic management alone. We describe our technique for endoscopy-assisted laparoscopic transluminal resection of a neoplasm located at the gastroesophageal junction.

METHODS: The patient is positioned in the lithotomy position. Pneumoperitoneum is established and three 5mm trocars are placed. The stomach is mobilized free from the transverse colon, the lesser sac is opened, and the greater curvature of the stomach is exposed. A gastroscope is introduced and the mass at the GE junction is visualized. The 5mm trocar is placed through the stomach wall and the laparoscopic camera is inserted into the insufflated gastric lumen. Two 2mm instruments are placed through the remaining two trocars into the stomach for dissection. After the mucosa is incised, the specimen is enucleated. A gastrotomy is made for specimen removal and then sealed with an endoluminal stapler.

RESULTS: The patient tolerated the procedure well. Pathology of the specimen demonstrated a leiomyoma with negative surgical margins. A swallow study confirmed normal gastric emptying without evidence of leakage. The patient was discharged on post-operative day number four and has had an uncomplicated post-operative course.

CONCLUSION: Endoscopy-assisted laparoscopic transluminal resection is a safe and effective technique that can be utilized for select gastrointestinal tract tumors that would otherwise require more extensive surgical resections.

NOTES (Natural Orifice Transluminal Endoscopic Su – P508)

EARLY EXPERIENCE WITH VISCERAL CLOSURE IN NOTES PROCEDURES IN A PORCINE MODEL, John R Romanelli MD, David J Desilets MD, Vihar C Surti BS, David B Earle MD, Baystate Medical Center, Tufts University School of Medicine, Springfield, MA

INTRODUCTION: NOTES is an exciting new frontier in minimal access surgery. Early reports have focused on animal models. We have conducted three NOTES labs in live porcine models with a focus on visceral closure. While most papers achieve visceral closure with endoclips, reliability of this method remains open to debate.

METHODS: Three female Yorkshire pigs were utilized for the study. After induction of general anesthesia, pneumoperitoneum was achieved via a Veress needle. A laparoscope was placed for an external view. After gastric intubation, an overtube was placed over the endoscope into the stomach. T-fasteners with Prolene suture were placed through the gastric wall under direct vision. Needle-knife cautery was used to perform a gastrotomy. After advancing the endoscope into the peritoneum, visceral closure using the T-fasteners was attempted.

RESULTS: In the first lab, T-fasteners were deployed in a square orientation. Laparoscopic visualization confirmed successful placement. A gastrotomy was made, and the endoscope was advanced into the peritoneum. Insufflation was successfully maintained. An appendectomy was simulated with an endoloop and snare on small bowel, and the specimen was extracted through the overtube via the endo-

scope. Gastric closure was then attempted with extracorporeal knot tying of the sutures; this was unsuccessful as tight closure was not achieved. T-fastener placement and gastrotomy were duplicated in the second lab. Via colonoscopy, four T-fasteners were placed in the rectal wall above the peritoneal reflection. A colotomy was made, and peritoneal access was gained with the colonoscope. The colonoscope was then withdrawn, but colonic closure using extracorporeal knot tying was unsuccessful due to the awkward angle to reach the anterior colonic wall. Gastric closure using a proprietary crimping device over the four sutures was successful. Inspection with endoscopic insufflation confirmed closure without leak. In the third lab, T-fasteners were again placed. A gastrotomy was made with balloon dilatation over a guide wire. T-fastener closure with the crimping device was unsuccessful because the gastrotomy was created obliquely.

NOTES procedures are still in their infancy, especially in humans. Further studies are needed to discover appropriate visceral closure. Rectal access may be best achieved with a side-viewing endoscope or transabdominally. Technical development may aid future growth in this area.

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TRANSGASTRIC VENTRAL HERNIA MESH REPAIR IN A PORCINE MODEL USING A NEW ENDOSURGICAL OPERATING SYSTEM, Marvin Ryou MD, Derek Fong MD, Christopher C Thompson MD, Department of Gastroenterology, Brigham & Women's Hospital; Harvard Medical School, Boston, MA, USA

Background & Aims: Laparoscopic ventral hernia repair has been shown to be superior to the open approach in terms of fewer complications, shorter hospital stays, and possibly a lower rate of recurrence. Natural Orifice Transluminal Endoscopic Surgery (NOTES) represents a potentially less invasive alternative to conventional laparoscopy. We report the first case of a transgastric ventral hernia mesh repair in a porcine model with the aid of the multi-lumen EndoSurgical Operating System (EOS) featuring ShapeLock technology from USGI Medical.

Methods: A single Yorkshire pig weighing 25 kg was used in this study. The ShapeLock TransPort was backloaded with a 2x6 cm rectangular segment of ePTFE mesh (Bard) into one of the instrument ports and advanced into the gastric lumen of the anesthetized animal via an esophagotomy (as the TransPort length is designed for adult human anatomy). The device has three instrument ports and allows off-axis visualization and instrument introduction. A gastrotomy was created and the TransPort was introduced cleanly into the peritoneal cavity. Following a brief abdominal exploration, the mesh was affixed to the mid-anterior abdominal wall. This was accomplished using a specialized grasper and the g-Prox, an endoscopic tissue-anchoring device. Tissue-anchors were deployed in random locations across the mesh piece. Afterwards, the animal was sacrificed and the relevant segment of abdominal wall was resected for gross inspection.

Results: The mesh was successfully affixed to the abdominal wall using novel tissue anchors. The EOS provided a stable endosurgical platform and allowed for easy manipulation of endoscopic devices. The novel tip provided the convenience of off-axis introduction of instruments into the field of operation. Upon visual inspection following necropsy, approximately 7 of tissue anchors deployed traversed the fascial plane.

Conclusions: Transgastric ventral hernia mesh repair is technically feasible. With modification of the g-Prox jaws for this application, consistent trans-fascial anchor deployment is likely. Further studies in a survival porcine model of ventral hernias are forthcoming.



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NATURAL ORIFICE TRANSLUMINAL ENDOSCOPIC SURGERY (NOTES) AND LAPAROSCOPY: A DOCUMENTATION ON ENDOSCOPE ORIENTATION, MANIPULATION AND INSTRUMENTATION IN A PORCINE MODEL: A LABORATORY WORK BY AN INDEPENDENT ENDOSCOPIC AND LAPAROSCOPY CENTER, Ray Sarmiento MD, V.J. Villaflor MD, Gozar Duque MD, Vivencio Villaflor MD, Narciso S Navarro MD, Dagupan Endoscopic and Laparoscopic Surgery Center Inc., Dagupan Doctors Villaflor Memorial Hospital, Dagupan City, Philippines

NOTESurgery theoretically provides lesser surgical trauma by avoiding the abdominal wall. The gastroscope endoluminally punctures the stomach and gains access into the peritoneal cavity. Human appendectomies and procedures in animal models were reported.

The objectives are to gain experience on how the flexible gastroscope (Olympus GIF-XQ30) and its accessories behaves inside the peritoneal cavity of a porcine model and to provide an endoscopic and laparoscopic documentation of this.

Proper animal handling was observed. A puncture was made through the stomach's anterior wall using a needle-knife (Boston Scientific) until a guidewire goes blindly into the peritoneal cavity. The scope itself dilates the perforation until inside the cavity. The bowels were the initial organ visualized. Pneumoperitonem was inadequate after endoscope insufflation making orientation difficult. The inner side of the abdominal wall was visualized after much manipulation with orientation guided externally by transillumination from the scope. The laparoscopy team then created pneumoperitoneum and assisted in retraction - a form of hybrid surgery. A tubular structure was retracted using lap instruments and its peritoneal attachments cut by the needle-knife. Endoscopic needle-knife adhesiolysis and hemostasis was done with precision. Grasping with multibite biopsy forceps (Boston Scientific) was inadequate to hold the whole structure. One Hemoclip (Olympus) was used to close the perforation. It was noted to be on one side of the perforation after sacrifice of the animal. The procedure was technically demanding. More experience in the animal model is needed. Support from the industry in terms of proper instrumentation is also needed

NOTES (Natural Orifice Transluminal Endoscopic Su – P511

TRANS-GASTRIC, TRANS-COLONIC, AND TRANS-VAGINAL CHOLECYSTECTOMY USING MAGNETICALLY ANCHORED INSTRUMENTS, Daniel J Scott MD, Shou Jiang Tang MD, Raul Fernandez PhD, Richard Bergs MS, Jeffrey A Cadreddu MD, University of Texas Southwestern Medical Center, Dallas, TX. Automation and Robotics Research Institute, University of Texas, Arlington, TX.

Introduction: An ideal approach has not been developed for Natural Orifice Transluminal Endoscopic Surgery (NOTES). The purpose of this study was to compare various NOTES approaches for cholecystectomy using Magnetic Anchoring and Guidance System (MAGS) instruments.

Methods: Non-survival procedures were conducted in pigs (n=3) using a transgastric (TG, pig 1), transcolonic (TC, pig 2), or transvaginal (TV, pig 3) approach. An overtube (18mm inner diameter) was placed intralumenally and inserted into the peritoneal cavity through a 20mm opening in the stomach (prepyloric), colon (rectosigmoid junction), or vagina (posterior fornix) using a flexible gastroscope and a needle knife (all), sphincterotome (TG), balloon dilator (TC), or direct dilation (TV). MAGS instruments were deployed through the overtube and held in place on the peritoneal surface using magnetic coupling via an external handheld magnet; instruments, including a camera, tissue retractor (clip-fixed magnet), and cautery dissector, were then maneuvered using magnetic guidance. Two 5mm ports were placed transabdominally to maintain a CO2 pneumoperitoneum and for laparoscopic assistance as needed.

Results: Overtube insertion, instrument deployment, and magnetic anchoring and guidance were successful for all procedures. The MAGS camera was limited by fogging and a 5mm laparoscope was used in all cases. The MAGS retractor was successfully secured to the gallbladder with EGD clips but required additional laparoscopic suture fixation in all cases; the retractor uniformly provided excellent fundus retraction but a laparoscopic grasper was required for infundibulum retraction. In all cases, the MAGS cauterizer was used for 100% of the dissection of the gallbladder from the liver bed and facilitated complete gallbladder removal with extraction through the overtube using a Roth net or snare. Inadvertent magnetic coupling between instruments occurred in the first 2 cases (requiring a 3rd laparoscopic port in the TC procedure) but not in the final case. Access to the gallbladder using the flexible endoscope, including clipping the cystic duct and artery, was best for the transpelvic (TC, TV) approaches.

Conclusions: MAGS instruments may be successfully used for cholecystectomy via TG, TC, or TV routes, with transpelvic approaches best suited for access to the gallbladder. MAGS instruments facilitate tissue retraction and dissection, significantly enhance NOTES, and should be further developed.

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INVESTIGATION OF TECHNICAL PROBLEMS FOR THE DEVELOPMENT OF NOTES ASSISTING SYSTEM, Kazuhiko Shinohara MD, School of Bionics, Tokyo University of Technology

Technical problems for the development of Natural Orifice Transluminal Endoscopic Surgery (NOTES) assisting system were surveyed by the method of Failure Mode and Effect Analysis (FMEA). The process of NOTES was simplified and classified into 6 steps, i.e. insertion of the endoscope, creation of the gastrotomy and access to the intraperitoneal space, intraperitoneal operation, retrieve of the specimen, closure of the gastrotomy, and extubation of the endoscope. Incidents and troubles were estimated in each step and technical problems to be conquered as the NOTES assisting system were investigated. Estimated failures of the NOTES caused by the factors of assisting system were the laceration of pharynx and esophagus during the insertion of devices and retrieve of specimen and devices, missed creation of the adequate gastrotomy and successive organ injury, bleeding and contamination from the gastrotomy, laceration of the gastrotomy during the procedure, ineffective irrigation and suction via the endoscope, leakage and bleeding after the closure of gastrotomy and so on. Not only the necessity of development of main endoscope for NOTES, but also the necessity of development for safe and smooth method and devices for the intubation of main endoscope via esophagus and creation of the intraperitoneal access through the gastrotomy, sterile and hemostatic management system for the overtube and gastrotomy during the operation, effective suction and irrigation system and reliable devices for the closure of gastrotomy were revealed in this study.

Pediatrics – P513

LAPAROSCOPY-MEDIATED ATTENUATION OF BETA-FIBRINOGEN EXPRESSION IS LOST WITH AGE Eric J Hanly MD, Antonio De Maio PhD, Christopher A Gitzelmann MD, Walter Pegoli MD, Mario Mendoza-Sagaon MD, Mark A Talamini MD, Departments of Surgery, The Johns Hopkins University and University of California San Diego

INTRODUCTION: Hepatic expression of acute phase genes (such as beta-fibrinogen in rodents) results in altered synthesis of stress proteins which serve to regulate the response to inflammation or injury and defend against further tissue damage during system stress. Compared to conventional open surgery, laparoscopy with CO2 has been shown to attenuate the host response to surgical stress. However, because age-related differences exist in the expression of hormone-, and other protein groups, we



hypothesized that the immunomodulatory effects of CO₂ pneumoperitoneum may vary with age.

METHODS: Eighteen 3-week-old and 18 adult Sprague-Dawley rats were randomized into 3 groups each (n=6): Anesthesia only (Anes), Conventional laparotomy (Lap), and insufflation with CO₂ (CO₂). Procedure duration was 90 min for all groups after which livers were harvested and hepatic expression of beta-fibrinogen was determined by Northern blot/ hybridization analysis.

RESULTS:

b-fibrinogen	Anesthes (Anes)	Laparotom (Lap)	CO ₂ Lapar (CO ₂)
Infants (Inf)	0.25 ± 0.05	0.29 ± 0.06	0.18 ± 0.02*
Adults (Adult)	0.20 ± 0.01	0.47 ± 0.05†‡	0.51 ± 0.06†‡&

*p<0.05 v Inf Lap; †p<0.01 v Adult Anes; ‡p<0.05 v Inf Lap; †‡p<0.01 v Inf CO₂. Among infant rats, CO₂ laparoscopy resulted in significant attenuation of beta-fibrinogen expression compared to laparotomy. However, this effect was lost among adult animals in which beta-fibrinogen expression was increased 2.5 fold for both laparotomy and CO₂ laparoscopy compared to anesthesia alone.

CONCLUSIONS: Laparoscopy-mediated down-regulation of the rodent hepatic acute phase gene beta-fibrinogen occurs among infant rats. beta-fibrinogen expression is upregulated significantly more by laparotomy in adult rats than in infant rats, and the attenuating effects of CO₂ laparoscopy on the expression of this gene are lost in older animals. Age-related differences in the genetic expression of stress proteins in response to inflammation and injury may make the immunologically beneficial effects of laparoscopy of greater clinical significance in children.

Pediatrics – P514

LAPAROSCOPIC REPAIR OF A BOCHDALEK'S HERNIA IN AN INFANT, G. Brent Sorensen MD, Daniel G Kolder MD, Venkataraman Ramachandran MD, University of Missouri Health Care

Congenital diaphragmatic hernias are relatively rare anomalies, occurring in approximately 1 in 5000 live births. These hernias are felt to be secondary to failure of normal closure of the pleuroperitoneal canal in the developing embryo. This results in herniation of abdominal contents into the thoracic cavity, resulting in compression of the developing lung. The usual presentation is respiratory distress due to severe hypoxia within 24 hours of birth. Less commonly, after 24 hours of life, infants can develop feeding difficulties, chronic respiratory disease, pneumonia, or intestinal obstruction. We present a 5 month old female with respiratory distress and concerns of left tension pneumothorax on chest X-ray. Computerized tomography revealed a diaphragmatic hernia. She was taken urgently to the operating room for laparoscopic repair of her Bochdalek's hernia.

On review of the literature, laparoscopic repair of a diaphragmatic hernia is rare. There has been only one reported case utilizing the laparoscopic approach to Bochdalek's hernia in an infant. This attempt failed and required conversion to thoracoscopy to complete the repair. We describe a successful laparoscopic approach to this challenging hernia.

Pediatrics – P515

CALCULOUS CHOLECYSTITIS AFTER LIVER TRAUMA IN A CHILD: A CASE REPORT, Sung Ock Suh, Tae Jin Song, Min Young Cho, Wan Bae Kim, Young Chul Kim, Jin Kim, Korea University Hospital

Gallbladder disease is quite uncommon during childhood and adolescence. Cholelithiasis is not often given serious consideration in differential diagnosis of abdominal pain. We report the development of calculous cholecystitis after hepatic injury in a 4 year-old child. He got grade III hepatic injury in a traffic accident. After a period of conservative treatment, the patient complained of abdominal pain. Follow-up computed tomography of abdomen showed multiple stones in gallbladder which had not been shown in the initial study. He was successfully treated with laparoscopic cholecystectomy. Cholelithiasis after trauma is an unusual manifestation. The causative etiologic condition varies as

described above. But the conditions can be occurred to a traumatized patient simultaneously. So if a traumatized patient complains of abdominal pain after a period of conservative treatment, surgeon should consider gallstone formation even if the pre-treatment study did not revealed cholelithiasis.

Pediatrics – P516

THORACOSCOPY FOR MALIGNANCY IN CHILDREN, Abhilash Nair, Shawn D St. Peter MD, KuoJen Tsao MD, Daniel J Ostlie, George W Holcomb III BA, Children's Mercy Hospital

Background: The safety and efficacy of the minimally invasive approach for evaluating thoracic masses in children is evolving. Our experience with thoracoscopy for lesions that may represent malignancy has expanded in recent years. Therefore, we audited our experience to determine efficacy and to define future application of minimally invasive surgery for malignant diseases.

Methods: A retrospective review of all patients undergoing a thoracoscopic procedure for possible malignancy at The Childrens Mercy Hospital between January 1, 2000, and May 1, 2006, was performed. Data points reviewed included location of lesion, type of operation, operative time, histology diagnosis, complications, and recovery.

Results: Fifty-eight children with malignancy underwent a thoracoscopic procedure during the study period. Mean age was 11.3 years with mean weight of 36.9 kg. Wedge or segmental resections were performed for lesions in the lung parenchyma in 43 patients. Excisional biopsy was performed in 13 patients with lesions in the mediastinum, two patients had lesions in both locations. Mean operative time was 62 28 minutes in the lung group and 112 40 minutes in the mediastinal group. Definitive tissue diagnosis was established in all cases. Pre-operative localization was utilized in 14 cases, with a wire in 11 cases, methylene-blue injection in 1 case, and both techniques were used in 2 cases. There were no post-operative complications. One patient in the mediastinal group had intraoperative spillage of a malignant schwannoma which represented the only intra-operative complication in this series. The majority of patients were discharged in 2 days or less following the procedure, the remainder staying in the hospital for cancer-related treatments. **Conclusions:** In pediatric patients with suspected cancer, thoracoscopy is a highly accurate approach with minimal morbidity allowing for adequate assessment of resectability, staging, and for evaluation of recurrent or metastatic disease.

Robotics – P517

GASTRIC STIMULATOR PLACEMENT FOR GASTROPARESIS: OUR EXPERIENCE WITH THE DA VINCI ROBOT. Phillip Price MD, Brent Ziegler MD, J Andres Astudillo MD, Mount Carmel Health System, Department of Surgery, Columbus, OH

Background: Gastric Electrical Stimulation (GES) is one of the last alternatives for the management of severe gastroparesis. Prior the reaching this point most of the resources for treatment have been utilized. GES has shown good results in the management of this problem. Placement can be done either with open or laparoscopic surgery with good results. Another option is laparoscopic placement with the DaVinci Robot due to the fact that the work area is small and the core of the operation is securing the leads intramurally to the gastric wall with intracorporeal sutures. This is an area in which the Robot excels.

Methods and procedures: From January 2004 to September 2006 22 gastric stimulators have been placed in our institution. 3 in an open procedure, 14 laparoscopically and 4 using de DaVinci Robot. All procedures were completed without complications.

To our knowledge, and doing an extensive review of literature and by information from the INTUITIVE and the MEDTRONIC representatives this are the first cases done robotically.

Results: Gastric stimulator placement with the DaVinci Robot is feasible, and the robot is well suited for this procedure. The hospital stay is similar to nonrobotic laparoscopic



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placement. Advantages are the possibility to work in a reduced surface area with secure suture fixation of the leads due to ease of laparoscopic suturing provided by the robot.

Robotics – P518

ROBOTIC PARAESOPHAGEAL HERNIA REPAIR COMPARES FAVORABLY TO LAPAROSCOPIC PARAESOPHAGEAL HERNIA REPAIR, Ward J Dunnican MD, T. Paul Singh MD, Gloria G Guptill BS, Michael G Doorly MD, Albany Medical College

Little information regarding the use of robotic surgery for the treatment of paraesophageal hernias (PEH) currently exists. Studies have examined the use of robotic surgery for the treatment of GERD, excluding those patients with PEH. We studied the 30-day outcomes of Robotic PEH (RPEH) repair compared with Laparoscopic PEH (LPEH) repair to determine if Robotic PEH repair would be a feasible option for repair of PEH.

A retrospective review of all patients who underwent minimally invasive PEH repair between August 2004 and May 2006 by a single surgeon were studied. Demographic information, operative times, narcotic use, length of stay, and perioperative complications were analyzed for statistical significance using the Mann-Whitney U test.

Ten patients underwent LPEH and 7 patients had RPEH. There was no calculated statistical difference between both groups in regard to age, body mass index, co-morbidities, number of prior operations, ASA class, type of PEH (e.g. III, IV), estimated blood loss, length of stay and 30 day complications. Operative times were similar between the RPEH and LPEH (RPEH: mean 195 min, range 101-266 min; LPEH: mean 174 min, range 97 to 262 min; p-value=0.89). Patients with RPEH (1) were less likely to undergo repair with mesh when compared to the LPEH (9).

Patients undergoing Robotic PEH repair have similar short term outcomes compared to patients undergoing Laparoscopic PEH repair. Patients undergoing Robotic PEH repair may be less likely to require mesh reinforcement. Long-term follow-up is necessary to detect recurrence and other potential complications of PEH repair by either modality. Given the limitations of our study, we feel that Robotically performed anti-reflux operations complicated by the presence of a PEH have equivalent short term outcomes compared to Laparoscopic repair.

Robotics – P519

COMPARISON OF DEXTERITY BETWEEN BEGINNERS WITHOUT LAPAROSCOPIC EXPERIENCE AND LAPAROSCOPIC SURGEONS IN THEIR FIRST USE OF THE DA VINCI ROBOT, Monika E Hagen MD, Isan Ihanan MD, Schindler M Philipp, Philippe Morel PhD, University Hospital Geneva

BACKGROUND: Due to improved ergonomics and dexterity, robotic surgery is supposed to be much easier than laparoscopy, especially for inexperienced individuals. We tested the null hypotheses that the performance of inexperienced individuals using the da Vinci® robot is not different than with conventional laparoscopic equipment and there are no differences between inexperienced and laparoscopic trained surgeons.

AIM: The aim of this study was first, to clarify how beginners perform specific tasks robotically and laparoscopically and second, to compare the performance of beginners with laparoscopic surgeons.

METHODS AND DESIGN: 34 individuals were tested for robotic and laparoscopic dexterity. Group 1 included 18 surgical inexperienced students and doctors (age 25 to 35). Group 2 included 16 experienced laparoscopic surgeons (age 30 to 60). Each individual performed an easy, a medium and a difficult tasks both robotically and laparoscopically 10 times. Time and errors were measured, an overall score allocated and evaluated statistically.

RESULTS: Group 1 performed all 3 of their allocated tasks significantly better using the da Vinci robot when compared to their performance using conventional laparoscopic equipment (p<0,05). Group 2 performed significantly better with the robot for the medium and the difficult task in compari-

son to laparoscopy (p<0,05). Differences were not significant for the easy task. No significant differences between group 1 and 2 were found when performing the easy task both with the robotic and laparoscopic equipment. There were no significant differences between the two groups performing the medium task with the robot, while group 2 was superior to group 1 in laparoscopy for the same task (p<0,05). For the difficult task, group 2 performed significantly better than group 1 with both robotic and laparoscopic equipment (p<0,05).

CONCLUSION: The data support the conclusion that the performance of inexperienced individuals using the da Vinci® robot is superior to their performance with conventional laparoscopic equipment. The difference in performance of inexperienced individuals and experienced laparoscopic surgeons is less evident while using the robotic system when compared to conventional laparoscopy, but experienced laparoscopists are superior in difficult tasks.

Robotics – P520

DEVELOPMENT OF A NEW ROBOTIC ASSISTANT SYSTEM FOR LAPAROSCOPIC SURGERY, Kazuyuki Okada MD, Shuji

Tagiguchi MD, Yuichiro Doki MD, Makoto Yamasaki MD, Hiroshi Miyata MD, Yoshiyuki Fujiwara MD, Mitsugu Sekimoto MD, Morito Monden MD, Dept. Gastroenterological Surg., Grad. Sch. Med., Osaka Univ.

[Purpose] During the last five years, there has been an increasing development and experience with robotics in laparoscopic surgery. A robotic assistant system such as AESOP was developed as a voice- controlled camera-arm to provide precise positioning of the laparoscope and stable image without the support of the human camera assistant. However, operating this system was stressful for surgeons, because they had to voice- control the motion of the laparoscope. Thus, we report about the prototype of robotic assistant system, which has an intraoperative 3D instrument tracking system.

[Method] By using 3D instrument tracking system, the laparoscope automatically can trace the tip of the right surgical instrument with centering the workspace in the laparoscopic image. Moreover, if surgeon preoperatively decides several workspaces and appropriate scales of magnification, the laparoscope under the operation automatically can be magnified with the appropriate scale in the decided workspace. To evaluate validity of this system, we conducted a laparoscopic cholecystectomy using an extracted pig liver with gallbladder. Operators in this study were two surgeons who experienced more than 50 cases of laparoscopic cholecystectomy. The operating time performed under the robotic assistant system was compared with that of under the support of the human camera assistant.

[Result] The operating time performed under the robotic assistant system was 20{1.4 min, whereas it was 27.5{9.2 min under the support of the human camera assistant. There was no significant difference between two groups (p=0.37).

[Conclusion] This pilot study performed that the motion of robotic assistant system was comparable that of the human camera assistant, and enabled smooth surgical operation. Thus, it was indicated that our robotic assistant system had a practicability sufficiently.

Robotics – P521

TWO CASES OF GASTROINTESTINAL STROMAL TUMORS DIAGNOSED BY TRANSRECTAL ULTRASOUND GUIDED PROSTATE BIOPSY: TREATMENT COURSE AND REVIEW OF LITERATURE, Ketul K Shah MD, Rahul K Thaly MD, Vipul R Patel MD, Department of Robotics and Computer assisted surgery, Division of Urology, Ohio State University, Columbus, Ohio

Objective: Gastrointestinal Stromal tumors (GIST) are the most common mesenchymal malignancy of the gastrointestinal tract. To our knowledge no cases have been reported in the literature diagnosed after a transrectal ultrasound (TRUS) guided prostate biopsy. We describe two cases diagnosed in such manner as well as their unique management



in the era of molecularly targeted therapy.

Methods: Case 1: A 61 year old male with a history of benign prostatic hypertrophy presented with increasing dysuria and urinary retention. The work up led to CT imaging that demonstrated a large 8 x 9cm pelvic floor mass arising from the prostate gland. Transrectal biopsy revealed a spindle cell neoplasm. Immunohistochemical staining was negative for prostate specific antigen (PSA), S-100, AE1/AE3, desmin, ER, PR, smooth muscle antigen (SMA) and Her2neu. Positive stains included CD117, CD34, CD31 (weak) all consistent with GIST. Serum tumor markers included PSA level of 0.7 ng/ml, carcinoembryonic antigen (CEA) of 0.6, and undetectable levels of CA 19-9. Mild renal insufficiency was noted due to bilateral hydronephrosis. After bilateral nephrostomy tube placement, Imatinib therapy was started with a plan for future tumor resection. The patient experienced prompt improvement in local symptoms and underwent a radical robotic assisted prostatectomy. The resected specimen showed no residual tumor (pathological complete response) and 14 months later the patient remains on imatinib without recurrence.

Case 2: A 61 year old male presented to a colorectal surgeon for the management of an anal fissure and irregular diffusely enlarged prostate was noted. His PSA was 0.4ng. TRUS guided prostate biopsy showed a spindle cell lesion consistent with GIST. Immunohistochemistry markers were positive for CD34 and CD117 and negative for SMA, AE1/AE3, and S100. Further imaging studies revealed a pelvic floor mass of approximately 7.7cm. The patient was initiated on neoadjuvant Imatinib therapy with excellent clinical and radiological response that a surgical intervention was feasible. A radical robotic prostatectomy and pelvic mass removal was performed. Pathological complete response was noted on the specimen.

Conclusion: The detection of GIST after TRUS guided biopsy in these two unusual cases highlights the treatable nature of these tumors, the importance of recognizing GIST in unusual locations and the need to seek neoadjuvant therapeutic options in non surgical candidates.

Solid Organ Removal – P522

LAPAROSCOPIC SPLENECTOMY: DOES GENDER PREDICT OUTCOME?, *Severn G Barloco MD, Jonathan R Adkins MD, Stephanie Kreml MD, Vadim Sherman MD, John F Sweeney MD, Baylor College Of Medicine - Michael E. DeBakey Department Of Surgery*

Introduction: Laparoscopic splenectomy (LS) is a widely accepted treatment for both benign and malignant hematologic disorders. Evidence that age and obesity are predictive of outcomes for LS has previously been demonstrated. The current study was undertaken to evaluate the impact of gender on outcomes for LS.

Methods: A retrospective review of all patients undergoing LS at our institution was performed. Analysis included patient age, gender, body mass index (BMI), indication for LS, comorbidities, operative time, estimated blood loss (EBL), splenic weight, length of stay (LOS), time to tolerating oral intake (PO), and post-operative complications. Continuous data are expressed as mean ± [SD] and are analyzed by Students T-test.

Results: A total of 126 LS were performed between March 1996 and April 2006 (70 males and 56 females). Benign hematologic conditions were the indication for LS in 71% of females and 61% of males.

	Age (Years)	BMI	OR Time (Minutes)	EBL (cc)	Splenic Wt. (Grams)	LOS (Days)	PO (Days)
Male (N=70)	54.2 [16.4]	29.9* [6.6]	177.5* [55.7]	688.0* [978.3]	324.9* [850.6]	5.0 [5.3]	2.7* [2.5]
Female (N=56)	48.4 [19.5]	27.6 [5.5]	141.6 [41.2]	270.8 [401.5]	414.4 [488.9]	3.8 [4.4]	1.7 [0.9]

[Standard deviation]; * Significantly Different From Females, P<0.05

Males undergoing LS were significantly taller and heavier, and had higher BMIs when compared to females. In addition, males were found to have significantly larger splenic weights and longer OR times with more operative blood loss. The conversion rate was 21.4% in males and 8.9% in

females, and the complication rate was 27.1% in males and 12.5% in females. There were 3 mortalities in the male group (4.3%) and none in the female group.

Conclusions: Our data demonstrate that females undergoing LS have better outcomes when compared to males. This is likely due to a combination of patient size, splenic weight, and indication for surgery. Surgeons should be aware of these factors when performing LS in male patients and make every effort to minimize risk and improve outcomes.

Solid Organ Removal – P523

LAPAROSCOPIC ADRENALECTOMY FOR THE TREATMENT OF ADRENAL TUMORS, *Patricio Donnelly MD, Javier Salgado MD, Pavlos Pappasavas MD, Philip Caushaj MD, Daniel Gagne MD, The Western Pennsylvania Hospital, Clinical Campus Temple University*

Background: Since laparoscopic adrenalectomy (LA) was first performed in 1992, the technique has gained wide acceptance and is now considered the standard of care for treating benign adrenal tumors. The role of LA for the treatment of malignant adrenal tumors is still controversial. We report our experience with LA.

Methods: Retrospective analysis of 18 consecutive LAs performed between July 1999 and September 2006. All cases were performed by three surgeons using a laparoscopic transperitoneal approach. One patient was approached with a laparoscopic hand assisted technique. Parameters studied included age, gender, length of stay, tumor size, histopathology, operative time, estimated blood loss, intraoperative and postoperative complications and conversion rate. The relationship between tumor size and operative time or estimated blood loss was determined using a Pearson correlation.

Result: Eighteen LAs were included (eleven right and seven left). The mean patient age was 55 years (range 17-71 years) and the female/male ratio 14/4. The mean operative time was 173 minutes (range 80-270 minutes). There were no conversions to open technique. The mean tumor size was 3.9 cm (range 0.8-9 cm). There were no deaths.

Intraoperative complications included 2 patients with bleeding which was controlled laparoscopically; one patient required transfusion. Postoperative complications included one patient with pneumonia and one patient with adrenal insufficiency. The length of hospital stay was 2.6 days (range 1-7 days). Pathological examination of the tumors revealed cortical adenoma (n=10), pheochromocytoma (n=3), metastatic disease (n=3), cortical hyperplasia (n=1), and a calcified vascular cyst (n=1). The primary origin of the metastatic lesions was lung, kidney and colon. There was no significant correlation between the tumor size and operative time (r=0.33) or estimated blood loss (r=0.25).

Conclusion: Laparoscopic adrenalectomy is a safe and effective technique for the treatment of adrenal tumors.

Solid Organ Removal – P524

LAPAROSCOPIC NEPHRECTOMY EXPERIENCE AT A COMMUNITY TEACHING HOSPITAL, *Eric D Edwards MD, Corneliu Vulpe MD, Armando E Castro MD, George S Ferzli MD, Lutheran Medical Center*

Laparoscopic nephrectomy, either partial or radical, is considered to be an advanced level case. Due to the technical demands of laparoscopic nephrectomy these operations are typically performed at high volume academic medical centers. We report our experience with partial and radical nephrectomy at a community teaching hospital. A retrospective review of all nephrectomies performed at a single institution from March 2004 to July 2006 was performed. During this period, 7 partial nephrectomies and 30 radical nephrectomies were performed. Indications for surgery were: renal cell carcinoma (21 cases), complications from obstructive uropathy (7 cases), urothelial carcinoma (3 cases), transitional cell carcinoma (3 cases) renal leiomyoma (1 case), papillary adenoma (1 case), and oncocytoma (1 case). Mean patient age was 63.4 years (27-81 years). Twenty seven patients were male and ten patients female. Mean operative time was 130 minutes (90-165 minutes). Estimated blood



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loss was 90 mL (5-150 mL). One case was converted to an open procedure for bleeding. One patient required blood transfusion post-operatively. No patient required re-operation. Post-operative complications included: ileus (2 patients), exacerbation of congestive heart failure (1 patient), and sepsis (1 patient). There were no mortalities. Mean length of stay post-operatively was 3.6 days (1-9 days). Our results are comparable to those achieved by higher volume academic centers.

Solid Organ Removal – P525

HAND-ASSISTED LAPAROSCOPIC SPLENECTOMY FOR HCV POSITIVE PATIENTS WITH THROMBOCYTOPENIA, Michiya Kobayashi MD, Ken Okamoto MD, Tsutomu Namikawa MD, Takehiro Okabayashi MD, Kazuhiro Hanazaki MD, Department of Surgery, Kochi Medical School

Background: Peg-Interferon treatment for hepatitis C virus (HCV) positive patients are promising, however it may be sometimes given up due to thrombocytopenia as the side effect. We perform hand-assisted laparoscopic splenectomy for HCV positive patients with thrombocytopenia.

Patients and Method: From March to July of 2006, we have performed hand-assisted laparoscopic splenectomy for 4 patients with portal hypertension due to HCV positive chronic liver disease. All patients were female with average age of 56 years old (50 - 65). The indications of the splenectomy for these patients were thrombocytopenia for 3 patients who were supposed to take a treatment with Peg-Interferon for HCV therapy, and gastric varices with thrombocytopenia due to hypersplenism for 1 patient. Patients were placed in the right semilateral position with the left side up. A 7cm median skin incision was made in the upper abdomen and GelPortTM was placed for hand-assisted laparoscopic surgery. A 12 mm trocar was placed infraumbilically and additional two ports were placed in the left abdomen. The spleen was mobilized with spatula type electric cautery and ultrasonic cutting and coagulating surgical device. During the mobilization, surgeon's left hand could make good operation fields. The artery and vein were cut with LigaSureTM vessel sealing system at the splenic hilus without stapler. The spleen was put in a plastic bag and taken out through the median skin incision.

Results: The average operating time and blood loss were 159min (150 - 170) and 100g (30 - 180), respectively. The average spleen weight was 213g (110 - 350). The case of gastric varices who underwent splenectomy with Hassab operation stayed hospital for 21days after surgery due to ascites. The average hospital stay after surgery of other three cases was 10 days (9 - 11). One case showed high amylase level in the drained fluid, which became normal within 8 days.

The average platelet count before surgery was 59,000 /microl (40,000 - 60,000). That of 1st, 3rd, and 7th postoperative date were 66,000 /microl (47,000 - 80,000), 87,000 /microl (60,000 - 110,000), and 157,000/microl (91,000 - 216,000), respectively. All three patients could proceed to take Peg-Interferon treatment safely.

Conclusion: Hand-assisted technique for laparoscopic splenectomy was helpful for making good operation fields and safe even for patients with portal hypertension.

Solid Organ Removal – P526

EXPERIENCE WITH TRANSPERITONEAL LAPAROSCOPIC ADRENALECTOMY, Misuzu Mori MD, Nobumi Tagaya PhD, Keiichi Kubota PhD, Second Department of Surgery, Dokkyo Medical University, Tochigi, Japan

Background: Laparoscopic adrenalectomy for benign adrenal tumors has become the preferred surgical treatment, however, for pheochromocytoma or metastatic tumor it is still controversial. We report our experience with transperitoneal laparoscopic adrenalectomy.

Materials and methods: Recent eight years, we performed 30 transabdominal laparoscopic adrenalectomies in 10 males and 19 females. Their diagnoses were primary aldosteronism in 12 patients (40%), pheochromocytoma in 6 (20%), Cushing syndrome in 5 (16.7%), non-function in 5 (16.7%) and metastasis in one (3.3%), respectively. Their ages

ranged from 17 to 67 years with a mean of 35 years. The location of tumor was right side in 8 patients (26.7%), left side in 17 (56.7%), bilateral side in 3 (synchronous: 2, metachronous:1) (10%) and Zucherkanle in one (3.3%), respectively. Synchronous laparoscopic cholecystectomy was performed in 3 patients (10%).

Results: There were no conversions to open surgery. The operation time and estimated blood loss ranged from 60 to 450 min (mean: 132 min) and 3 to 1200 ml (mean: 130 ml). None of the patients required transfusion. Only two bilateral patients of pheochromocytoma had two and four tumors. The mean diameter of the excised tumors was 23.3 mm (range: 8 to 90 mm). There were no postoperative complications. All patients became normal blood pressure and catecholamine levels without treatment. The mean postoperative hospital stay was 9 days (range: 3-15 days). The mean duration of follow up was 61.5 months (range: 1-123 months). There was no recurrence during the follow-up period.

Conclusion: Laparoscopic treatment for adrenal tumors is safe and effective procedure without major perioperative complications even in pheochromocytoma.

Solid Organ Removal – P527

LAPAROSCOPIC ADRENALECTOMY: A 6 YEAR NON-TERTIARY CARE SINGLE CENTER RETROSPECTIVE STUDY, Biswanath Gouda MD, Thomas J Nelson MD, Jennifer I Lin MD, Sunil Bhojru MD, Scripps Clinic, Torrey Pines, CA 92037

Background: Laparoscopic adrenalectomy is considered the gold standard for the removal of most adrenal tumors. We have been performing laparoscopic adrenalectomy at our institution since June 2000. We conducted a retrospective study to review our experience in the context of this surgery being performed outside a tertiary care center.

Methods: From June 2000 to Aug. 2006, 19 transperitoneal laparoscopic adrenalectomies were performed at the Scripps Clinic. All patients' charts were retrospectively reviewed for operative time, blood loss, complications, conversion to open surgery and hospital stay.

Results: The mean age was 50.6 years (range, 21-65 years) of which the majority were females (63.1%, n=12). Indications were pheochromocytomas (36.8%), nonfunctional adenomas (31.5%), aldosterone-producing adenomas (10.5%), adrenal hyperplasia (10.51%) and adrenal cyst (10.51%). The median size of the tumors on abdominal CT was 3.65cm (range, 1-9 cm) and median pathology reported weight was 18.0 gm (range, 2-170 gm). Median time for anesthesia was 146.5 minutes (range, 124-214 minutes), and median operative time was 101.0 minutes (range, 91-148 minutes). Median estimated blood loss was 10.0 ml (range, 10-700 ml). There was no mortality, and post operative complications occurred in 15.7% patients (n=3). Pulmonary edema, retroperitoneal bleeding and anemia were the treated complications. A single patient, who developed pulmonary edema at the onset of laparoscopy, was converted to an open procedure. Preoperative medically treated hypertension completely resolved in 63.6% patients (n=7) after the surgery. The median length of hospital stay was 1.5 days (range, 1-6 days).

Conclusion: This retrospective series demonstrates that a well trained and experienced surgeon in a non-tertiary care environment can demonstrate equivalent operative times, blood loss, complications, conversion to open procedures and hospital stays when compared to major tertiary care centers.

Solid Organ Removal – P528

HAND-ASSISTED LAPAROSCOPIC SPLENECTOMY: WHEN SHOULD IT BE OFFERED?, Nathan Novotny MD, Don Selzer MD, Indiana School of Medicine, Department of Surgery

Background: Laparoscopic splenectomy (LS) has been shown superior to open splenectomy (OS). Although rare, splenomegaly (splenic weight > 1000 g) presents unique challenges of loss of domain within the abdomen and manipulation of the organ due to its weight. Traditionally, OS has been offered to these patients. In an attempt to offer these patients a minimally invasive approach, hand-assisted



laparoscopic splenectomy (HALS) has been proposed as the solution without sacrificing the benefits afforded by LS.

Methods: A single surgeon's experience from 2003 to 2006 at an academic center was reviewed. Demographics, operative information, and perioperative data were compiled. **Results:** Eighteen patients underwent isolated splenectomy during that time period. Diagnoses included leukemia, lymphomas, hemophagocytic syndrome, sarcoidosis, myelodysplastic syndrome, hemolytic anemia, and myelofibrosis. Six patients underwent HALS, ten LS, and two OS. HALS and LS provided similar outcomes based upon estimated blood loss, operative time, time to oral intake, length of stay, and mortality. Three of 10 (30%) LS spleens weighed > 1000 g. Two of these 3 (67%) were converted to open. No LS with a spleen of < 1000 g was converted to open. Five of 6 HALS spleens weighed > 1000 gm. No HALS was converted to open. One-way analysis of variance demonstrates a statistically significant relationship between splenomegaly and CT splenic vein diameter ($p=0.002$), CT generated craniocaudal length ($p=0.011$), and palpable distance from costal margin ($p=0.013$).

Conclusions: HALS and LS have equivalent outcomes and are superior to OS. In our experience, LS for splenomegaly has a prohibitively high conversion rate and should be replaced with HALS for spleens predicted to be greater than 1000 g. Splenic weight is best estimated preoperatively by a combination of CT determined splenic vein diameter and length and the physical exam.

Solid Organ Removal – P529

OBESITY DOES NOT ADVERSELY AFFECT OUTCOMES AFTER LAPAROSCOPIC SPLENECTOMY, Tracy S Pitt

DO, Brethauer Stacy MD, Sutep Udomsawaengsup MD, Chikunguwo Silas MD, Ballem Naveen MD, Chand Bipan MD, Rosenblatt Steven MD, Cleveland Clinic Foundation

INTRODUCTION: Obesity is considered a relative contraindication to laparoscopic splenectomy (LS) by many surgeons. The purpose of this study is to evaluate the surgical outcomes of LS in obese patients.

METHODS: A retrospective review of our LS database from 1995 to 2006 was conducted. Patients were classified according to BMI (Group A, BMI > 30 and Group B, BMI < 30). Our primary endpoints were conversion rate, complications (hemorrhage, infection, pancreatic injury, cardiopulmonary complications), length of stay, operative time, and estimated blood loss (EBL). Logistic and multiple regression analyses were performed to control for age, ASA classification, spleen weight, preoperative platelet count, and the diagnoses of idiopathic thrombocytopenic purpura (ITP), autoimmune hemolytic anemia (AHA), and lymphoproliferative disorders (LPD).

RESULTS: 246 LS patients were included in the analysis. The two groups showed no significant difference with respect to age, ASA, preoperative platelet counts or spleen size ($p>0.05$). There was however a difference with respect to the diagnosis of ITP and LPD ($p<0.03$). In group A ($n=77$) the average BMI was 36 (30-65). There were 7 (9%) conversions to open and 15 (19%) complications. Length of stay was 3.8 days, mean EBL was 229 mL, and the mean operative time was 158 minutes. Group B ($n=169$) had an average BMI of 24 (15-29). This group included 21 (12%) conversions and 31 (18%) complications. The average LOS was 4 days, EBL was 255 mL, and the mean operative time was 142 minutes. After controlling for ITP, LPD, and spleen size, there was no significant difference between obese and non-obese patients with regards to conversions or complications ($p=0.26$ and 0.8 , respectively). Also, EBL and LOS were not significantly different between the two groups ($p>0.6$). OR time was longer for obese patients ($p=0.003$).

CONCLUSION: Obesity does not adversely affect outcomes after LS. Operative times were longer in obese patients however this did not affect conversion rates, complication rates, or LOS. The laparoscopic approach is the optimal technique for splenectomy regardless of patient weight.

Solid Organ Removal – P530

LAPAROSCOPIC HAND-ASSISTED SPLENECTOMY FOR MASSIVE SPLENOMEGALY, Ram M Spira MD, Abi Vainstein MD, Vered Avidan MD, Joseph Alberton MD, Petachia Reissman MD, Department of Surgery, Shaare Zedek Medical Center (affiliated with The Faculty of Health Sciences, Ben-Gurion University of the Negev), Jerusalem, Israel.

BACKGROUND Laparoscopic splenectomy (LS) is the gold standard for normal-sized spleens, but is still controversial for massive splenomegaly (MS), mainly due to expected technical difficulty and increased risk of bleeding. The aim of this study was to assess the outcome of LS in patients with MS.

PATIENTS and METHODS We reviewed all consecutive patients who underwent LS for MS in the department of surgery, Shaare-Zedek Medical Center during 2002-2006. Massive splenomegaly was defined as weight >700 gr. We used a total laparoscopic (TL) or hand assisted (HALS) technique.

RESULTS 20 patients underwent LS for MS [12 males, 8 females, mean (range) age 50 (6-76) years]. Indications were: Myelofibrosis- 5, Lymphoma- 4, Spherocytosis- 3, Polycythemia Vera- 2, Reactive splenomegaly- 2, Thalassemia- 1, Tuberculosis- 1, Myelodysplastic syndrome- 1, and ITP+CLL- 1.

The technique was TL in 6 patients and HALS in 15. Mean (range) splenic weight was 1715 (915-3200) gr. for the entire study group, 1460 and 1749 gr. for the TL and HALS groups, respectively.

Mean (range) operative time was 189 minutes (83-340) for the entire study group, 157 and 202 minutes for the TL and HALS groups, respectively.

Median (range) PRBC transfusion was 2 (0-20) units. Intra operative bleeding occurred in 5 patients all of which occurred in the HALS group. One case was converted to an open procedure. We believe that most of these bleeding events would have required conversion to an open procedure if the hand was not in the abdomen to allow rapid control of the bleeding.

Median length of hospital stay was 8 days.

Postoperative major complications (sepsis, bleeding) occurred in 8 patients.

One patient died 6 weeks after surgery due to pulmonary leukosequestration and respiratory failure.

CONCLUSIONS

Laparoscopic splenectomy in splenomegaly is feasible and safe in experienced hands. The use of the Hand-Assisted technique in massively enlarged spleens is the preferred technique in our experience.

Solid Organ Removal – P531

CLINICAL, ANATOMIC AND PATHOLOGIC PREDICTIVE FACTORS FOR IMMEDIATE SURGICAL OUTCOME AFTER LAPAROSCOPIC SPLENECTOMY IN CASE OF

SPLENOMEGALY, R D Targarona MD, EM Targarona MD, JC Pernas MD, L Pallares MD, C Balague MD, Gich I MD, M Trias MD, Service of Surgery, Radiology* & Epidemiology. Hospital Sant Pau, Autonomous University of Barcelona, Barcelona, Spain**

Laparoscopic approach has become the surgical choice for splenectomy (LS), but some controversies exist about its definitive role in case of splenomegaly. Factors that may impact immediate outcome are clinical (type of disease, plat. count), but also of anatomic and pathological nature due to the size and volume of the spleen and the difficulty for its intrabdominal manipulation.

Aim: to evaluate the predictive value of clinical and anatomic factors on immediate outcome after LS in cases of splenomegaly.

Material & methods. We reviewed from a prospective data base all the patients submitted to LS with a final spleen weight > 800 g, in which a previous CT scan were also available. 3D reconstruction of the spleen was performed, and spleen volume and main spleen (AP, Lat-lat, Craneo.caudal) and abdominal cavity diameters were measured (3D Doctor



SAGES POSTER ABSTRACTS

software). Age, sex, BMI, platelet count, and diagnosis (benign/malignant) were also recorded. Dependent variable were op time, bleeding, conversion and stay. Univariate and multivariate analysis was performed (SPSS).

Results. This series included 39 pts, 18 m and 21 f, 59+15 y.; 7 benign and 32 malignant. Conversion: 15%, op time: 140? (90-300), Morbidity: 15%, bleeding: 50 cc (0-1000), Stay: 5 d. (3-22). Multivariate analysis showed that factors predictive for conversion were: mediolateral spleen diameter and platelet count. For intraop bleeding, predictive factor was spleen volume. Ant-post spleen diameter was related to op. time, but the main factor related to postop morbidity was age. **Conclusion:** Local anatomy and clinical factors directly affect surgical outcome in LS for massive spleen. Spleen volume and ant?post and medio-lat diameter were predictive factors for intraoperative outcome, but only age was related to postop morbidity. These factors should be taken in account when planning this kind of procedures

Solid Organ Removal – P532

LAPAROSCOPIC SPLENECTOMY FOR SPLENIC MASSES, D J Tessier MD, L M Brunt MD, R Pierce MD, V Halpin MD, J C Eagon MD, M M Frisella RN, J Czerniejewski, B D Matthews MD, Washington University School of Medicine

Introduction: The purpose of this study is to evaluate perioperative outcomes and pathology in patients undergoing laparoscopic splenectomy for splenic masses.

Methods: The records for 174 patients undergoing laparoscopic splenectomy from 5/94-8/06 were reviewed. Patient demographics, preoperative imaging, EBL, OR time, spleen size, intraoperative/postoperative complications, LOS, pathology, and 30-day mortality were extracted. Data are mean \pm SD. Statistical significance ($p < 0.05$) was determined using two-tailed t-test and Fisher's exact test.

Results: A splenic mass was diagnosed preoperatively in 18 (10.3%) patients, 7 males and 11 females. Mean patient age was 51.4 yrs \pm 13.7, mean ASA 2.3 \pm 0.8 and mean BMI 27.3 kg/m² \pm 5.8. CT scans demonstrated splenic masses in all patients. The mean mass size was 4.3 cm \pm 3.3 cm (range 1.0 - 11.0 cm). Three patients had numerous splenic masses. Mean spleen length was 14.6 cm \pm 7.5 (range, 5.5-40.2). Six patients had FDG-uptake on PET scans. Totally laparoscopic splenectomy was completed in 15 patients and hand-assisted splenectomy in 3 patients (2 planned hand-assist, 1 converted). Mean OR time was 128.3 min \pm 38.5 and mean EBL was 110 ml \pm 137.5. Mean splenic weight was 288.2 gm \pm 252.2. There were no intraoperative complications or 30-day mortalities. Postoperative complication rate was 11.1%. Mean LOS was 1.9 days \pm 1.0. Pathology was malignant in 6 (33.3%) patients (n=5 lymphoma; n=1 adenoCA) and benign in 12 (66.6%) patients (n=4 pseudotumor, lymphoid/granulomatous hyperplasia; n= 4 cystic mass; n=1 hamartomas; n=2 hemangioma; n=1 angioendothelioma). There were 3 false positive PET scans. In comparison to 73 patients undergoing laparoscopic splenectomy for ITP, there was no significant difference in mean EBL, OR time, conversion rate, intraoperative complication rate or LOS. The postoperative complication rate was 11.0% ($p=0.5$) and 30-day mortality rate 1.3% ($p=0.8$) for patients with ITP.

Conclusions: Laparoscopic splenectomy is appropriate for patients whose indication for surgery is splenic mass. Suspicious splenic masses should be removed due to the relatively high incidence of malignant pathology (33.3% in this series), most commonly lymphoma.

Thoracoscopy – P533

THORACOSCOPIC SURGERY. OUR EXPERIENCE., Jose Manuel Hernandez Gutierrez MD, Miguel Angel Martinez Alfonso MD, National center for endoscopic surgery

We are carried out descriptive, observational work, in the national center for endoscopic surgery, in Havana, Cuba. The period of time understood between 1995 and 2005. The objective was to evaluate our results in connection with the reach of the specialty in the current moment. For they are

compared it the results of our group with this technique with the best results that they are reported in the literature and that in turn they contribute outstanding scientific evidence. We were carried out in our center a total of 237 interventions, of them 54 with diagnostic ends and 183 for therapies. The carried out surgeries were the following ones: Parietal Pleurectomias 55, dorsal simpatectomias 30, bulectomia for emphysema 28, empiema 26, vagotomia transtorácica 19, exéresis of mediastinal tumors 12, pericardic windows 9, exéresis of pleural mesotelioma 2 and ruled lung resections 2. Our time surgical average was of 65 minutes with a range from 20 to 150 minutes. The use of pleural drainage in 65% and their permanency average of 38 hours. The uses of preoperative intercostal analgesia in the place of the thoracoport exchanging in 95% of the cases and the use of analgesic postoperative was of a dose in 100%, of 2 dose in 51% and of 3 dose in 9% of those operated. The postoperative morbidity was not significant, being only needed of a reintervención (empiema pleural that doesn't solve). The demurrage average of 3 days with a range from 2 to 5 days and the mortality of 0,4%, given by a deceased that presented massive bled later to an inferior lobectomy.

Thoracoscopy – P534

EVALUATION OF COMPENSATORY SWEATING AFTER BILATERAL THORACOSCOPIC SYMPATHECTOMY FOR PALMAR HYPERHIDROSIS., Leonid Lantsberg MD, Shai Libson MD, Boris Kirshtein MD, Solly Mizrahi MD, Department of Surgery ?A? Soroka University Medical Center

Faculty of Health Sciences Ben Gurion University of the Negev, Beer Sheva, Israel

OBJECTIVE: Compensatory sweating (CS) is the most common side effect of thoracoscopic sympathectomy (TS) and considered the main cause of patient discontent. We investigated the extent and severity of CS following TS in patients suffering from palmar hyperhidrosis (PH).

METHODS: We performed a retrospective review of 60 patients undergoing bilateral T2-T3 TS for PH in our department between 1997 and 2003. The study was based on a telephone questionnaire and medical chart review. 40 patients (67%) replied to the questionnaire and were included in the study. Postoperative complications, therapeutic results, patient satisfaction and the severity of CS were assessed.

RESULTS: In all patients both palms were dry at the end of surgery. Postoperative complications included permanent unilateral Horner's syndrome, wound infection and residual pneumothorax resolving after thoracal drainage in 1 patient each. CS with different severity occurred in 35 patients (87.5%). 6 patients (15%) regretted undergoing the operation due to the extent and severity of the CS affecting seriously their quality of life.

CONCLUSION: TS is a simple procedure with a high success rate. However, CS is a serious complication and in a significant number of patients may cause regret of undergoing the operation, and therefore a careful selection of patients and comprehensive explanation are advisable.

Thoracoscopy – P535

THORACOSCOPIC RESECTION OF THE ECTOPIC MEDIASTINAL PARATHYROID ADENOMA, Masahide Murasugi

PhD, Toyohide Ikeda PhD, Takuma Kikkawa MD, Tamami Ikasa MD, Toshihide Shimizu PhD, Kunihiro Oyama PhD, Masahiro Mae PhD, Takamasa Onuki PhD, First Department of Surgery, Tokyo Women's Medical University

(Background) Patients undergoing long-term hemodialysis often suffer from secondary hyperparathyroidism. Most mediastinal parathyroid adenomas can be resected with a transcervical approach, median sternotomy or thoracotomy. We present to describe our experiences in which video-assisted endoscopic surgery using thoracoscopy or mediastinoscopy was effective in treating patients with mediastinal parathyroid adenomas.

(Subjects and Methods) We treated 8 male and 13 female patients using video-assisted endoscopy to resect ectopic



mediastinal parathyroid tissues between July 1996 and April 2006. The patients ranged in age from 38 to 76 years.

(Results) Eighteen patients had undergone surgical treatment of hyperparathyroidism by the cervical approach to resect the four cervical parathyroid glands during their previous operation, but signs and symptoms associated with hyperparathyroidism recurred and PTH level increased during follow-up. In these patients, chest CT revealed masses in the mediastinal space, and technetium 99m MIBI scintigraphy revealed hot spots. In another patient, pre-operative MIBI scintigraphy revealed hot spots in the four cervical parathyroid glands and a hot spot suggestive of an ectopic parathyroid gland in the mediastinal space. During the previous surgery, the four cervical parathyroid glands had been removed using the conventional approach and the ectopic gland was removed with the endoscopic technique. Ectopic mediastinal parathyroid glands were resected using video-assisted thoracoscopy or mediastinoscopy. Duration of operation ranged from 45 to 145 minutes. Mean blood loss was 25 mL and mean duration of hospitalization after operation was 5 days.

(Discussion) Many ectopic parathyroid adenomas can be removed by the cervical approach only, but some ectopic tumors in the mediastinal space cannot be accessed with this approach. Such patients have had to undergo median sternotomy or conventional thoracotomy. In the cases considered here, we were able to resect mediastinal parathyroid adenomas using video-assisted thoracoscopy or mediastinoscopy. In order to obtain successful results using the video-assisted technique, it is very important to specify the positions of ectopic parathyroid glands by preoperative MIBI scintigraphy and chest CT.

Thoracoscopy – P536

DEVELOPMENT OF NON-CONTACT SENSING SYSTEM DURING VIDEO-ASSISTED THORACIC SURGERY (VATS),

Masazumi Okajima MD, Yoshihiro Miyata MD, Masanori Yoshimitsu MD, Koichi Akayama MD, Tomohiro Kawahara, Chisashi Toya, Makoto Kaneko, Toshimasa Asahara MD, Hiroshima University

Aim: VATS procedures are often available to extirpate small pulmonary nodules. The disadvantage of VATS is the lack of tactile capacity. We have a hard time to detect such small pulmonary nodules during the VATS procedure, especially when they are located some depth from the lung surface. To supplement the lack of tactile capacity during VATS procedures, we developed a noble non-contact tactile sensor where an air jet is shot to the lung tissue so that we can extract the displacement pattern of the stiff point.

Methods-Results: We first developed an imager which consists of an optical fiber distance sensor and an air nozzle that produces an air jet to determine the deformity of the object. A right upper lobe of the lung was removed surgically from a lung cancer patient. The lung tissue was examined for stiffness by measuring the displacement distance following an air jet shot. The peak displacement distance reached 5 mm at a normal lung tissue, whereas it reached 3 mm at the tumor, indicating that the tumor is much stiffer than a normal lung tissue. Because the displacement of the object is measured based on the relationship between the reflected light quantity and the distance, the color of the object and the inclination angle of the tissue will affect the result. To

overcome this problem, we changed measurement system based on phase differential technique, where an air pulse jet was used instead of a single step force input. The developed sensor is composed of an air nozzle and optical fibers based distance sensors. For an air pulse jet (40Hz), sensors provide us a sinusoidal output with an individual phase. The sensor was scanned on the silicon rubber with a plastic ball. The outputs from optical fiber sensors change due to the existence of the ball. By Lissajous patterns, we can clearly observe the change of the phase from the change of its shape. The measurement was not affected by the color and inclination angle of the tissue. Recently, we made the animal model embed a several mm sized plastic ball in the living lung. Even in this living animal model we achieved to detect the plastic ball by this non-contact tactile sensor.

Conclusion: Non-contact tactile sensor based on phase differentiation is feasible for a diagnosis of pulmonary nodules during VATS procedure.

Thoracoscopy – P537

THORACOSCOPIC ENUCLEATION OF GIANT SUBMUCOSAL TUMOR OF THE ESOPHAGUS: A CASE REPORT, Chadin

Tharavej MD, Patpong Navicharoen MD, Suppa-at Pungpapong MD, Department of Surgery, Chulalongkorn University, Bangkok THAILAND

Open thoracotomy with tumor enucleation has been the standard treatment of symptomatic leiomyoma of the esophagus. Recently, the safety and feasibility of thoracoscopic approach has been reported by many investigators. However, the vast majority of tumor size was less than 5 cm. We report herein the feasibility and safety of thoracoscopic enucleation of giant submucosal tumor of the esophagus.

A Case report: A 27 year-old female presented with intractable chest pain and dysphagia for 3 and a half years. She has been previously diagnosed of panic disorder and treated with anti-anxiety medication for quite a long period without improvement. Finally, she underwent UGI endoscopy because of her worsening dysphagia. On examination, a large submucosal mass was found on mid part of the esophagus compromising about 60% of esophageal lumen. Computerized scan of her chest revealed 8 by 6 cm soft tissue mass on the right posterior wall of middle third of the esophagus compatible with leiomyoma. Thoracoscopic approach for tumor enucleation was done using a 4 port technique. Mediastinal pleural and muscular layer over the tumor was incised. Tumor was successfully removed without mucosa tearing. Muscular layer defect was repaired using a running stitch. Tumor was put into a plastic bag and cut into multiple pieces before removal from the thoracic cavity. The operative time was 132 minutes and estimated blood loss was 150 ml. Postoperative period was uneventful. Patient can have regular food on day 4 after surgery. Her chest pain and panic disorder were completely resolved. Unfortunately, pathological examination revealed low grade leiomyosarcoma in one piece of the tumor. Esophagectomy was offered to the patient.

Conclusion: Thoracoscopic enucleation of giant submucosal tumor of the esophagus is feasible and can be safely performed. More experiences are needed to confirm this conclusion.



SAGES EMERGING TECHNOLOGY ORAL ABSTRACTS

ET001

NEW DEVICE FOR CLOSURE IN TRANSLUMINAL SURGERY, Kenneth Horton MS, Peter Hathaway, Gregg Krehel MPA, Eric Taylor BS, U.S Surgical, Auto Suture, Tyco Healthcare

Objective: Natural Orifice Transluminal Endoscopic Surgery (NOTES) involves the technique of performing abdominal surgery through an incision in the digestive tract such as the stomach or colon. Endoscopes are passed through the luminal incision and both diagnostic and therapeutic interventions have been reported in animal models including trans-gastric organ resection.

A fundamental challenge and potential barrier to the adoption of NOTES includes a secure and reliable closure method. While animal work to date would suggest that a puncture site can be closed with clips, the integrity of this closure method is suspect.

The ASGE/SAGES White Paper on NOTES suggests that the ability to suture intraluminally would offer maximum flexibility for the clinician. The aim of this study was to assess the technical and clinical feasibility of an endoscopic suture device.

Technology and Method: A porcine model was used for an endoscopic guided, intra-gastric exploration. An endotracheal intubation tube was used to deploy an endoscope, a flexible, articulating grasper and an endoluminal suturing device, with an end effector similar to the ENDO STITCH™ suturing product. This unique 7 mm flexible suturing device has a distal end which articulates thru a broad range, to orient the device for a precise tissue bite. Its jaws are similar to those found on US Surgical's laparoscopic ENDO STITCH™ product. The needle penetrated the tissue and the mechanism consistently transferred the needle and suture between jaws with ease. This configuration allowed for placement of a running or interrupted suture. Tissue manipulation was assisted by a 5 mm flexible, articulating grasper.

Preliminary Results: The use of this flexible suturing device is technically feasible, and enables the clinician to place sutures into the gastric wall.

Conclusion: A System that can offer this level of flexibility, precision and manipulation shows great promise in addressing the challenges of endoluminal closure, and warrants further investigation.

ET002

ENDOSCOPIC STAPLED GASTROPLASTY FOR THE TREATMENT OF MORBID OBESITY, Brent W Miedema MD, Jacques Deviere MD, Steven Edmundowicz MD, Roger de la Torre MD, Steven Scott MD, University of Missouri

Objective: To develop a totally endoscopic technique to construct a proximal gastric pouch with a restricted outlet. This restrictive gastroplasty may avoid the complications and morbidity associated with laparoscopic weight loss techniques.

Description: The transoral gastroplasty system ("TOGaTM System") made by Satiety, Inc. has two disposable stapling devices (a sleeve stapler and a restrictor stapler) that are placed under endoscopic view. Both staplers have a handle, a flexible shaft, and a rigid portion near the tip where the stapler assembly is located. A 19 mm sleeve stapler is placed transorally into the stomach over a guide wire. The sleeve stapler rotates open its jaws where the cartridge and anvil of a linear stapler are imbedded. A vacuum chamber is located in each jaw. A septum between the jaws directs the correct tissue into the suction chamber. Suction is applied, a portion of the anterior and posterior stomach is included in each vacuum chamber respectively, the septum is removed, and the stapler is closed and fired. The staple line has three rows of titanium staples and is 45 mm in length. This creates a transmural staple line (with serosa to serosa apposition) connecting the anterior and posterior stomach beginning at the angle of His and extending distal, parallel to the lesser curvature. A second more distal staple line is also placed to create an 80-90 mm sleeve, approximately 19 mm in diameter. The sleeve outlet is then constricted using a 25 mm linear stapler whose jaws open like an alligator. The restrictor stapler also uses a vacuum to acquire the tissue

and provide a full thickness staple line that forms a pleat and narrows the pouch outlet. The restrictor stapler is fired two to four times to create a 10-12 mm outlet. This completes a restricted gastroplasty along the lesser curvature of the proximal stomach similar in size to gastric pouches created with open or laparoscopic bariatric procedures. An animation and actual video of the procedure will be presented.

Results: This system has been used in 24 morbidly obese patients. The procedure is safe and results in significant weight loss for most patients. Clinical results are being presented in the plenary session.

Future: An FDA application will be made to perform a trial in the US to prove safety and efficacy. This is the first endoscopic stapler treatment for morbid obesity that has been used in man. This system holds promise as a safer treatment for obesity.

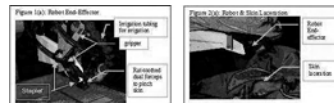
ET003

ROBOT ENGINEERED SKIN CLOSURE UNASSISTED ENVIRONMENT, Michael Kia DO, Lucy King PhD, Corneliu Rabla PhD, Kettering University, McLaren Regional Med Ctr

Objective - The goal of the Robot Engineered Skin Closure Unassisted Environment (RESCUE) project is to design, prototype and fabricate a safety conscious, vision-driven automated robot system for closing a skin laceration with surgical staples.

Description - The robot system is fitted with a unique sensor feedback end-effector (for short - gripper), and integrated with a vision system powered by high resolution image processing algorithm. The system will apply local anesthesia and irrigate the laceration and staple without the presence of a physician. Although seam tracking has been used in hard-surface components manufacturing such as robotic welding, the seam recognition algorithms are not sufficient to apply to soft tissue and ill-defined skin profiles in the lacerated areas. This project hinges on developing a specialized image processing algorithm.

Result - To date, prototype models of the end-effector system have been developed as well as early trials of the vision algorithm.



Conclusion - The end product will be a well tested, well documented, safe RESCUE system which, when presented with a laceration, will locate, identify, determine the approach for skin closure and perform the skin closing (stapling) operation. This type of technology can be implemented in the emergency departments for management of simple lacerations as well as integration into the military Trauma Pod project.

ET004

SINGLE SITE ACCESS FOR FLEXIBLE LAPAROSCOPIC SURGERY, Michael J Norton MD, Noel Ischy BS, Access Instruments

Objective: Describe a small, transabdominal, single site, multichannel access port which provides a stable platform for a flexible endoscope and instrumentation necessary to perform common operations such as appendectomy, cholecystectomy, and oophorectomy. **Description:** The transaxial single site port utilizes divergent, nonparallel and nonintersecting channels in a conical housing. One channel accepts 5mm straight instruments and one curved channel accepts an approximately 5mm flexible endoscope with a working channel. The device is small, measuring 12 mm at the entry point into the abdominal cavity. Minimal diameter of the housing is maintained by a gentle curve in the endoscopic channel to maintain a position close to the straight instrument channel. The port is placed in proximity of the target organ using an open technique. A flexible endoscope with a working channel is introduced into the curved channel and retroflexed to view the operative field. Triangulation and scope of field are preserved by the orientation of the chan-

nels. An instrument is introduced into the straight channel and a second instrument is placed through the working channel of the endoscope. The target organ is grasped or retracted and the operation is performed. The specimen is removed through the incision. Results: A prototype model has been designed for manufacturing and subsequent testing in an animal laboratory. Conclusions: The concept of a transaxial multichannel access port may present an opportunity to perform common operations through a single small incision. Laboratory evaluation is necessary.

ET005

DATA FUSION FOR VIRTUAL BILARY AND PANCREATIC ENDOSCOPY GENERATED BY OSIRIX AND CO2 MDCT

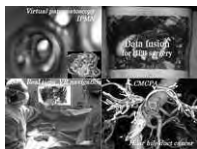
CHOLANGIOPANCREATOGRAPHY Maki Sugimoto MD, Hideki Yasuda MD, Keiji Koda MD, Masato Yamazaki MD, Tohru Tezuka MD, Chihiro Kosugi MD, Yoshihisa Watayo MD, Shuji Naka MD, Teikyo University Chiba Medical Center

Purpose: Data fusion technique is a most recent virtual navigation system. We describe a new data fusion technique of CO2 MDCT enables synchronous visualization of biliary and pancreatic anatomy and abdominal vessels to provide real time navigation for digestive surgery. Our MDCT technique using carbon dioxide (CO2) gas as a negative contrast agent for hepato-pancreato-biliary assessment provides image-guided virtual endoscopy

Methodology: MDCT was performed in 50 HPB patients under trans-papillary infusion of CO2. Synchronously intravenous contrast material was applied for virtual CT-Angiography. Postprocessing these data, we generated virtual endoscopy (cholangioscopy and pancreatoscopy) with arterio-cholangio-pancreatography (CMCPA). DICOM viewer OsiriX based 3-D reconstructions were incorporated on display in the operating room during surgery by surgeons. Moreover, these data were preview on the patient body surface and operative field by projector. Capability of these pre- and intra-operative virtual navigations using data fusion of virtual endoscopy and CMCPA was evaluated.

Results and discussions: CMCPA provided accurate information for localizing the target lesions of HPB benign and malignancies with its relationship to the surrounding vessels compared with open laparotomy without any complications. This procedure could help improve surgical prognosis.

Conclusion: Data fusion by OsiriX and synchronous fusion CMCPA provide useful intraoperative real time 3-D navigation for detailed planning operation in complex HPB surgeries.



ET006

COMPUTER ASSISTED ENDOSCOPY, Amir Belson MD, Neoguide Systems

Flexible endoscopy is routinely used in medicine for diagnosis and treatment of hollow organs. The flexibility of those devices enables them to be inserted into a non-straight path or tortuous organ by pushing the scope against and applying forces to the walls of the organ. Most of the flexible scopes have a steerable tip that is controlled by the operator according to images transmitted from a camera in the tip. However, the shaft of a flexible endoscope is under no control.

Rigid endoscopes, on the other hand, provide a stable platform for surgical interventions but do not change their shape and therefore cannot be used to inspect tortuous organs or be inserted through a non-straight path.

NeoGuide Systems is developing a computer-assisted flexible endoscope that can traverse a tortuous path without applying forces to the walls. When active, it is more rigid than the conventional flexible scopes, enabling it to serve as

a stable platform for tools delivered through the scope's working channel.

NeoGuide's technology measures the tip's depth of insertion the tip's position in space - as instructed by the operator. Combing the two, enables the system to build a numerical three dimensional map that can be converted to a graphical map. The shaft of the endoscope consists of multiple segments in addition to the user-controller tip. These segments are controlled by the computer, which directs each segment to assume the shape that the tip had at the same depth of insertion.

In conventional colonoscopy, the scope is pushed against the wall of the colon - which leads to stretching of the wall and the mesenteric tissues. This phenomenon, known as looping, is one of the major reasons for the difficulty of the procedure and the pain associated with it. NeoGuide's initial product is a computer-assisted colonoscope designed to deal with this problem. The system was cleared by the FDA in 2006. and is expected to be commercially available in 2008.

The second application that could potentially benefit from NeoGuide's computer-assisted endoscopy technology is Natural Orifice Transluminal Endoscopic Surgery (NOTES) where the system that delivers the tools needs to be advanced to the correct location, often in a path that runs between organs in a non-straight fashion and then positioned in the correct place relative to the surgical field and serve as a stable platform for the tools.

Pre-clinical NOTES studies will be performed in the near future.

ET007

BALLOON MICROWAVE CATHETERS FOR ABLATING SOLID TUMORS AND FORMING CAVITIES FOR THE LOCAL DELIVERY OF THERAPEUTIC AGENTS, Francis E Rosato MD, Thiru Lakshman MD, Ernest L Rosato MD, Arye Rosen PhD, Fred Sterzer PhD, Thomas Jefferson University

Balloon Microwave Catheters for Ablating Solid Tumors and Forming Cavities for the Local Delivery of Therapeutic Agents.

Francis E. Rosato Jr, Thiru Lakshman, Ernest L. Rosato, Arye Rosen, and Fred Sterzer. Thomas Jefferson University, Philadelphia Pa

Objective: This study was designed to evaluate the ability of balloon microwave catheters to rapidly ablate tissue and form a residual cavity allowing for the instillation of therapeutic agents.

Description/Methods: All experiments used a balloon catheter by Angiodynamics. Fluorescein isothiocyanate dextran (FID) solution was injected under pressure into the cavity created by the balloon ablation. The penetration of dextran was evaluated using ultraviolet light during sectioning of the tissue. Balloon microwave catheters with internal reflectors were also used. In vitro studies were carried out in beef liver and in vitro studies were carried out in pig livers.

Preliminary Results: Cylindrical shaped necrotic lesions with a diameter of 3.0 cm and length of approximately 4.5 cm could be produced in vivo for a 3 minute ablation with 100 watts of 915 MHz microwave power without carbonizing any of the tissues surrounding the balloons. Lasting hollow cavities formed in the ablated tissues around the catheters closely approximated the shapes and sizes of the expanded balloons. When fluorescent dextran was introduced into these cavities under pressure the solution penetrated to the margins of the ablated tissue. Using balloon catheters with internal microwave reflectors it was possible to preferentially heat tissues in only one direction.

Conclusion/Future: Balloon microwave catheters appear to be well suited for the treatment of solid malignancies. They rapidly and uniformly ablate large volumes of tissue. Furthermore, these catheters can create reservoirs for anti-cancer agents in the ablated tissues that can be forced through the destroyed malignant tissues to the margins of the ablations where they can act against any remaining viable malignant cells, that if not destroyed could lead to recurrences of the cancer.



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ET008

AN INFRARED ENDOSCOPE FOR ENERGISED LAPAROSCOPIC SURGERY, Chengli Song PhD, Benjie Tang PhD, Paul Campbell PhD, Tim Frank PhD, Alfred Cuschieri PhD, University of Dundee

Objective: A novel infrared endoscope has been developed to investigate the thermal spread and collateral damage during energized laparoscopic surgery.

System and Method: The infrared endoscopic system consisted of an endoscope measuring 10 mm in diameter and 30 cm in length. The endoscope is directly coupled to an advanced Cedip mid-infrared (3-5 μm) thermal camera, which has a focal plane array of 320 by 240 pixels, and a thermal sensitivity of 0.02C.

The system was evaluated in a standard laparoscopic surgery trainer with the aim of detecting thermal spread during laparoscopic energized dissections. Cutting and coagulation procedures were conducted on pig stomach using HF electrosurgery, AutoSonix scalpel and LigaSure vessel sealing system. Digital and thermographic videos were taken for advanced thermal analysis and image processing.

Results: During the energized cutting and coagulation experiments, thermographic measurement showed that the average thermal spread was 4.2 mm above 45C with the LigaSure, and the exposed instrument surface at the tip developed a temperature of approximately 100C. The LigaSure Atlas 10 mm laparoscopic device exhibited a superior performance with only 2.3 mm thermal spread and with a maximal temperature on the jaws well within tolerable limit 35C. The AutoSonix dissection device caused a bigger thermal spread of 5.3 mm. During HF electrocoagulation temperatures reaching 275C were observed.

Conclusions: The study has confirmed that infrared laparoscopy is able to monitor thermal profiles in tissues during energized dissections in real-time. It thus has the potential to increase the safety of laparoscopic dissections when used as an adjunct to white light laparoscopy.

ET009

HIGH DEXTERITY INSTRUMENTATION IN LAPAROSCOPIC SURGERY, Paul G Curcillo II MD, Drexel University College of Medicine, Dept of Surgery

Laparoscopic surgery has clearly minimized the incisions and discomfort associated with standard open surgery. In addition, the range and complexity of procedures now performed cover the entire range of General Surgery, Urologic Surgery, Gynecologic Surgery and Thoracic Surgery. Until recently, the limitations on laparoscopy were mostly secondary to the rigidity of the instrumentation. Introduction of initial articulating devices demonstrated the clear need to reintroduce freedom of movement at the end effectors of laparoscopic instruments.

RealHand™ laparoscopic instruments represent a new device category termed High Dexterity (HD) instrumentation. Functioning through a patented series of proximal to distal cables and links allows for the unique movement and control of the end of the instrument with simple wrist action. This novel line of hand-held MIS instruments provides dynamic articulation with 7 degrees of freedom of movement. RealHand™ allows the instrument tip to mirror all hand movements, providing robotic-like maneuverability without the need or cost of complex hardware.

A series of colonic resections (right, transverse, sigmoid and near-total proctocolectomy), gallbladder surgeries and abdominal adhesiolysis have all been successfully completed using one High Dexterity Instrument along with a standard rigid laparoscopic instrument. All procedures were accomplished using two instrument ports and one camera port (three total ports). Total operative times, results and outcomes are comparable to standard laparoscopy. No extra training, set-up time or port placement limitations have

been experienced.

This novel High Dexterity instrumentation allows for adaptability to any position within the abdomen, allowing any necessary angle of approach, virtually removing constraints of standard port placement positions. In addition, procedures involving more than one quadrant or total abdominal access are easily approached secondary to the simple articulation and control mechanisms.

Additional applications in endoscopy may demonstrate adaptability to the emerging NOTES procedures.

ET010

VAGAL BLOCKING FOR OBESITY CONTROL (VBLOC THERAPY), Mark B Knudson PhD, Adrianus Donders MS, Mark Stultz MS, EnteroMedics St. Paul, MN US

1)Objective of the technology

The objective of VBLOC Therapy is to foster weight loss in persons with obesity by intermittently blocking the anterior and posterior vagal trunks at the level of the esophagogastric junction. Vagal BLocking for Obesity Control (VBLOC) Therapy utilizes an implanted neuroregulator to deliver very high frequency, low energy electrical pulses to block afferent and efferent vagal activity. The objective of offering rechargeable as well as RF system neuroregulators is to maximize patient choice and quality of life.

2)Description of the technology and method of its use.

The use of neuromodulation systems that incorporate implantable power sources has been previously reported by one of the authors to foster greater improvements in patient quality of life when compared to the use of RF-coupled (externally powered) systems. Because RF systems utilize an external power source, they can be made smaller than rechargeable systems, but they require continuous wear of an external device for therapy delivery. The rechargeable technology in development incorporates an implanted lithium ion rechargeable power source that requires once weekly, rather than continuous, wear of an external device; in the case of the rechargeable system, the external device provides ambulatory recharging capability. In either case, the implanted RF or rechargeable neuroregulator is connected to two leads, the electrodes of which are laparoscopically implanted onto the anterior and posterior vagal trunks.

3)Preliminary results

Patient use of the RF system in a multi-center international clinical trial is underway. Assessment of the rechargeable neuroblocking system is expected to begin soon.

4)Conclusions/Future directions

Procedures that are capable of reducing mortality and morbidity while fostering weight loss are highly desirable. The early results of ongoing human studies assessing the safety and efficacy of VBLOC Therapy and the initiation of US clinical trials are highly anticipated. VBLOC Therapy is not available or approved for use in the United States.

ET011

ENDOLUMINAL FUNDOPLICATION (ELF) BY TRANSORAL DEVICE, Guy-Bernard Cadière MD, Amin Rajan MD, G. Dapri MD, Jacques Himpens MD, Department of Gastrointestinal Surgery, Saint-Pierre University Hospital, Brussels, Belgium1, Unit of Gastroenterology and Endoscopy, Chirec, Brussels, Belgium2

Background: The use of the first generation EsophyX device (EndoGastric Solutions Inc., Redmond, WA), for treatment of GERD was evaluated in a prospective Phase 1 clinical trial in patients who were unsatisfied with proton pump inhibitors (PPI) and who were referred for Nissen fundoplication surgery. The ELF procedure was intended to reconstruct the anti-reflux barrier through the creation of a 3-5 cm valve at the GE junction, reduction of hiatal hernia (HH) and restoration of the angle of his.

Methods: Inclusion criteria included GERD symptoms >6 months, and PPI dependence. Exclusion criteria were: BMI > 30, irreducible HH > 2 cm, stricture, Barrett's esophagus, ulcer, dysphagia, esophageal motility disorder, or previously failed antireflux procedures. Nineteen patients (7M/12F) were enrolled between June and October 2005 with intent to



treat, but one patient was not treated due to presence of stricture/stenosis. Among the 18 patients treated, another patient was excluded due to 6 cm HH. Median age of the remaining 17 patients (7M/10F) was 34 years (23-58), median duration of symptoms was 10 years (3-15), and median duration of PPI use was 6 years (2-13). All patients were taking daily PPIs at between 20-40 mg prior to the procedure. **Results:** Median operative time was 123 minutes (55-254), median number of fasteners placed was 11 (6-14), median length of the ELF valve was 4 cm (3-5), median circumference of the ELF valve was 210 degrees (180-270 degrees), median hospital stay was one day. Adverse events were limited to mild to moderate throat irritation and epigastric pain, which resolved spontaneously. One patient was readmitted for persistent pain assessment and was released from the hospital after three days with no clinical sequelae. No anatomical correlates were found. After 12 months, 82% (14/17) of the patients remained completely off PPIs, 63% (10/16) patients had normal pH (pH <4 for \geq 5.3% time measured with the Medtronic BRAVO system), 57% of patients had greater or equal to a 50% improvement in median GERD-HRQL scores (17 to 7), and 76% (13/17) of the patients had HH and all of these were reduced. **Conclusions:** The results of this Phase 1 trial demonstrate the technical feasibility and safety of the ELF procedure and provide preliminary data on efficacy and longer term durability. Future device and procedural refinements are expected to dramatically reduce procedure time and improve clinical efficacy. A Phase 2 study is underway.

ET012

STOMACH RESTRICTION WITH AN EXTRAGASTRIC BALLOON, Michael Gertner MD, Stanford University

The objective of this developmental stage technology is development of a gastric displacement device which resides between the stomach and the abdominal wall. Because the implantation procedure does not involve penetration of the gastric wall and the device does not circumscribe the stomach and apply a high pressure, it is anticipated that this device will ultimately have an improved safety profile over the Lap-Band™. This device is implantable with a modified PEG procedure so that minimal anesthesia will be required. The device was created by dipping a polypropylene mesh into a medical grade silicone and then forming the balloon over a semi-circular mold. Implantation of the balloon was performed by sliding the siliconized mesh over polypropylene sutures. Position and restricting ability were confirmed with a barium swallow. Pressure on the stomach is accomplished with the balloon contacting the anterior portion of the stomach with posterior support behind the stomach from the retroperitoneum.

Over a 5 week period, increasing amounts of saline were added to the balloon reaching a maximum of 100cc at week 4. At the higher balloon volumes, restriction of the stomach was notable on barium swallow. At 35 days, the balloon was still in firm position. At necropsy, a capsule was noted around the balloon and there was no evidence of erosion of the mesh or the balloon. The device was easily removable after entrance into its capsule.

Ongoing work involves larger animal trials, a longer follow-up period, and miniaturization of the device.

ET013

ENDOSCOPIC WATER JET ABLATION OF BARRETT'S ESOPHAGUS, Matthew D Kroh MD, Robert Hall MD, Suthep Udomsuwaengsup MD, Alexander Smith BS, Lisa Yerian MD, Bipan Chand MD, Cleveland Clinic

Background: The optimal management of Barrett's esophagus, a precursor to esophageal adenocarcinoma, remains controversial. Current therapy includes surveillance, and ablative and resection techniques of varying safety and efficacy. The purpose of this study is to determine the feasibility of a new catheter-based, endoscopic water jet technique

to ablate Barrett's epithelium.

Methods: We have developed a high-pressure flexible catheter that can be passed through the working port of a gastroscope that has micro-drilled holes on one side near the tip. Under foot pedal control and endoscopic vision, a contiguous 4 cm water jet is delivered at pressures adjustable from 100 to 700 psi. After approval from our IRB, tissue segments from esophagectomy specimens were ablated by the catheter without using an endoscope. Using gross appearance and histologic analysis, variable pressures and times were evaluated.

Results: A total of 11 ablation sessions were performed, using variable pressures and times: 5 on normal esophagus, 4 on normal stomach, and 2 across the GE junction in the setting of Barrett's. Using ablation pressures of 150-300 psi for 30-60 seconds resulted in selective ablation of mucosa with preservation of the muscularis propria. This was determined by gross inspection at the time of ablation and confirmed by histologic evaluation. There was no embedding of epithelial cells in the muscularis propria. In a single normal esophagus specimen, 400 psi for 120 seconds resulted in gross perforation.

Conclusion: Selective ablation of Barrett's esophagus using a catheter-based water jet ablation technique is feasible. This preliminary data using a non-endoscopic technique shows that the epithelium can be removed while preserving the underlying submucosa and muscular layers. Further studies are warranted and will focus on defining more precisely the pressure and duration required for optimal results and the practical application of this technique endoscopically.

ET014

A NEW DEVELOPMENT OF THE ENDOSEW™ INTRACORPOREAL SUTURING MACHINE: FROM LINEAR TO CIRCULAR ANASTOMOSIS, S Perretta MD, J Leroy MD, B Dallemagne MD, C Moll*, J Marescaux, IRCAD-EITS. University of Strasbourg. France/ * KARL STORZ, Germany

Background: Laparoscopic intracorporeal suturing might be challenging and has a steep learning curve. We present a new development of the suturing EndoSew™ system intended to perform intracorporeal end-to-end anastomosis with the objective to shorten suturing time and improve the quality of anastomosis.

Aim: to test the new EndoSew™ system to perform end-to-end small bowel anastomosis in a survival animal model. **Materials:** the EndoSew™ system is composed of two parts: a driving unit, (Unidrive II with EC Motor) connected to the EndoSew™ machine and to a foot pedal that controls the system and, the sewing machine itself which consists of a handle and a shaft. The extracorporeal handle contains the gear box and working mechanism. The intracorporeal shaft has at its tip suturing plate. The EndoSew™ is held in a vertical position through a 15mm trocar and is fixed to the operating table. In order to improve the end-to-end anastomosis performed with the linear EndoSew™ system we designed a special ring of 13 mm diameter, attached to the sewing shaft. When the EndoSew™ system is introduced into the abdomen the ring is clicked in its working position. Both ends of bowel are rolled over the ring and the end-to-end anastomosis can be performed in one uninterrupted sewing.

Methods: Three male pigs had general anesthesia. After induction of pneumoperitoneum three working ports were inserted. The 15mm metallic sewing machine port was placed 5 cm away from the camera port using the triangulation principle. A segmental small bowel resection was then carried out followed by an end-to-end anastomosis using the EndoSew™ roll system. The mesenteric defect was closed with the linear EndoSew™ machine.

Results: EndoSew™ was used to perform 3 end-to-end small bowel anastomosis in three pigs. All the anastomosis were performed successfully with a mean operative time of 15 min, and no technical problems. There were no complications in the immediate post-operative course. An explorato-



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ry laparoscopy performed one week after the procedure, showed no sign of sepsis, leak or bowel obstruction. At mean follow-up of 10 days all the animals thrived with appropriate weight gain and behavioral pattern.

Conclusion: End-to-end anastomosis using the EndoSew™ system is feasible and safe in a porcine model. With the potential to facilitate and expedite advanced suturing technique, our study encourages future developments and further additional application of the EndoSew™ in the field of laparoscopy.

ET015

USE OF A NEW ENDOLUMINAL DEVICE IN THE TRANSORAL ENDOSCOPIC SURGICAL PROCEDURE FOR THE TREATMENT OF WEIGHT REGAIN AFTER ROUX-EN-Y GASTRIC BYPASS, Jacques Himpens MD, Michel Cremer MD, Guy-Bernard Cadere MD, Dean Mikami MD, 1Sint Blasius Hospital, Dendermonde, Belgium; 2Saint-Pierre University Hospital, Brussels, Belgium, 3Ohio State University, Columbus, Ohio, U.S.A.

BACKGROUND: Roux-en-Y gastric bypass procedure (RYGBP) is the most common weight-loss bariatric surgery in the United States. However, 25-30% of patients regain weight after 2 years as a result of dilatation of the gastric pouch and of the gastro enteral anastomosis. The StomaphyX™ system (EndoGastric Solutions, Inc., Redmond, WA) was developed to allow gastric pouch reduction by transoral endoluminal plication using polypropylene fasteners and evaluated for safety and feasibility in revising the gastric pouch.

METHODS: Patients who underwent laparoscopic RYGBP and regained weight after 2 years were selected for the study. Ten patients were treated in two sessions (n=5 in Dec 2006, n=5 in Jan 2007) and have been followed for at least 21 days.

RESULTS: Total median procedure time was 22 min (range 14-90). An average of 5 (4-7) and 9 (8-12) fasteners were deployed. The pouch size was reduced by up to approximately 25% in the first session and 50% in the second. There were no serious complications or deaths. Adverse events were limited to transient drop in hemoglobin and interscapular pain. The first group of patients lost an average of 4 kg (2-7) by day 14 but showed no weight change and no feeling of gastric restriction by day 21, whereas the second group lost an average of 8 kg (6-12) by day 21 and have continued to lose weight. These patients also reported a persistent feeling of gastric restriction and a reduced hunger.

CONCLUSIONS: These results support the safety of the new procedure for revision of the post-RYGBP gastric pouch. The procedure was effective in reducing the gastric pouch by up to approximately 50%. Improved clinical results seem to coincide with a higher number of fasteners implanted.

ET016

COMORBIDITY AND WEIGHT REDUCTION AFTER ENDOLUMINAL VERTICAL GASTROPLASTY - 31 PATIENTS WITH 3 MONTH FOLLOW-UP, Roberto Fogel MD, Isaac Rajjman MD, Juana Fogel MD, Ydaly Bonilla MD, Rafael De la Fuente MD, Hospital Clinicas Caracas, Caracas Venezuela

INTRODUCTION: Morbid obesity is a significant global health problem. It is only second to cancer in adult-related mortality and is associated with multiple and various comorbidities. While the surgical methods are effective for weight loss and reduction of some comorbidities, they are associated with significant morbidity and mortality.

Endoluminal methods, such as the endoluminal suturing, can provide an alternative to surgical approaches, which may limit adverse complications associated with surgery.

METHODS: Thirty-one patients underwent an Endoluminal Vertical Gastroplasty (EVG) procedure using an interrupted suture pattern. The average BMI at the time of procedure was 38.1. Weight measurements and blood chemistry work-ups were performed at baseline and at 3 months post-procedure. All procedures were performed under general anesthesia.

RESULTS: Prior to the procedure, 14 patients suffered from glucose intolerance or type II diabetes, 26 patients suffered from hypertension, and 27 patients suffered from dyslipidemia. Three months after the EVG procedure, only 2 patients suffered from glucose intolerance or type II diabetes (86% reduction), 11 patients suffered from hypertension (58% reduction), and 11 patients suffered from dyslipidemia (59% reduction). At three months, these patients realized an average percent excess weight loss of 46%.

CONCLUSION: 1) Endoluminal Vertical Gastroplasty is an effective and safe method for the short-term treatment of morbid obesity, and 2) A significant reduction in comorbidities is realized during short-term follow up. It is mandatory to obtain long-term follow up and a larger number of patients before firm conclusions are obtained.

ET017

TRANSVAGINAL CHOLECYSTECTOMY, LAPAROSCOPICALLY ASSISTED, FOR GALLSTONES, A HUMAN CASE, Marc Bessler MD, Peter Stevens MD, Luca Milone MD, Dennis Fowler MD, Department of Surgery - Columbia University College of Physicians & Surgeons

BACKGROUND: NOTES cholecystectomy has so far only been proven to be technically feasible in a large animal model. Many articles have been published regarding abdominal organ removal via the stomach, the rectum or the vagina. After working as a team in the laboratory on a porcine model we obtained IRB approval for performing Trans Vaginal Cholecystectomy (TVC) in human patients.

METHODS AND CLINICAL CASE: We present our first clinical laparoscopically assisted TVC. The patient is a 66 year old woman with a past surgical history of appendectomy. She presented with symptoms consistent with biliary colic for 20 years. USG confirmed gallstones, and LFT's were normal. Informed consent was obtained.

SURGICAL TECHNIQUE AND RESULTS: The patient was positioned in low lithotomy position. One 5mm and two 3mm laparoscopic trocars were placed. A laparoscope was placed at the umbilicus to aid introduction of the gastro-scope transvaginally. A double channel therapeutic gastro-scope was inserted through a flexible, locking overtube (ShapeLock, USGI). After elevating the uterus, with the patient in steep Trendelenberg position, the endoscope was inserted into the vagina. Under direct laparoscopic visualization a needle knife was used to puncture the vaginal wall posterior to the cervix followed by a wire and balloon to allow the endoscope to proceed into the abdomen. From this point on only the endoscopic view was used to accomplish the operation. A laparoscopic grasper was used to retract the gallbladder fundus to the RUQ. An endoscopic hook knife and a grasper biopsy forceps were inserted into the endoscopic channels and the dissection was commenced. The combination of grasping and cutting with the endoscopic instruments and the deflection movements of the tip of the endoscope were used to accomplish the dissection. Dissection was assisted with laparoscopic instruments as needed. Once the dissection was completed, the gallbladder was removed from the abdomen through the incision in the vagina. The colpotomy was closed with absorbable sutures. The gallbladder was 15 cm long, 5cm wide, thickened and hydropic, and contained multiple 1cm stones, one of which was impacted in the neck. Operative time was 3.5 hours. The patient was feeling well after the operation but, this being our first TVC, we elected to observe her overnight and she was discharged on post-op day #1.

CONCLUSION: We have demonstrated that hybrid trans-vaginal cholecystectomy is feasible. Training in the animal lab and the combination of surgical and endoscopic skills was mandatory and important for accomplishing this procedure. The development of new instruments dedicated to NOTES will allow expanded use of this technique.

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- ETP001 Evaluation of the Safety and Efficacy of NiTi Compression Anastomosis Clip (CAC) in an Experimental Colonic Anastomosis Model** Koiana Trencheva, Krista La Perle, Toyooki Sonoda, Sang Lee, Zack Sisko, Jeffrey Milsom, Weill Medical College of Cornell University-New York Presbyterian Hospital NY, USA
- ETP002 Building a Bridge to NOTES: Hybridization of NOTES and Flexible Laparoscopy in the Porcine Model** Raza M Zaidi, MD, Amit Joshi, MD, Eugene Rubach, MD, George DeNoto, MD, Niraj Kaushik, MD, Gary Gecelter, MD, North Shore - LJ Health System
- ETP003 Nanoparticle Phosphor Intracorporeal Light Generation for "External Beam" Photodynamic Therapy in Murine Lung Cancer Model** Joseph S Friedberg, MD, Joshua E Collins, MS, Ba T Nguyen, BS, Thiru V Lakshman, MD, Melissa J Culligan, RN, Howard Bell, BS, University of Pennsylvania and Sunstones, Inc
- ETP004 REMOVABLE FULL-COVERED SELF EXPANDABLE METALLIC STENT (SEMS) FOR BENIGN INTESTINAL ANASTOMOTIC STRICTURE** Fausto Fiocca, MD, Gianfranco Donatelli, MD, Vincenzo Ceci, MD, Fabrizio Cereatti, Antonio Bruni, MD, Mario Corona, MD, Filippo M Salvasori, MD, Department of Emergency Endoscopic Surgery - University "La Sapienza" - Policlinico Umberto I - Rome, Italy
- ETP005 Image Reversal Algorithms for Robotic Natural Orifice Transluminal Endoscopic Surgery** John Afthinos, MD, Julio Teixeira, MD, James McGinty, MD, Faiz Bhora, MD, Sandhya Balaram, MD, Cliff Connery, MD, Marc Attiyeh, BS, Avinash Burra, BS, Domingo Nunez, MD, Daniel Swistel, MD, George Todd, Scott Belsley, MD, St. Luke's - Roosevelt Hospital Center
- ETP006 Belly-Cam: A hands free, smart laparoscopic imaging system** Timothy W Perez, MD, Robert Johnson, MS, William Radigan, BS, Albuquerque Surgical Consultants
- ETP007 Single Port Surgery and the Dundee Endocone** Stuart I Brown, PhD, Alfred Cuschieri, MD, University of Dundee, UK
- ETP008 Long Term Outcome of Gastric Electric Stimulation for Refractory Gastroparesis** J R Salameh, MD, R S Schmieg, MD, J M Runnels, MD, T L Abell, MD, Departments of Surgery and Medicine, University of Mississippi, Jackson, Mississippi
- iETP009 AN OFFICE BASED SYSTEM FOR ACCESSING IMPLANTED PORTS** James Ellsmere, MD, Daniel B Jones, MD, William Wells, PhD, 1. Department of Surgery, Beth Israel Deaconess Medical Center, Boston MA, 2. Department of Radiology, Brigham and Women's Hospital, Boston MA
- ETP010 The discrimination of expert and novice surgeons based on prefrontal cortical activation during a technical surgical task** Daniel R Leff, BS, Julian J Leong, BS, Louis Atallah, PhD, Thanos Athanasiou, PhD, Peck Hui-Koh, Clare E Elwell, David t Delpy, Guang-Zhong Yang, PhD, Ara Darzi, MD, Imperial College London and University College London
- ETP011 Clinical Application of a Novel Gaseous Airway Reflux Detector in Infants and Children** Chris Landon, MD, Ventura County Medical Center
- ETP012 Natural Orifice Robotic Surgery: da Vinci™ Longo technique description** Adrian LOBONTIU, MD, Daniel RABREAU, MD, Paul-Henri CUGNENC, MD, Claude TAYAR, MD, Daniel LOISANCE, MD, (1)Henri Mondor Hospital - Créteil, Paris XII, France and (2)European Hospital Georges Pompidou - Paris, France
- ETP013 Radiofrequency ablation of liver tumors: a novel needle perfusion technique enhances efficiency** Paolo Abitabile, MD, Christoph A Maurer, MD, Kantonsspital Liestal, Switzerland, Clinic for General, Visceral, Thoracic and Vascular Surgery
- ETP014 Rebound HRD (Hernia Repair Device)** Roderick B Brown, MD, Glacial Ridge Health System, Minnesota Medical Development Inc.
- ETP015 TEM as a portal for NOTES** P M Denk, MD, M H Whiteford, MD, L L Swanstrom, MD, Legacy Health System, Portland, OR
- ETP016 Laparoscopic umbrella system for mesh placement in Ventral hernia** Brij B Agarwal, Nayan Agarwal, Krishna A Agarwal, Manish K Gupta, MS, Sneha Agarwal, MS, Krishan C Mahajan, MS, Sir Ganga Ram Hospital, Lady Hardinge Medical College & DPS, RK Puram, India
- ETP017 Natural Orifice Transluminal Surgery : long term survival study after closure of the gastrotomy using a cardiac septal occluder in a porcine model** Silvana Perretta, MD, Bernard Dallemagne, MD, Stefano Sereno, MD, Antonello Forgione, MD, Dimitri Coumaros, MD, Christof Boosfeld, Jacques Marescaux, MD, IRCAD-EITS, University of Strasbourg, France/ * DRABO / Occlutech, Germany
- ETP018 The effect of a compression mechanism on energy based vessel sealing** Marc Singer MD, Linda S Oleson, University of Illinois, Chicago, SurgRx, Inc.
- ETP019 Preliminary Report of a Novel Gastric Sensing and Electrical Stimulation Device to Treat Obese Subjects with T2DM** John Pilcher, MD, Mark Kipnes, MD, Edy Soffer, MD, Jeffrey Conklin, MD, Scott Cunneen, MD, Diabetes and Glandular Disease Research Associates, Inc. San Antonio, Texas and Cedars Sinai Medical Center, Los Angeles, California
- ETP020 Endoluminal Approaches to Bariatric Surgery; A New Application of the Modified NDO Plicator** Carol A McCloskey, MD, Anita P Courcoulas, MD, Amos Cruz, George Eid, MD, University of Pittsburgh Medical Center and the VA Health Care System
- ETP021 DEVELOPING AN ULTRASONIC PROBE FOR TUMOR ABLATION IN LIVER: Experimental Results with morphological analysis of the ultrasonic lesions.** Belhassen Seket, MD, Cyril Lafon, PhD, Rares Salomir, PhD, François Mithieux, MD, Jean-Yves Chapelon, PhD, Michel Rivoire, MD, Dominique Cathignol, PhD, Insitut National de la Santé et de la Recherche Médicale (INSERM) unité 556, Université Claude Bernard - Lyon 1 and Centre Léon Bérard (Institut de Chirurgie Expérimentale) , Lyon, France.
- ETP022 Development of Hybrid Surgical Simulation Device** Cronwel N Irias, Daniel A Hashimoto, Daniel M Jones, MD, Beth Israel Deaconess Medical Center
- ETP023 Pilot Study on the Effects of Gastric Electrical Stimulation (TANTALUS™) on Glycemic Control in Morbidly Obese Patients with Type 2 Diabetes (T2DM)** Arthur Bohdjalian, MD, Bernhard Ludvik, MD, Rudolph Weiner, MD, Christoph Rosak, MD, Gerhard Prager, MD, Medical University of Vienna, Dept. of Surgery and Internal Medicine III; Krankenhaus Sachsenhausen Frankfurt, Dept. of Surgery and Internal Medicine
- ETP024 USEFULNESS OF ELECTRICAL STABILIZATION OF LAPAROSCOPIC IMAGE AND DEPTH PERCEPTION BY MOVEMENT PARALLAX IN LAPAROSCOPIC SURGERY** Tatsuo Igarashi, MD, Yukio Naya, MD, Harufumi Makino, MD, Hideki Hayashi, MD, Research Center for Frontier Medical Engineering, Chiba University
- ETP025 Transcorporeal Magnetic Retraction of Luminal Viscera** Stephen Van Lue, DVM, DACVS, Anne Palsgaard-Van Lue, DVM, University of Copenhagen, Faculty of Life Sciences, Copenhagen, Denmark
- ETP026 Transbronchial Evaluation of Mediastinal Lymph Nodes: A Single Institution's Early Experience with Endobronchial Ultrasound** Shawn S Groth, MD, Bryan A Whitson, MD, Michael A Maddaus, MD, Rafael S Andrade, MD, University of Minnesota Department of Surgery



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- ETP027 Real-Time Imaging of the Common Bile Duct using Infrared Technology in a Porcine Model** Ben R McHone, MD, Alexander Gorbach, PhD, Jack Liu, BA, Mehrdad Alemozaffar, BA, Nadeem Dhanani, MD, Fred Gage, PhD, Peter Pinto, MD, Eric Elster, MD, National Cancer Institute, National Institute of Biomedical Imaging, Naval Medical Research Center
- ETP028 Design and instrumentation of new devices for performing appendectomy at colonoscopy.** Gerd Silberhumer, MD, Tudor Birsan, MD, Ewald Unger, MD, Winfried Mayr, MD, Johannes Zacherl, MD, Gerhard Prager, MD, Christoph Gasche, MD, Medical University Vienna, Department of Surgery, Department of Gastroenterology and Hepatology
- ETP029 Endoscopic Esophageal Mucosectomy Using a Multipurpose Therapeutic Hood (TxHood)** Tatsuyuki Kawano, MD, Shigeo Haruki, MD, Tokyo Medical and Dental University Hosita
- IETP030 Radiofrequency Ablation for Lung Tumors** Ghulam Abbas, MD, Arjun Pennathur, MD, Rodney J Landreneau, MD, James D Luketich, MD, University of Pittsburgh Medical Center
- ETP031 The Establishment of a Large Animal Survival Model of Laparoscopic Roux-en-Y Gastric Bypass to Study Subsequent Gastrojejunostomy Reduction Using the RESTORE™ Suturing System** David B Lautz, MD, Cesar E Escareno, MD, Ikram V Kureshi, MD, Arthur Nedder, Ali Tavakkolizadeh, MD, Kerri A Clancy, RN, Ajay Maker, MD, Michele Ryan, MS, Christopher C Thompson, MD, Brigham and Women's Hospital, Harvard Medical School, Boston MA
- ETP032 LTS3e Augmented Reality Laparoscopic Simulator** Andrée Sansregret, MD, Paul Yarin, MS, David Hananel, BS, Harrith M Hasson, MD, Univ. of Montreal, Blackdust Design, Medical Education Technologies, Inc., Univ. of New Mexico
- ETP033 Dx pH measurement System. A Sensitive Radiotelemetry Device for Detecting Liquid and Aerosolized Supraesophageal Gastric Reflux (SEGR)** Harry S Miller, MD, Tomas Garibaldi-Hardy, H.G.R.#20 of The Instituto Mexicano del Seguro Social & Restech Corp. USA
- ETP034 Endo-Laparoscopic Intra-gastric Tumor Excision (ELITE) - An Emerging Concept of Synchronized Laparoscopy-Endoscopy Approach** Simon K Wong, MD, Michael Li, MD, Department of Surgery, Pamela Youde Nethersole Eastern Hospital, Hong Kong
- ETP035 Microwave Ablation of Liver Tissue: The Future of Hepatic Tumor Ablation** John P Cullen, MD, David W Easter, MD, Sonia Ramamoorthy, MD, Brian Datnow, MD, Santiago Horgan, MD, Mark A Talamini, MD, Yoav Mintz, MD, University of California at San Diego
- ETP036 Evaluation of the Use of a New Impedance Controlled Bipolar Device with Monopolar Capability** Thomas M Schmelzer, MD, William W Hope, MD, William L Newcomb, MD, Keith S Gersin, MD, David A Iannitti, MD, B. Todd Heniford, MD, Carolinas Medical Center
- ETP037 Irreversible Electroporation for the Ablation of Malignant HCC Tumors** Brett Sheppard, MD, Douglas Faigel, MD, Gary Long, PhD, Dave Plescia, MS, Christie Cunningham, BS, Phil Long, PhD, NOTES Development Group, Oregon Health Sciences University (OHSU), Portland OR Ethicon Endo-Surgery Cincinnati OH, Vet Path Services, Inc Mason, OH
- ETP038 A COMPARISON OF BURST PRESSURES OF GASTROJEJUNAL ANASTOMOSES WITH OR WITHOUT BUTTRESSING IN A PORCINE MODEL** William W Hope, MD, Marc Zerey, MD, B. Lauren Paton, MD, William L Newcomb, MD, Albert Y Chen, MD, Jessica J Heath, BS, Richard D Peindl, PhD, Amy E Lincourt, PhD, Timothy S Kuwada, MD, B. Todd Heniford, MD, Keith S Gersin, MD, Carolinas Medical Center
- ETP039 Early Clinical Results Using GORE SEAMGUARD® Bioabsorbable Staple Line Reinforcement (CBSG) For Circular Staplers** Wesley B Jones, MD, Katherine M Myers, Eric S Bour, MD, Greenville Hospital System University Medical Center, Department of Surgery, Greenville, SC, USA
- ETP040 Repair of Inguinal Hernia in Developing Countries** Teheyton E Udwardia, Breach Candy and Hinduja Hospitals, Mumbai.
- ETP041 Articulating Needle Holder Design** Tim Frank, PhD, Stuart Brown, PhD, Alfred Cuschieri, Department of Surgery and Molecular Oncology, University of Dundee, UK and Cuschieri Skills Centre, University of Dundee, UK
- ETP042 New 2 mm instruments not requiring trocars for Minimally Invasive Surgery** Ashutosh Kaul, MD, Ravi Kumar, MD, New York Medical College
- ETP043 Efficacy of Fully Covered Self-Expanding Nitinol Stents in the Treatment of Dysphagia for Patients with Refractory Anastomotic Strictures After Esophagectomy** Rajnish Mishra, MD, Paul Yeaton, MD, Michel Kahaleh, MD, Vanessa Shami, MD, University of Virginia Health System
- ETP044 A Direct Drive Endoscopic System for Complex Endoluminal and NOTES Applications** C C Thompson, R I Rothstein, N J Soper, M Ryou, D G Fong, R D Pai, P J Smith, B D Weitzner, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA; Dartmouth Hitchcock Medical Center, Dartmouth Medical School, Hanover, NH, USA; Northwestern University, Chicago, IL, USA; Boston Scientific, Marlborough, MA, USA
- ETP045 Building virtual reality haptic interfaces: The contributions of operative experience** Allan Okrainec, MD, Heather Carnahan, PhD, Liya Ni, PhD, David Wang, PhD, Adam Dubrowski, PhD, University of Toronto and University of Waterloo
- ETP046 Effectiveness of Virtual Instructor Feedback on Novice Learner Performance Using the GI Mentor II Gastrointestinal Endoscopy Simulator** James G Bittner IV, MD, Adeline M Deladisma, MD, Michael A Edwards, MD, Edward J Kruse, DO, John D Mellinger, MD, Mary Anne Park, MSc, Bruce V MacFadyen Jr., MD, D. Scott Lind, MD, Department of Surgery, Medical College of Georgia School of Medicine
- ETP047 Decision Aids in Laparoscopic Cholecystectomy** Dawit Worku Gebrehiwot, MD, St. Bartholomew's and The London School of Medicine and Dentistry
- ETP048 2-dimensional gel plasma proteomics: A tool for the assessment of the plasma protein response to illness and surgical intervention** John M Bennett, BA, Abigail C Polley, PhD, Mike Rhodes, MD, Ian T Johnson, PhD, Fran Mulholland, PhD, Institute of Food Research
- ETP049 TROCAR FOR LAPAROSCOPIC PLACEMENT OF CATHETER FOR PERITONEAL DIALYSIS** Zoran Cala, PhD, Ivo Soldo, PhD, Irena Senecic-Cala, MSc, Visnja Neseck-Adam, MSc, Univ Dpt of Surgery GH Sveti Duh, Univ Dpt of Pediatrics CH Rebro, Zagreb, Croatia
- ETP050 THORACOSCOPIC AND MINI-LUMBAR VERTEBRAL BODY STAPLING USING SHAPE MEMORY ALLOY (NITINOL) IN THE TREATMENT FOR SCOLIOSIS IN CHILDREN** Harsh Grewal, MD, Randal R Betz, Linda P D'Andrea, Section of Pediatric Surgery, Temple University Children's Medical Center and Orthopedic Surgery, Shriners' Hospitals for Children, Philadelphia
- ETP051 A NOVEL DEVICE FOR DEFOGGING, HEATING, WHITE-BALANCING, PROTECTING AND CLEANING THE LAPAROSCOPE** Sandy Heck, MD, Alexander Gomez, Brian Jacob, MD, Alfons Pomp, MD, Weill Cornell Medical College, New Wave Surgical Corp.

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- ETP052 THE LAPAROSCOPIC VASCULAR TRANSILLUMINATOR: EFFICACY OF A BLOOD VESSEL IDENTIFICATION DEVICE USING INFRARED EMISSION DIODE** Kozo Konishi, MD, Kazuo Tanoue, MD, Satoshi Ieiri, MD, Shohei Yamaguchi, MD, Etsuko Kobayashi, MD, Ichiro Sakuma, MD, Takeyoshi Dohi, MD, Makoto Hashizume, MD, 1. Graduate School of Medicine, Kyushu University; 2. Graduate School of Information Science and Technology Medicine, The University of Tokyo
- ETP053 Effective Appetite Management by Proximal Gastric Electric Stimulation** B. A Zikria, MD, Leaque Ahmad, MD, Joseph F Zikria, BA, M Al-Sawwaf, MD, Arthur Cooper, MD, Harlem Hospital Medical Center, Columbia University, New York
- ETP054 Robotic telepresence offers an alternative paradigm for post-residency surgical education** Alex Gandsas, MD, John S Koppman, MD, Christina Li, MD, Stuart Shindel, MD, Michael Schweitzer, MD, Sergio Cantarelli, MD, Gabriel Egidi, MD, Sinai Hospital of Baltimore and Johns Hopkins Bayview Medical Center
- ETP055 Comparison of task performance between articulating and conventional laparoscopic instruments** Prakash Gatta, MD, Peter M Denk, MD, Bin Zheng, PhD, Lee L Swanstrom, MD, Legacy Health System
- ETP056 Minimally traumatic suturing device for laparoscopic ventral hernia repair (LVHR)** Brij B Agarwal, MS, Krishna A Agarwal, Nayan Agarwal, Manish K Gupta, MS, Sneha Agarwal, MS, Krishan C Mahajan, MS, Sir Ganga Ram Hospital, Lady Hardinge Medical College & DPS, RK Puram, India
- ETP057 Objective measurement of FLS Precision Cutting Task** Derek Young, Fiona Slevin, Derek Cassidy, Donncha Ryan, Haptica Inc
- ETP058 The novel use of self-expanding, covered, plastic esophageal stents (SEPS) in the management of benign colorectal anastomotic strictures** William J Peche, MD, Kirsten B Wilkins, MD, Kelly M Tyler, MD, Theodore E Eisenstat, MD, Gregory C Oliver, MD, Joseph R Notaro, MD, Daniel Simon*, MD, Bertram T Chinn, MD, Department of Colon and Rectal Surgery, UMDNJ-Robert Wood Johnson University Hospital, New Brunswick, NJ and *Department of Radiology, Solaris Health Systems, Edison, NJ
- ETP059 Surgical Staplers With Magnetically Secured Components** Stephen Van Lue, DVM, DACVS, University of Copenhagen, Faculty of Life Sciences, Copenhagen, Denmark
- ETP060 Magnetic Optical Suturing** Stephen Van Lue, DVM, DACVS, University of Copenhagen, Faculty of Life Sciences, Copenhagen, Denmark
- ETP061 Support where it's needed: Smart Arm** Stuart I Brown, PhD, Ian Rutherford, University of Dundee, UK
- ETP062 New curriculum for acquiring "Surgical Skills" using Virtual Reality Surgical Simulation.** S. Ivanova, MD, N Iqbal, T Albrani, B Patel, Academic Department of Upper GI Surgery, Barts and The Royal London School of Medicine and Dentistry, Queen Mary, University of London, Institute of Cancer, Old Anatomy Building, Charterhouse Square, London, United Kingdom, EC1M 6BQ.
- ETP063 Development of Simulation for Practicing Laparoscopic Hernia Repairs and Gastric Bypass** Yael Friedman, PhD, Symbionix Corp.
- ETP064 Antimicrobial nanoparticle surface functionalization to prevent biofilm formation on medical devices** Roger Massengale, Bruce Gibbins, PhD, Alan Dine, BS, I-Flow Corporation, Acrymed Inc.
- ETP065 RADIOFREQUENCY ASSISTED LAPAROSCOPIC LIVER RESECTION: INITIAL EXPERIENCE WITH THE LAPAROSCOPIC HABIB DEVICE** Alejandro Mejia, MD, Stephen Cheng, MD, THE LIVER INSTITUTE - METHODIST DALLAS
- ETP066 Temporary Stent Placement After Colorectal Anastomosis Using Polyflex system: An Animal Model** Zurab Tsereteli, MD, Tim M Geiger, MD, Christopher Edwards, MD, Sharon Backman, MD, Nitin Rangnekar, MD, Brent Miedema, MD, Klaus Thaler, MD, University of Missouri-Columbia, Columbia, MO, Department of General Surgery
- ETP067 Preliminary Results Utilizing a Bioabsorbable Omega-3 Fatty Acid Coated Lightweight Polypropylene Mesh for Open and Laparoscopic Ventral and Inguinal Hernia Repair** Richard A Pierce, MD, Margaret M Frisella, RN, Laura M Todt, BS, Brent D Matthews, MD, Washington University School of Medicine and Institute for Minimally Invasive Surgery, Saint Louis, Missouri, USA
- ETP068 Twin Input Insufflator** Krishna A Agarwal, Brij B Agarwal, MS, Nayan Agarwal, Sneha Agarwal, MS, Krishan C Mahajan, MS, Sir Ganga Ram Hospital , Lady Hardinge Medical College & DPS-RK Puram, India
- ETP069 Transgastric Endoscopic Diagnostic Peritoneoscopy in Humans** Jeffrey W Hazey, MD, Scott Melvin, MD, Vimal K Narula, MD, Peter Muscarella, MD, Christopher Ellison, MD, The Ohio State University
- ETP070 GUIDELINE FOR CHOLECYSTECTOMY BY NOTES**, Kiyoshi Hashiba PhD, Sergio Roll PhD, Marco A D'Assuncao MD, Pablo R Siqueira MD, Hospital Sirio Libanes, Gastrointestinal Endoscopy Unit, Sao Paulo, Brazil
- ETP071 ANALYSIS OF PARAMEDIAN ABDOMINAL WALL DEFECTS FOLLOWING INTENTIONAL ACCESS CANNULA MANIPULATION IN SWINE**, Rich Schiretz MS, Steve Izzo BS, Greg Okoniewski BS, Russell Heinrich PhD, United States Surgical



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ETP001

EVALUATION OF THE SAFETY AND EFFICACY OF NITI COMPRESSION ANASTOMOSIS CLIP (CAC) IN AN EXPERIMENTAL COLONIC ANASTOMOSIS MODEL. Koiana Trencheva, Krista La Perle, Toyooki Sonoda, Sang Lee, Zack Sisko, Jeffrey Milsom, Weill Medical College of Cornell University-New York Presbyterian Hospital NY, USA

BACKGROUND: The compression anastomotic clip (CAC), NiTi Medical Technologies, Israel, is a new mechanical device that uses temperature-dependent memory-shape nickel-titanium to produce a sutureless bowel anastomosis. The aim of this study was to evaluate the usefulness, safety, and efficacy of the NiTi CAC in colonic anastomoses.

METHODS: 14 female Yorkshire pigs (30-35 kg) underwent large bowel resection (LBR) with anastomosis in 3 groups: Group 1 (Gp1) CAC version 1; Group 2 (Gp2) CAC version 2 and Group 3 (Gp3) CAC version 3 with 6, 2 and 6 animals respectively. The 3 experiments done consecutively involved improvement of the CAC and diet modification. LBR was done using a linear stapler and side-to-side anastomosis using the NiTi CAC. Post-op animals were observed for: vital signs, GI recovery, complications, and clip expulsion. Necropsies were done 12-13 days post surgery. Anastomotic sites were: leak tested, bursting pressures measured and evaluated histologically.

RESULTS: No animals in Gp3 had an abdominal distention vs. 100 % (6) in Gp1 (p<0.001). One animal from Gp1 had bowel obstruction and peritonitis and was euthanized. Bursting pressure was > 250-300 mmHg in 92.3% (12) of the animals. Tissue within the clip was necrotic but failed to slough in 83.3 % (10). NiTi anastomosis exhibited excellent apposition of the bowel wall in slight inversion, moderate amount of highly vascular granulation tissue, mature collagen and minimal to mild inflammation (See Image). The everted staple line site exhibited junctional invagination and significant architectural disruption resulting in delayed healing and had mild to moderate inflammation and fibrosis. **CONCLUSION:** The CAC histology revealed less inflammation and better healing at the NiTi anastomotic sites compared to staple lines. CAC (Version 3) appears to be useful and safe for colonic anastomoses, although partially remaining necrotic tissue within the clip is still a concern for post-op bowel obstruction.



ETP002

BUILDING A BRIDGE TO NOTES: HYBRIDIZATION OF NOTES AND FLEXIBLE LAPAROSCOPY IN THE PORCINE MODEL. Raza M Zaidi MD, Amit Joshi MD, Eugene Rubach MD, George DeNoto MD, Niraj Kaushik MD, Gary Gecelter MD, North Shore - LIJ Health System

INTRODUCTION: Park described Natural Orifice Translumenal Endoscopic Surgery (NOTES) transgastric cholecystectomy in the porcine model. Pai noted that transgastric cholecystectomy was limited by retroflexed views making en face visualization and dissection difficult. Alternatively, they approached the gallbladder through a colotomy. Both studies described the need for effective luminal closure. We propose a method utilizing the techniques of NOTES procedures via a transumbilical access port. A NOTES hybridization technique with flexible laparoscopy may allow easier spatial orientation while avoiding complications from the visceral puncture. It may also be an intermediary between conventional laparoscopic and completely translumenal procedures that still maintains cosmesis and minimizes pain. This is a unique approach to a novel surgical paradigm that may ultimately facilitate the widespread acceptance of this new technology.

HYPOTHESIS: This project aims to prove that a NOTES hybridization technique is feasible in an animal model with

greater technical ease using current endoscopic technology. **METHODS:** Yorkshire pigs are used in an approved animal laboratory. Under general anesthesia, pneumoperitoneum is established to 15 mmHg. A single 15-mm transumbilical laparoscopic port is inserted. A double channel endoscope is then inserted visualizing the peritoneal cavity. The gallbladder is identified and held with a grasping forceps, retracting it away from the gallbladder fossa. Cystic artery and vein are visualized using needle knife, biopsy forceps, hook knife and snare cautery. The cystic artery and duct are then endoclipped and transected. The gallbladder specimen is then withdrawn via the umbilical access port. The gallbladder fossa is examined for hemostasis and absence of biliary spillage. The procedure is then terminated and necropsy is performed to confirm correct placement of endoclips, maintenance of hemostasis and evaluate for unintended organ injury. Data is collected involving procedure time, estimated blood loss, visualization of peritoneal organs, and technical difficulty.

CONCLUSIONS: Using NOTES techniques, we propose that the complications related to the visceral organ puncture can be avoided using a transabdominal approach. This technique avoids the need for retroflexion of the endoscope, keeping en face orientation, maintaining the benefits of surgery through minimal incisions, while, avoiding a major technique related complication.

ETP003

NANOPARTICLE PHOSPHOR INTRACORPOREAL LIGHT GENERATION FOR "EXTERNAL BEAM" PHOTODYNAMIC THERAPY IN MURINE LUNG CANCER MODEL. Joseph S Friedberg MD, Joshua E Collins MS, Ba T Nguyen BS, Thiru V Lakshman MD, Melissa J Culligan RN, Howard Bell BS, University of Pennsylvania and Sunstones, Inc

Objective of the technology: Photodynamic therapy, PDT, is an effective cancer treatment that requires visible light to activate nontoxic photosensitizing compounds, PS. Because visible light only penetrates several mm into tissue, applications of PDT are limited to superficial tumors that are easily visualized and illuminated. Infrared light, IR has much greater tissue penetration, but does not activate PS. The ability to use IR for PDT could greatly expand the applications of PDT. Rare earth phosphors are inert lanthanide compounds that can capture IR and generate visible light. The objective of these experiments was to see if it was possible to use deep penetrating IR to generate intracorporeal visible light and if that light would be sufficient for PDT.

Methods: Murine LKR13 lung cancer cells were injected into the flanks of SCID mice. Treatment groups included: controls, IR plus phosphors, IR plus phosphors plus PS. PS was Photofrin (25 micrograms/ml), Phosphor was 200nm Etrium Gadolinium Oxysulfide activated with Erbium and Ytterbium (50mg/ml), Light was 980nm IR (110 J/cm²).

Results: Illumination with IR and phosphors resulted in minimal delay in growth compared to controls, while addition of the PS resulted in PDT induced killing. Mean tumor volumes at 14 days for controls, IR/phosphors and IR/phosphors/PS were: 140, 110 and 10 mm³, respectively.

Conclusions/Future directions: Nanoparticle phosphors can capture deep penetrating IR, which then upconverts to visible light sufficient to effect PDT. These experiments are the first demonstration of the feasibility of this concept. This combination of technologies has potential to greatly expand the applications of PDT and allow minimally invasive treatments of cancers, with PDT, at sites that are currently inaccessible or require major surgical procedures to access for visible light delivery. In addition, the combination of this technology with other novel light delivery strategies, such as luminal refractive index modification (Friedberg, et al JTCVS, 2003), has potential as a minimally invasive treatment of entire cavities for diseases such as pleural or peritoneal carcinomatosis.



ETP004

REMOVABLE FULL-COVERED SELF EXPANDABLE METALLIC STENT (SEMS) FOR BENIGN INTESTINAL ANASTOMOTIC STRICTURE, Fausto Fiocca MD, Gianfranco Donatelli MD, Vincenzo Ceci MD, Fabrizio Cereatti, Antonio Bruni MD, Mario Corona MD, Filippo M Salvatori MD, Department of Emergency Endoscopic Surgery - University "La Sapienza" - Policlinico Umberto I - Rome, Italy
New SEMS Niti-S Stent Taewoong Medical Co-Ltd, distributed by Deltamed Italy, full covered and that can be removed, are now available: a nylon stich at both margin of the prosthesis is placed. Endoscopically the stich can be pulled with a foreign body forcep: the prosthesis closes itself and it can slip along the bowel. Up to now SEMS were only for use in malignant intestinal strictures as they cannot be removed. The most frequent complications after digestive surgery are leaks and stenosis of the sutured bowel, occurring with a frequency of 11-13%. Strictures are commonly treated with conservative treatments such as repeated balloon dilatations or endoscopic incision but some times a new surgical treatment is needed. To maintain the patency of the stricture the use of these brand new removable SEMS should be proposed. Patients with colo-rectal anastomotic closure were successfully treated with SEMS, avoiding surgery, achieving the complete recovery of the patients.

PATIENTS AND METHODS: 31 patients with benign colo-rectal anastomotic strictures were treated with balloon dilatation along a guide wire placed with endoscopic and fluoroscopic control and a removable SEMS, 22 mm in diameter with distal and proximal enlargement 28 mm to avoid dislocation, was positioned. The procedures were carried out with a conscious sedation and a prophylactic antibiotic therapy. After 1-3 months the prosthesis was endoscopically removed and the patients considered for follow-up at 3-6-12 months to evaluate bowel patency.

RESULTS: 3 patients lost their prosthesis through the anus after 20 days. At clinical and endoscopic follow-up 28 patients showed good patency of the colo-rectal anastomosis. 3 patients had a stricture recurrence that required two sessions of balloon dilatation combined with argon-plasma coagulation of the scar.

CONCLUSION. The placement of SEMS in order to maintain an adequate lumen and to avoid any possible leak of an anastomotic stricture in colo-rectal surgery has demonstrated to be the gold standard. The use of SEMS seems valid also in term of cost benefits as it is cheaper than repeated endoscopic treatments or a new surgical approach.

ETP005

IMAGE REVERSAL ALGORITHMS FOR ROBOTIC NATURAL ORIFICE TRANSLUMENAL ENDOSCOPIC SURGERY, John Afthinos MD, Julio Teixeira MD, James McGinty MD, Faiz Bhora MD, Sandhya Balaram MD, Cliff Connery MD, Marc Attiyeh BS, Avinash Burra BS, Domingo Nunez MD, Daniel Swistel MD, George Todd, Scott Belsley MD, St. Luke's - Roosevelt Hospital Center

Objective: Image reversal in Natural Orifice Transluminal Endoscopic Surgery (NOTES) is underestimated in procedures attempted with laparoscopic instruments that only afford four degrees of freedom. Robotic NOTES that applies a third-party endoscope with the robotic instruments of the Da Vinci System (Intuitive Surgical) that have seven degrees of freedom highlights problems of mirrored views in each spatial dimension. Clinical algorithms to orient the operative surgeon with the endoscopist during complex traditional or robotic NOTES procedures are required.

Description: The video image from a flexible gastroscope (Olympus) was spliced through an image reverser (Colorado Video) into the visual field of the operative console of the Da Vinci Robot. The alterations in perceived motion in both the vertical and horizontal axes when looking directly at the trocars as well as in flexed view were recorded first in a lab model and then using two 50 kg pigs where a Robotic NOTES plication with transgastric instrumentation was attempted at the esophageal hiatus.

Results: Image reversal follows a reproducible algorithm depending on initial approach, gastroscope rotation and flexion that is elucidated by recording initial movement patterns and orientation of the transgastric trocars. Although four approaches are technically possible, only two allow correspondence of scope position with both horizontal and vertical movements at the esophageal hiatus- 0 degree gastroscope rotation with retroflexion and the use of the video reverser, and 180 degree gastroscope rotation with anteflexion both approached along the greater curvature. Although the later technique does not require an image reverser for flexed image correspondence, it is much more technically difficult for the endoscopist.

Conclusion: Complex NOTES instrumentation that requires both direct views and flexed visualization through an endoscope is greatly facilitated with the use of a video reverser. Although clinical orientation is facilitated by noting patterns of vertical and horizontal image reversal, automating this mathematical algorithm represents an area of essential technological development.

ETP006

BELLY-CAM: A HANDS FREE, SMART LAPAROSCOPIC IMAGING SYSTEM, Timothy W Perez MD, Robert Johnson MS, William Radigan BS, Albuquerque Surgical Consultants

Objective: In laparoscopic surgery the ability of the surgeon to see is entirely dependent on the skill of the person steering the laparoscope. Current hand-directed rigid laparoscopes suffer from several drawbacks:

- Constant manual adjustment to maintain an optimal view of the surgical field.
- Lack of a separate visual perspective for the assistant
- Rotation of the image off the horizontal

The Belly-Cam laparoscopic imaging system is designed to alleviate these shortcomings by departing from the laparoscope/trocar paradigm. The objective of Belly-Cam is to provide a hands free, optimally positioned view of the operative field for laparoscopic surgeons. Another goal is to engage the first assistant by providing a separate larger perspective image. By achieving these objectives, the Belly-Cam would allow the surgical team to focus on operating and not constantly troubleshooting the camera image.

Description of the technology and method of its use or

application: Belly-Cam is intended for use within the abdominal cavity. The camera is mounted on a mechanized apparatus that provides horizontal and vertical movement of the lens. Belly-Cam uses a CMOS imaging chip; technology which allows for panning and zooming operations to be performed on the chip. Tracking the surgeon's instruments is possible without manipulating the camera. Movements outside the range of the chip would be tracked by mechanical movement of the camera. The image would be centered based on cues from the dominant hand instrument. Thus , Belly-Cam would provide a hands free, self-adjusting image of the procedure.

Another feature of the CMOS camera is the ability to provide a separate, wide angle image that could be sent to a different monitor. This would provide the assistant with a view of their instrument movements typically outside the surgeon's sight.

Preliminary Results and Future Directions: A prototype of the Belly-Cam is under development. Key features, such as "on the chip" panning and zooming, have been demonstrated. Software to control tracking of the instruments and control the camera is under development. The Belly-Cam project team will develop a production model and conduct cadaver testing. An educational/collaborative effort is planned to garner feedback and support for this significant advancement in laparoscopic surgery.

ETP007

SINGLE PORT SURGERY AND THE DUNDEE ENDOCONE, Stuart I Brown PhD, Alfred Cuschieri MD, University of Dundee, UK

Objective: The development of modern imaging technology is resulting in the detection of early gastrointestinal lesions still confined to the mucosa and hence amenable to



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local excision. Prior attempts at laparoscopic endoluminal surgery for such procedures have employed multiple entry ports into the distended (gas inflated) viscus such as the stomach. The endoluminal surgical approach is facilitated by employing a single multi function operating port.

Description of the technology: The Endocone system was developed specifically for this application and is based on a conical frustrum with an atraumatic external thread. Mounted within this base unit is a second frustrum containing vision and illumination, ports for 3mm instruments and an insufflation channel. The geometry of the cone has been specifically developed to (a) provide the optimal viewing and manipulation angles; (b) maximise the instrument range of motion; (c) minimise the size of the entry wound. The device is used by firstly entering the abdomen through a laparoscopic approach and mobilising the stomach. The laparoscopic equipment is removed and one of the port sites incisions enlarged to about 20mm length. The mobilised stomach is then externalised through this incision and sutured temporarily to the external abdominal wall, following which a 20mm gastrotomy is made. The base cone is screwed into this gastrotomy and the remaining instrumentation assembled. The endoluminal procedure can then proceed. On completion, the instrumentation is removed and the gastrotomy closed before release of the stomach from the abdominal parieties.

Preliminary results: The system has been employed in a porcine model. Accessing the GI tract, mobilising the stomach and setting up the Endocone can be achieved in ten to fifteen minutes. Thereafter, the system was used without difficulty to dissect and remove segments of gastric mucosa. Care must be taken to ensure that the gastrotomy is made in the correct place: ideally opposite the lesion, so that minimal retraction of the tissue is required thereafter.

Conclusions/Future directions: Hitherto the Endocone has only been available in prototype form. Industrialisation of the device is now proceeding and further acute animal trials are anticipated to confirm efficacy and safety before clinical use. Intellectual property in the design has been secured by patent application.

ETP008

LONG TERM OUTCOME OF GASTRIC ELECTRIC STIMULATION FOR REFRACTORY GASTROPARESIS, J R Salameh MD, R S Schmiegl MD, J M Runnels MD, T L Abell MD, Departments of Surgery and Medicine, University of Mississippi, Jackson, Mississippi

OBJECTIVE OF THE TECHNOLOGY: Gastric Electrical Stimulation (GES) is used to treat medically refractory gastroparesis and received FDA Humanitarian Use Device approval in 2000. We examined the overall long-term outcomes with GES by underlying diagnosis.

DESCRIPTION AND METHOD OF USE: GES uses a battery powered neurostimulator, implantable using laparoscopy or laparotomy, and connected to the gastric antrum with two stimulating electrodes inserted into the muscularis propria 1 cm apart and 10 cm proximal to the pylorus. Recently, temporary endoscopic GES has been used to assess response to stimulation prior to surgically implanting a permanent device. 388 consecutive patients (311 females and 77 males, mean age of 42 years) were consented for GES: 104 patients were implanted with temporary alone, 111 with permanent alone and 140 with temporary followed by permanent GES. 33 consented patients were never implanted but were included in the intention to treat analysis. Average follow-up was 50 months (range: 6 months to 10 years).

PRELIMINARY RESULTS: Patients were assessed by IDIOMS (a HRQOL measure) and symptom scores (nausea score, vomiting score and total symptom score or TSS) at baseline and at the latest available follow-up. Percent change in HRQOL and symptoms are reported in the table below.

	ALL	IDIOPATHIC	DIABETIC	POST-SURGICAL
N	388	227	104	57
Baseline HRQOL (max 30)	16.3	15.4	18.8	15.6
% improvement in HRQOL	35.5%	33.9%	36.6%	40.0%
% improvement in Nausea	41.7%	37.6%	45.2%	51.3%
% improvement in Vomiting	50.7%	43.1%	55.8%	72.2%
% improvement in TSS	42.0%	36.4%	50.7%	48.6%

CONCLUSIONS/FUTURE DIRECTIONS: GES results in significant and sustained improvement in symptoms and quality of life in patients suffering of refractory gastroparesis. Certain patient subgroups with gastroparesis undergoing GES have different symptom outcomes. Additional factors that may predict outcomes for GES are needed.

ETP009

AN OFFICE BASED SYSTEM FOR ACCESSING IMPLANTED PORTS, James Ellsmere MD, Daniel B Jones MD, William Wells PhD, 1. Department of Surgery, Beth Israel Deaconess Medical Center, Boston MA, 2. Department of Radiology, Brigham and Women's Hospital, Boston MA

Objective: We have found that a significant number of patients following laparoscopic adjustable gastric banding (LAGB) require fluoroscopy to make adjustments. We are developing a system that enables clinicians to access LAGB ports in a safe and reliable manner that it is easily accomplished in an office setting without imaging system support.

Description: The system consists of two major components: one is an external device called the port locator and the other is a device called the beacon. The beacon is a passive device that is attached to the port at the time of implantation. It is energized by magnetic induction and then emits a signal that is used by the port locator to determine the relative location of the port and the optimal angle to approach it. The feedback from the port locator to the clinician performing the port access is visual. The visual feedback allows the user to position and orient the needle such that it facilitates port access.

Preliminary results: The approximate characteristics of the current prototype are operating range: 10 cm, position accuracy: +/- 3.0 mm and angular accuracy: +/- 5 degrees. In our current testing environment, we have found the system can facilitate port access at multiple port depths and orientations.

Future direction: We are developing a more transparent user interface as well as a more sophisticated testing environment to better quantify the system performance characteristics and to train clinicians. Subsequently, we plan to proceed to animal testing to further assess safety and effectiveness.

ETP010

THE DISCRIMINATION OF EXPERT AND NOVICE SURGEONS BASED ON PREFRONTAL CORTICAL ACTIVATION DURING A TECHNICAL SURGICAL TASK, Daniel R Leff BS, Julian J Leong BS, Louis Atallah PhD, Thanos Athanasiou PhD, Peck Hui-Koh, Clare E Elwell, David t Delpy, Guang-Zhong Yang PhD, Ara Darzi MD, Imperial College London and University College London

OBJECTIVE OF THE DEVICE: Our aim is to "shed light" on the neurocognitive mechanisms associated with expertise development in surgery. Specifically, we are interested in the potential role that neuroimaging may have in explaining variations in longitudinal technical skills acquisition. Optical topography (OT) is a functional neuroimaging technique that utilizes near infrared (NIR) light to non-invasively quantify the haemodynamic response to neuronal brain activation. The degree to which cortical regions are recruited during the execution of complex tasks can be measured non-invasively using OT. Unlike other neuroimaging techniques OT, is portable, discreet, tolerant to body motion artefact and allows subjects to be evaluated in realistic settings.

DESCRIPTION OF THE TECHNOLOGY: NIR light is capable of penetrating biological tissues and can still be detected after absorption and scattering on the cortical surface. The dominant absorbers of NIR light in biological tissue are oxyhaemoglobin (HbO2) and deoxyhaemoglobin (HHb) and attenuated light levels can be converted into relative changes in these chromophores. The typical haemodynamic response in functionally activated tissue consists of a task-induced increase in HbO2 coupled to a decrease in HHb. Commercially available spectrometers emit light at multiple NIR wavelengths and provide haemodynamic data at several cortical measuring positions.

PRELIMINARY RESULTS: 62 healthy, right-handed male subjects (22 novices, 40 surgeons) participated in a study of open surgical knot tying in a bench-top environment. Medical students were subjected to a condensed didactic knot tying training session prior to the evaluation. A block design experiment was conducted involving episodes of self-paced surgical knot tying interspersed with episodes of motor rest. Optical responses were recorded from both prefrontal cortices using an OT imager [ETG-4000, Hitachi, Japan]. Surgical dexterity was measured using the Imperial College Surgical Assessment Device (ICSAD). Surgeons were significantly faster ($p=0.000$), used shorter pathlengths ($p=0.000$) and made fewer unnecessary movements ($p=0.000$) to complete trials than medical students.

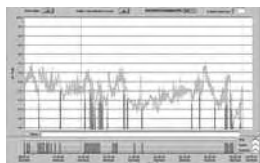
Significant haemodynamic patterns of brain activation were only isolated in the left prefrontal cortex in medical students and not in expert surgeons. Surgical knot tying evokes a lateralised brain response in novices, possibly reflecting error detection and online monitoring of performance.

FUTURE DIRECTIONS: Future evaluation aims to assess the 'neuroplasticity' associated with protracted technical skills acquisition to determine whether prefrontal activation wanes in the context of learning success in surgery.

ETP011

CLINICAL APPLICATION OF A NOVEL GASEOUS AIRWAY REFLEX DETECTOR IN INFANTS AND CHILDREN, Chris Landon MD, Ventura County Medical Center

We undertook assessment of the use of a hypopharyngeal sensor for detection of laryngopharyngeal reflux in infants and children. Gastric reflux in the airway, or supraesophageal reflux, commonly takes a gaseous form that cannot easily be measured using conventional technology. The miniaturized pH sensor at the tip of the Dx-pH Probe is the only sensor able to measure pH in the airway. Fifteen infants and children referred to the Pediatric Pulmonary Center for assessment of chronic cough, hoarse voice, or uncontrolled asthma unresponsive to usual medical intervention underwent 6-48 hour to placement of the Dx-pH probe in supplementation of radiologic assessment of gastroesophageal reflux. The probe was placed transnasally and visualized in the hypopharynx with the red light at the tip. Drops in pH <5 were correlated with food and symptom diaries.



Positive results were found in 10/15 patients, leading to surgical intervention in three patients. Negative results led to changes in medical therapy. The device was tolerated in 13/15 patients with early removal in one young adult with endstage neuromuscular disease and in an infant with "colic" due to a hysterical parental reaction. As a result of our experience we have incorporated the use of supraesophageal pH monitoring into our practice, with particular attention to infants with persistent asthma and children with histories suggestive of gastric asthma. We have now incorporated it into our Vivometrics LifeShirt, an ambulatory physiologic monitoring device which will allow us to examine supraesophageal pH and its relationship to sleep apnea, cough, tachycardia, tachypnea, and hypoxemia.

ETP012

NATURAL ORIFICE ROBOTIC SURGERY: DA VINCI? LONGO TECHNIQUE DESCRIPTION, Adrian LOBONTIU MD, Daniel RABREAU MD, Paul-Henri CUGNENC MD, Claude TAYAR MD, Daniel LOISANCE MD, (1)Henri Mondor Hospital - Créteil, Paris XII, France and (2)European Hospital Georges Pompidou - Paris, France

The endolumenal surgery has tremendously been developed these last few years. So has been the robotic surgery.

By combining these two recent innovative developments we may solve some limitations and open new horizons and indications in surgery.

This work describes the Longo technique performed with the aid of the da Vinci Surgical Robot through natural orifices (trans-anal approach).

The degrees of freedom in rectal endolumenal surgery are limited because instruments need to be long and are manipulated through limited anatomy area.

In order to solve these limitations tools have been developed that have an articulation at the tip, which increases the degrees of freedom. Computer assistance is warranted, as the human brain cannot efficiently manipulate articulated instruments by mechanical means.

The surgeon sits comfortably at a master console located at a distance from the patient with eyes focused down toward the operative site, mirroring an open surgical technique. The anal canal is exposed by placing 3 robotic trocars in triangulation, transanal, at the level of the sphincter.

By manipulating the joysticks at the console, all movements are transmitted in real time at the tip of the articulated instruments while the surgeon navigates with the Camera inside the rectum. The 3D stereoscopic vision is 15 times magnified.

The computer allows different scale motions set ups, filtering in mean time any involuntary trembling of the surgeon's hand.

Advantages of this technique consists in: better control for gaps of the stapler line; better inspection of bleeding points; optimal robotic hemostasis; outstanding accuracy in placing the pursestring suture: the needle is at the level of the mucosa, avoiding in this way any possible recto-vaginal or recto-urethral fistula due to including too much tissue. We believe that endolumenal surgery and robotic surgery can develop together in a complimentary way. We continue to explore this exciting field and obtain more data for the work described.

The future is the one of robotic surgery but also the one of endolumenal surgery. By combining these two new trends in surgery we believe that new surgical indications will occur.

ETP013

RADIOFREQUENCY ABLATION OF LIVER TUMORS: A NOVEL NEEDLE PERFUSION TECHNIQUE ENHANCES EFFICIENCY, Paolo Abitabile MD, Christoph A Maurer MD, Kantonsspital Liestal, Switzerland, Clinic for General, Visceral, Thoracic and Vascular Surgery

Objective: Radiofrequency ablation (RFA) has become an important adjunct to modern liver surgery. Usually, the ablation is time-consuming due to charring around the electrodes. This charring increases the tissue impedance and hinders the propagation of the radiofrequency waves within the tumorous tissue. We hypothesize that an open saline perfusion of the RFA needle might help to overcome this problem and allow faster ablations.

Methods: From June 2000 to November 2004, a total of 159 liver tumors were treated during 95 sessions of RFA. Fifty-four tumors were treated according to the proposed manufacturer's protocol and compared with 105 tumors treated according to the novel saline perfusion protocol (0.9% saline solution). The ablation procedure was performed until a tissue temperature of at least 100°C was reached at every electrode tip for at least 5 minutes. The ablation area had to exceed the tumorous area for at least 1 cm to all sides. All the patients were followed up with contrast enhanced computed tomography (CT) at regular intervals. Local hepatic recurrence was defined as radiologic and/or histologic evidence of viable tumor in the ablated liver area.

Results: Both study groups were comparable especially with regard to median tumor sizes, mode of interventional approaches and times of follow-up. The median follow-up was 18 months. The median RFA time was significantly reduced from 18.9 minutes in the group without needle perfusion to 8.0 minutes in the group with needle perfusion ($p<0.001$). The local recurrence rate at the RFA site was tentatively higher in the non-perfusion group than in the per-



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fusion group (9.6% vs 5.8%, p=0.405). No recurrence occurred at the ablation site of tumors smaller than 3 cm in either group.

Conclusion: The perfusion of an expandable radiofrequency needle with 0.9% saline solution significantly accelerates the ablation procedure of liver tumors without compromising the oncological result.

This technical improvement of RFA may render this treatment modality more attractive for surgeons.

ETP014

REBOUND HRD (HERNIA REPAIR DEVICE), Roderick B Brown MD, Glacial Ridge Health System, Minnesota Medical Development Inc.

The Rebound HRD a new era in tension-free laparoscopic hernia repair.

by: Roderick Brown, M.D.

The Rebound HRD (Hernia Repair Device) was developed with the objective of improving upon existing technologies and methods used to repair various types of hernias. The Rebound HRD is a self-expanding hernia patch that helps to facilitate placement and coverage of a hernia defect. The Rebound HRD consists of an implantable polymer mesh with a Nitinol frame. The Nitinol frame supports and stabilizes the mesh and facilitates placement. The Rebound HRD is designed to be loaded into the supplied loading cannula and introduced using a 10mm - 12mm access port. The Nitinol frame is extremely durable and provides stability; eliminating the need for anchoring, which in turn, minimizes patient post-op discomfort and the risk of injury to nerves or blood vessels. Although the Rebound HRD is ideally suited for laparoscopic surgery it may also be placed via an open incisional approach using the same dissection and positioning methods described for the laparoscopic technique. Once deployed, the device fully unfurls or "rebounds" back to its original shape - ready for placement over the previously dissected hernia defect. The Rebound HRD has undergone MRI testing, an animal study and bench testing for burst strength, deployment and fatigue. Results for all tests were acceptable, meeting any pre-established acceptance criteria. During the 90-day animal study, laparoscopic deployments of the Rebound HRD were performed without any complications. All of the devices were easily distinguishable via x-ray. X-ray evaluation was able to confirm that there was no gross movement for any of the devices from their initial placement site. The assessment of the intranscience of the devices confirmed that the mesh held firmly to the Nitinol wire frame and that the original shape of the frame was preserved. Tissue reaction surrounding the cable, mesh and coupling was as expected with an implantable device and surface orientation had no discernable effect on the outcome. Specific patient and surgeon needs addressed with this new technology are:

- Shorter operating times
- Reduce the risk of vascular or nerve injury
- Eliminating fixation
- Minimizing patient post-operative discomfort

ETP015

TEM AS A PORTAL FOR NOTES, P M Denk MD, M H Whiteford MD, L L Swanstrom MD, Legacy Health System, Portland, OR

The potential of natural orifice surgery has excited the surgical community worldwide. Appropriate concerns over safe access and closure of transvisceral enterotomies have made many believe the technology is far from clinical use. Natural orifice transluminal endoscopic surgery (NOTES) is most commonly described using a transgastric access point however retroflexion for tasks in the upper abdomen results in significant perception and manipulation difficulties. We are actively investigating transrectal access for natural orifice surgery which offers the advantage of antegrade visualization of surgical sites in the upper abdomen. This avoids the technical challenge of horizon shift and maintains strong spatial orientation.

We present the use of transanal endoscopic microsurgery (TEM) as a portal for transrectal NOTES. TEM techniques for

full-thickness resection, closure, and even circumferential rectal anastomosis have been used clinically in humans for two decades. Entry into the abdomen following resection of upper rectal lesions is routinely performed and has been demonstrated to be safe.

The modular design of the TEM instrumentation offers the potential for rapid modification to incorporate future NOTES devices. The 4 cm diameter of the TEM scope offers sufficient room for the introduction of multiple rigid or flexible instruments. The TEM scope provides a stable platform to lift organs and manipulate tissue, difficult tasks for simple flexible instruments. Maintaining CO2 pneumoperitoneum is predictable, accurate, and facile with the TEM insufflator. Finally, TEM techniques allow a careful surgical closure of full-thickness rectotomies using standard suture with laparoscopic suturing techniques.

Our presentation will demonstrate of the benefits of TEM as a portal for NOTES including endoscopic views and surgical task performance through transrectal access, and secure rectal closure.

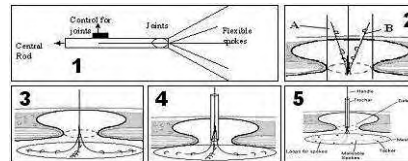
ETP016

LAPAROSCOPIC UMBRELLA SYSTEM FOR MESH PLACEMENT IN VENTRAL HERNIA, Brij B Agarwal, Nayan Agarwal, Krishna A Agarwal, Manish K Gupta MS, Sneha Agarwal MS, Krishan C Mahajan MS, Sir Ganga Ram Hospital, Lady Hardinge Medical College & DPS, RK Puram, India

OBJECTIVE- To achieve scientific Introduction, unrolling, centering & mesh fixation in laparoscopic ventral hernia repair (LVHR). **DESIGN-** Based on mechanics of an umbrella(1). Introduction is like pushing a closed umbrella through port(A) leaving mesh(B) in and pulling out the remaining umbrella. A central rod with metallic, flexible spokes attached by a movable joint to its tip. The central rod has a lever to close or open the joint to 90 degree. Length of spoke is equal to the radius of a circular mesh (1). The spokes sleeve through loops arranged radially on the parietal surface of mesh(2).

METHOD of application- Mesh is radially sleeved on spokes which are folded back on the central rod as closed umbrella. This is introduced(2), joints opened to 90 degree. The mesh opens up and is spread parallel to the abdominal wall (AW). Instrument is slightly withdrawn till mesh is in contact with AW(3). Mesh securing tackers placed(4). The instrument is withdrawn leading the spokes out of loops on parietal surface of mesh(5). Mesh is now transfixed. This is combined with "Pant over Vest" repair in LVHR (abstract ID. 14215) to comply with Pascal's law.

FUTURE DIRECTION- This ensures easy introduction without skin/hand contact, wrinkle free unfolding & centering of the mesh. Avoiding contamination or harmful manipulation of mesh on the visceral surface.



ETP017

NATURAL ORIFICE TRANSLUMENAL SURGERY : LONG TERM SURVIVAL STUDY AFTER CLOSURE OF THE GASTROTOMY USING A CARDIAC SEPTAL OCCLUDER IN A PORCINE MODEL, Silvana Perretta MD, Bernard Dallemagne MD, Stefano Sereno MD, Antonello Forgione MD, Dimitri Coumaros MD, Christof Boosfeld, Jacques Marescaux MD, IRCAD-EITS. University of Strasbourg, France/ * DRABO / Occlutech, Germany

Introduction: Transgastric approach to the peritoneal cavity has been proved to be feasible both in experimental models and in humans. The closure of the gastrotomy when performing transgastric procedures is one of the most challenging step to overcome.



Aim: The aim of this study was to evaluate the technical feasibility, safety and long term efficacy of a new endoscopic method of gastric closure using a nitinol septal occluder in a porcine survival model.

Materials and Methods: Using a single channel video gastroscope, a 1 cm full thickness gastrotomy was created to access the peritoneal cavity in six anaesthetised male pigs (25-30kg), after gastric preparation. After peritoneoscopy, the gastrotomy was closed with a nitinol septal occluder. The efficacy of the closure was tested intraoperatively inflating the stomach under laparoscopic and endoscopic control. All animals were survived and monitored daily. Follow-up included iterative laparoscopy (4) and gastroscopy(8). Necropsy was performed at week 15 and included bacteriologic study of intraperitoneal liquid, inspection of adhesions, air leak testing and histopathologic examinations of the stomach.

Results: All the gastrotomy closures with the septal occluder were successful with a mean positioning time of 15 min. A regular diet was resumed within 24 hours after the procedure. There were no complications in the immediate post-operative course. One animal developed clinical signs of distress and stopped feeding on postoperative day 12th. The necropsy revealed peritonitis, unrelated to the gastric closure. At a 15 weeks follow-up five of the six animals thrived with appropriate weight gain. The post-mortem examination revealed no signs of infection or adhesions in the peritoneal cavity with normal tissue healing around the occluder at the histopathologic examination.

Conclusions: Endoscopic gastrotomy closure with the septal occluder system is technically feasible, safe and effective in a long-term survival porcine model. This gastrotomy closure device has shown enormous potentials being highly effective, rapid and simple.

ETP018

THE EFFECT OF A COMPRESSION MECHANISM ON ENERGY BASED VESSEL SEALING, Marc Singer MD, Linda S Oleson, University of Illinois, Chicago, SurgRx, Inc.

Objective of the technology: Improve vessel sealing by combining a compression mechanism with a proprietary thermal energy device. Mechanism provides uniform pressure along the full length of the seal, or tissue treated, to achieve a thorough and durable vessel fusion. In addition, this mechanism may help to minimize destructive thermal effects to the surrounding tissues.

Description of the technology and method of its use or application: The compression mechanism consists of a metal structure in the shape of an "I-beam" with the cross section of a capital "I", namely, an "I-Blade". The distal and vertical edge of the I-Blade mechanism is sharpened to act as a blade that transects tissue. When used in conjunction with the proprietary electrode configuration of a bipolar radiofrequency vessel sealer, the I-Blade mechanism compresses the targeted volume of tissue as the tissue desiccates and the collagen denatures or "melts". The I-Blade advances smoothly through the melted tissue as the handle grip is squeezed, dividing the tissue in its path to the distal end of the jaw. The forward motion of the I-Blade simultaneously draws the top and bottom jaws parallel to compress and cut the captured tissue in the jaws, creating a newly formed seal. The collagen immediately cools in the new sealed configuration.

Preliminary results: The maximum compression force during I-Blade advancement is above 7,000 PSI. This instrument is capable of producing seal strengths upwards of 7 times normal systolic pressure. With regards to thermal effects, information on collagen denaturation can be found in the literature which suggests that mechanical loads on tissue minimize the destructive effects of heat on tissue.

Future directions: Though acute studies on the histopathologic effects of thermal vessel sealing can be found in the literature, the cytologic manifestations of tissue injury don't fully develop until after 36 to 48 hours. To truly evaluate the thermal effects of compression from the I-Blade on treated tissue, a chronic study should be done, and the thermal effects compared and evaluated.

ETP019

PRELIMINARY REPORT OF A NOVEL GASTRIC SENSING AND ELECTRICAL STIMULATION DEVICE TO TREAT OBESE SUBJECTS WITH T2DM, John Pilcher MD, Mark Kipnes MD, Edy Soffer MD, Jeffrey Conklin MD, Scott Cunneen MD, Diabetes and Glandular Disease Research Associates, Inc. San Antonio, Texas and Cedars Sinai Medical Center, Los Angeles, California

Background: Gastric electrical stimulation represents a new paradigm for treating obesity and diabetes. The following describes a feasibility study of an investigational device, the TANTALUSTM System (Metacure (USA) Inc.), intended for use in obese and overweight subjects with type 2 diabetes. The system uses automatic detection of food intake and delivers electrical pulses synchronized to the natural gastric activity. This multi-center study is conducted with an FDA/IRB approved IDE.

Methods: The study design includes 16 obese/morbidly obese subjects, with a BMI between 30 and 45kg/m² and HbA1c between 7.5% and 9.5%. The therapy is initiated four weeks post-surgery for 12 weeks with periodic evaluations of HbA1c, fasting blood glucose, weight, serum Adiponectin and Ghrelin measurement. The patients will be monitored for safety and functionality of the device for an additional 18 months.

Results: To date, 3 subjects have been implanted with automatic eating detection successfully demonstrated in the two subjects who have started therapy. Data representing measures of safety and functionality will be presented consisting of adverse events, measures of glycemic control, changes in weight and the hormones Ghrelin, Adiponectin and GLP-1. **Conclusion:** Recruitment of subjects into this multicenter feasibility study of an investigational gastric sensing and electrical stimulation device to treat obese or over-weight subjects with T2DM is on-going. Preliminary safety and functionality data will be presented from all study subjects.

ETP020

ENDOLUMINAL APPROACHES TO BARIATRIC SURGERY; A NEW APPLICATION OF THE MODIFIED NDO PLICATOR, Carol A McCloskey MD, Anita P Courcoulas MD, Amos Cruz, George Eid MD, University of Pittsburgh Medical Center and the VA Health Care System

Endoluminal interventions are undergoing rapid evolution. Our current interest is the application of this approach to the field of bariatric surgery. Although Roux-en-Y gastric bypass is an effective treatment of morbid obesity, many patients regain weight over time; an outcome thought to be due to dilation of the gastrojejunal (GJ) anastomosis. Surgical reduction of the anastomoses has been performed with variable results, but it is a complex operation, with a high complication rate. Therefore, we attempted to assess the safety and feasibility of utilizing the NDO plicator device to perform an endoscopic anastomotic reduction.

The current NDO plicator is an FDA approved endoluminal suturing device applied to the treatment of GERD. The NDO plicator is a suturing device with opposing jaws between which a pre-tied suture is deployed. It contains a channel through which a small endoscope is passed in order to directly visualize the suturing process. It currently utilizes an accessory device that fits through a side channel and functions to anchor the tissue. This device is a spiraling wire that directly screws into the tissue, retracting it between the jaws of the plicator, allowing a full thickness bite. However, this device is unable to grasp two opposing tissue surfaces at once. We therefore devised an additional flexible grasper that fits through the same side channel of the plicator. It has opposing teeth that allows the device to be advanced through the side channel, with the ability to open once deployed in a lumen or a tissue space, and is able to grasp two opposing tissue edges tightly, facilitating suture placement by the device.

We have performed GJ stomaplasty on 10 pigs. By using the new grasper prototype, we were able to successfully deploy sutures that reduced the aperture of the GJ anastomosis. No intraoperative complications were encountered



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during the procedure. In addition, when the stoma was completely closed in several animals, the sutures were able to withstand 50mmHg of burst pressure. These experiments were documented by video footage.

Our results have demonstrated that endoluminal stomaplasty using our modification of the NDO plicator device is technically feasible. Future studies will include survival studies to assess the effect on weight loss. This technique may also be applicable to the repair of gastro-gastric fistulae and/or anastomotic leaks. Ultimately, application to human bariatric patients will represent a safer alternative to revisional surgery.

ETP021

DEVELOPING AN ULTRASONIC PROBE FOR TUMOR ABLATION IN LIVER: EXPERIMENTAL RESULTS WITH MORPHOLOGICAL ANALYSIS OF THE ULTRASONIC LESIONS.,

Belhassen Seket MD, Cyril Lafon PhD, Rares Salomir PhD, François Mithieux MD, Jean-Yves Chapelon PhD, Michel Rivoire MD, Dominique Cathignol PhD, Institut National de la Santé et de la Recherche Médicale (INSERM) unité 556, Université Claude Bernard - Lyon 1 and Centre Léon Bérard (Institut de Chirurgie Expérimentale), Lyon, France.

Main existing thermal ablation techniques gave satisfactory results for tumors of no more than 3 cm in diameter. The aim of our work was to develop an ultrasonic probe for interstitial liver ablation, to check its destructive capabilities and define the ultrasonic parameters to obtain large areas of tissue destruction.

An ultrasonic probe, 4 mm in diameter, which is fitted with a flat piezoceramic transducer is developed for experimental applications. A pneumatic support, which holds the probe positioned in the liver, is fitted with a rotation device allowing a computer-controlled rotation of the probe around its axis.

The array element causes immediate necrosis which size is altered very little by the cooling effect due to blood flow. Two types of lesions were obtained: elementary and cylindrical lesions. At a given angular position, the single shot induces an elementary lesion whose length can be adjusted according to several parameters. In a first study, we obtained without pedicle clamping elementary lesions of 29 mm in mean length. Rotation of the transducer at short angular intervals resulted in the fusion of elementary lesions and gave a cylindrical lesion. The step-by-step mode of rotation was superior than the continuous mode in terms of rapidity and size of lesions. The cylindrical ablation areas were of 50 cm³ in mean volume and of 56 mm in mean length and presented well-defined contours. Histological analysis showed complete coagulation even around large vessels when efficient ballistics was used.

These results are encouraging and further improvements are quite possible. At the difference of the other techniques, the ultrasonic probe give bigger ablation areas and more possibilities to adapt our application to the target zone. Transducers capable to integrate at the same time ultrasound imaging and therapy may offer more precision and options, such as the use of ultrasound contrast agents may be useful to treat large tumors.

ETP022

DEVELOPMENT OF HYBRID SURGICAL SIMULATION

DEVICE, Cronwel N Irias, Daniel A Hashimoto, Daniel M Jones MD, Beth Israel Deaconess Medical Center

Human Patient Simulators (HPS) allow for the performance of basic clinical and trauma procedures using a team training approach. Partial and whole task training simulators measure metrics of performance that human patient simulators do not. The abdominal model combines existing low-fidelity partial task simulation technology and human patient simulators to create a high-fidelity simulation. The model was developed using a chassis to house the perfusing organs and provide a sealed pneumoperitoneum.



Features within the METI Human Patient Simulator's hardware and software provided programming of perfusion to the abdominal model allowing the recreation of internal hemorrhage; conversion to open to control hemorrhage is possible. As simulation technology evolves, new methods of creating immersive simulation education and training opportunities can provide realistic surgical training. HPS Abdomen provides for engaging performance of laparoscopic and open surgery. Our aim was to develop a hybrid simulation training device, HPS Abdomen, to allow surgeons to experience a more immersive role during team training based simulation for laparoscopic and open procedures and is a foundation for more complex scenarios.

ETP023

PILOT STUDY ON THE EFFECTS OF GASTRIC ELECTRICAL STIMULATION (TANTALUS) ON GLYCEMIC CONTROL IN MORBIDLY OBESE PATIENTS WITH TYPE 2 DIABETES

(T2DM), Arthur Bohdjalian MD, Bernhard Ludvik MD, Rudolph Weiner MD, Christoph Rosak MD, Gerhard Prager MD, Medical University of Vienna, Dept. of Surgery and Internal Medicine III; Krankenhaus Sachsenhausen Frankfurt, Dept. of Surgery and Internal Medicine

Background: Previous work suggests that non-excitatory electrical stimulation, synchronized to the gastric refractory period and applied during meals, can induce weight loss in morbidly obese subjects. The TANTALUS System (MetaCure N.V.) is a minimally invasive implantable gastric stimulation modality that does not exhibit malabsorptive or restrictive characteristics.

Aim: to investigate the potential effect of the TANTALUS system on glycemic control and weight in morbidly obese subjects with T2DM.

Patients and Methods: In this European multi-center, open label study, 24 T2DM obese (9 m, 15 f, BMI: 41.7±0.9 kg/m²) subjects treated either with insulin (7) or oral anti-diabetic medications (17) were implanted laparoscopically with the TANTALUS System. The system includes a pulse generator and three bipolar leads and delivers a non-excitatory signal initiated upon automatic detection of food intake. Results: 20 subjects have completed one year and exhibit a decrease in HbA1c from 8±0.2% at baseline to 7.5±0.2% (p=0.06) and in fasting blood glucose from 180±15mg/dl to 150±8mg/dl (p<0.05). 16 subjects on oral anti-diabetic medications showed a decrease in HbA1c from 8.11±0.3% at baseline to 7.37±0.2% (p<0.05) and an average weight loss of 5.5±2kg (p<0.05). Self glucose monitoring available at 9 months post-op from 12 subjects shows a significant (p<0.05) decrease in 2 hours post-prandial glucose (184±11mg/dl vs. 148±11mg/dl). In a subset of 9 patients at 9 months of post-operative follow-up we could find an increase in adiponectin (9.5±2.3 vs. 11.5±2.3µg/ml, p<0.05) and a decrease in fasting ghrelin (428±80 vs. 252±20pg/ml, p<0.05). Four insulin subjects have completed one year and showed no significant changes in HbA1c and weight.

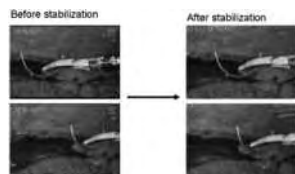
Conclusion: Interim results with the TANTALUS System suggest that this stimulation regime can potentially improve glucose levels and induce weight loss in obese T2DM subjects on oral anti-diabetic therapy. Further evaluation is required to determine whether this effect is due to induced weight loss and/or due to direct signal dependent mechanisms.

ETP024

USEFULNESS OF ELECTRICAL STABILIZATION OF LAPAROSCOPIC IMAGE AND DEPTH PERCEPTION BY MOVEMENT PARALLAX IN LAPAROSCOPIC SURGERY, Tatsuo Igarashi MD, Yukio Naya MD, Harufumi Makino MD, Hideki Hayashi MD, Research Center for Frontier Medical Engineering, Chiba University

Background: Laparoscopic surgery is carried out under conditions without depth perception and somewhat turbulent vision by the scope handled by a scopist. Previous report proved movement parallax affords depth perception using monocular laparoscopy coupling with the head movements of the surgeon (Voorhorst FA, et al. Med Prog Technol 21:211-8, 1996-7). We found similar effect could be obtained by stabilizing video image of shaking monocular laparoscopy. We tested a new technology of electric stabilization of turbulent image of laparoscopy for possible application in laparoscopic surgery, with special attention to depth perception. Materials and Methods: Motion stabilization software is kindly provided from ProTrack Co. Video images of 3 laparoscopic surgeries (resection of colon, pyeloplasty of the kidney, nephrectomy) are used to test the software in cancellation of turbulent motion of the image and depth perception by movement parallax. Experimental surgery (cholecystectomy, anastomosis of stomach and intestine, nephrectomy) was carried out in an animal model under the stabilized vision.

Results: Cancellation of shaking motion is recognized in every video without interference of motion of the forceps. In the experimental surgery, the target organ is fixed in the allotted position of the monitor, and swing in accordance with the camera motion, thus affording the depth perception. In this way, the depth perception is possible and useful especially in suturing.



Conclusion: Present electrical motion stabilization technology is useful and is directly applied to laparoscopic surgery in stabilizing of the image, and affords depth perception when required.

ETP025

TRANSCORPOREAL MAGNETIC RETRACTION OF LUMINAL VISCERA, Stephen Van Lue, DVM, DACVS, Anne Palsgaard-Van Lue, DVM, University of Copenhagen, Faculty of Life Sciences, Copenhagen, Denmark

Objective: Adequate retraction of the bowel and other luminal viscera is important in lower abdominal and pelvic surgery. The objective was to place magnetic elements discreetly at select locations within luminal viscera, and engage these elements at the level of the abdominal wall with an external magnet for precise manipulation of the tissues.

Description/Results: A magnetically permeable element was deployed intraluminally at the level of the mid-descending colon in canine and feline cadavers. External compression on the abdominal wall brought the anterior abdominal wall proximate to the descending colon. A magnet was then utilized directly on the external abdominal wall to elevate the colon by magnetically engaging the intraluminal magnetically permeable element. Inflating a Foley catheter balloon positioned in the urinary bladder with a magneto-rheologic fluid provided a similar means of manipulating the urinary bladder.

Conclusions: Transluminal magnetic retraction and manipulation of visceral structures was easily achieved. With a more linear colonic intraluminal component, a longer segment of bowel could be elevated and "driven" around the anterior body wall with precision. Visibility of, and access to the mesenteric vasculature was excellent. Laparoscopic or

direct endoscopic visualization during placement of the intraluminal component(s) may provide a means whereby a surgeon could precisely identify relevant pathology and so direct their ideal placement. By incorporating a light emitting feature to the intraluminal retractor components, additional utility of the intraluminal components may be realized. Use of a magnetically permeable fluid may enable deployment of retractor balloons endoscopically or may enable retractor elements to be injected into specific anatomical spaces or tissues directly through the body wall. With further refinement, the described techniques may enable an incisionless procedure, or provide for a reduction in the number of laparoscopic ports normally utilized to manipulate visceral structures. Further investigations are warranted in human cadavers.

ETP026

TRANSBRONCHIAL EVALUATION OF MEDIASTINAL LYMPH NODES: A SINGLE INSTITUTION'S EARLY EXPERIENCE WITH ENDOBRONCHIAL ULTRASOUND, Shawn S Groth MD, Bryan A Whitson MD, Michael A Maddaus MD, Rafael S Andrade MD, University of Minnesota Department of Surgery

Objective: Mediastinoscopy, the gold standard for histological evaluation of mediastinal lymph nodes (MLNs), is invasive and allows access only to certain MLN stations (American Thoracic Society stations 2, 4, and 7). We present our initial experience using endobronchial ultrasound-guided fine needle aspiration (EBUS-FNA) to biopsy MLNs in patients with benign and malignant disease.

Methods: We perform the procedure under general anesthesia (endotracheal tube size > 7 mm) and use an Olympus EVIS EXERA® BF-UC160F-OL8 ultrasonic bronchofiberoptic (Olympus Imaging American Inc., Center Valley, PA, U.S.A.). Using integrated Doppler to accurately distinguish vascular structures from MLNs, EBUS-FNA MLN biopsies from stations 2, 3, 4, 7, 10 or 11 are obtained with a 22-gauge aspiration needle (Vizishot®; Olympus Medical Systems Co., Tokyo, Japan) under real-time ultrasonographic guidance. Each target MLN is accessed 1 to 3 times using 15 needle passes. Immediate and permanent cytology are performed on each sample. Patients without a histological diagnosis of cancer on immediate cytology from EBUS-FNA undergo confirmatory MLN biopsy with either mediastinoscopy or thoracoscopy.

Preliminary Results: Between September 2006 and February 2007, 18 patients (9 with malignancy, 9 with benign pathology) underwent EBUS-FNA at our institution. There were no complications. EBUS-FNA has a sensitivity of 71.4%, a specificity of 100%, and an accuracy of 77.8% in the diagnosis of benign and malignant nodal disease. Of our first 9 patients, 4 had false negative results; there were no false negatives in the subsequent 9 patients. Biopsies of station 11 MLNs, which are otherwise only accessible via thoracotomy or thoracoscopy (not mediastinoscopy), correctly established the diagnosis in 62.5% of (5 out of 8) patients. The smallest MLN from which diagnostic tissue was obtained was 6.5 mm.

Conclusions: EBUS-FNA is a safe, minimally invasive technique that allows access to more MLNs than mediastinoscopy and is emerging as an important tool in the evaluation of mediastinal pathology. Until the results of larger numbers of patients allow for a more accurate determination of the sensitivity of EBUS-FNA, negative biopsies require confirmation with either mediastinoscopy or thoracoscopy.

ETP027

REAL-TIME IMAGING OF THE COMMON BILE DUCT USING INFRARED TECHNOLOGY IN A PORCINE MODEL, Ben R McHone MD, Alexander Gorbach PhD, Jack Liu BA, Mehrdad Alemozaffar BA, Nadeem Dhanani MD, Fred Gage PhD, Peter Pinto MD, Eric Elster MD, National Cancer Institute, National Institute of Biomedical Imaging, Naval Medical Research Center

Introduction: Intraoperative cholangiograms (IOCs) confer both an added cost to the laparoscopic cholecystectomy



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(LC) as well as radiation exposure to both patients and operating room personnel. We introduce the application of passive infrared (IR) imaging to intraoperative cholangiography as a feasible alternative to traditional fluoroscopic IOCs.

Methods: A porcine model was used in which the gallbladder, CBD, and duodenum were exposed and an 18 gauge angiocatheter was inserted into the cystic duct. IR emission was detected using a digital IR camera (Lockheed Martin Inc., Goleta, CA) positioned at ~ 50cm above the abdomen. IR images (~1/s) were taken in real-time during infusion of room temperature saline (IR-IOC). Thermoplastic polymer stones were then inserted into the CBD. Once the artificial stone was placed, saline was again injected. The experiment was concluded by a CBD injury via a lateral 2cm incision immediately proximal to the duodenum. At the completions of each case, a standard single shot IOC was obtained with the infusion of 15 cc Renograffin.

Results: A total of 8 pigs were used. Real-time IR imaging was able to capture a visible temperature decrease, outlining the lumen of the CBD. With the injection of saline a decrease in temperature was noted in the lumen of the duodenum, corresponding to saline flowing unobstructed through the CBD into the duodenum, which was visualized as a dark area. Real-time IR images displayed the injected bolus being slowed by the obstruction. Finally, after partial transection of the CBD, the IR camera visualized saline flowing from the site of injury into the peritoneal cavity. These findings were all correlated with IOCs.

Conclusions: CBD anatomy, obstruction, and injury can be clearly visualized with an IR camera. Ultimately, the integration of IR technology into a standard laparoscope would require a fusion of real-time IR and visible light images. Intraoperative IR imaging is an emerging approach being utilized in several surgical fields.

ETP028

DESIGN AND INSTRUMENTATION OF NEW DEVICES FOR PERFORMING APPENDECTOMY AT COLONOSCOPY. Gerd Silberhumer MD, Tudor Birsan MD, Ewald Unger MD, Winfried Mayr MD, Johannes Zacherl MD, Gerhard Prager MD, Christoph Gasche MD, Medical University Vienna, Department of Surgery, Department of Gastroenterology and Hepatology

Introduction: Appendectomy is the most common operation in the gastrointestinal tract. There is increasing interest in interval appendectomy as a treatment for refractory ulcerative colitis. A less-invasive flexible endoscopic method for removing the appendix might offer advantages especially for interval appendectomy in patients undergoing colonoscopy. Aim: To design, develop and test new devices for removing the appendix via Natural Orifice Transluminal Endoscopic Surgery (NOTES).

Methods: Tests were performed on the bench in 13 colons from adult human cadavers. Various prototypes were tested, which could be inserted into the appendiceal orifice to its tip and could invert the appendix at its base in a controlled fashion into the lumen of the cecum. The advantage of using a tubular structure as counter force to aid inversion of the appendix was evaluated. After partial inversion the growing strain was relieved by endoluminal incision of the mesenteric side of the appendix. Closure methods with endoloops, clips and thread ties were studied. Appendiceal resection was completed by snare diathermy leaving an inverted intraluminal stump.

Results: The position of the appendix was retrocecal in seven cases, pelvic in two, and pre-ileal or post-ileal in one each. The median length and luminal diameter was 85mm (52-125mm) and 5.5mm (3-7mm) respectively. Partial obstruction of the lumen was present in 5/13 cases. It was possible to advance the guide-wires and retraction devices to the tip of the appendiceal lumen in all cases. Partial inversion of the appendix was successful in 11/13 tests. The median length of the inverted stump was 13mm (3-18mm). The tension and volume (due to fat deposit) of the mesoappendix was the main reason for incomplete inversion. Complete inversion was achieved by endoluminal incision in 11/13 tests. The mean volume of the resected tissue (invert-

ed appendix incl. its mesoappendix) was 6.8 ± 1.9 cm.

Conclusions: Despite high individual variability, appendectomy at flexible colonoscopy proved to be feasible and relatively easy. New devices to allow appendix inversion were successfully tested.

ETP029

ENDOSCOPIC ESOPHAGEAL MUCOSECTOMY USING A MULTIPURPOSE THERAPEUTIC HOOD (TXHOOD), Tatsuyuki Kawano MD, Shigeo Haruki MD, Tokyo Medical and Dental University Hospital

Endoscopic resection including endoscopic mucosectomy (endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD)) is a minimally invasive treatment for patients with early esophageal carcinoma (EEC) because almost all EECs are curable by endoscopic mucosectomy, esophagi are preserved and precise diagnoses of esophageal tumors are confirmed by histological examination of the resected specimens. Nowadays, although EMR techniques involving one piece resection (OPR) are established for relatively small lesions (2cm in diameter or less), wider lesions are still resected by piecemeal resection (PMR) techniques. ESD is appropriate for mucosal lesions of any size; however, ESD techniques are relatively difficult and can lead to serious complications, e.g., perforation and massive bleeding are reported more frequently following ESD than EMR.

We devised a novel technique for ESD and performed basic experiments to ensure safety. The new ESD technique can be performed easily using a newly designed piece of equipment called a multipurpose therapeutic hood (TxHood). The TxHood includes various therapeutic tools, e.g., electric needle knife, snare wire, and injection needle, and the lines can be selected freely before insertion of an endoscope covered by a TxHood. The main techniques for the resection of the target mucosal and submucosal tissues are endoscopic submucosal saline injections on demand through a working channel of the endoscope or TxHood, cut or swing cut with a needle knife attached to the TxHood, and grasping of the target area with grasping forceps through a working channel of the endoscope.

In our experiments, an electric needle knife was set parallel to the shaft of the endoscope and offered safety and ease of handling for dissecting procedures. We reported this new device and the results of experimental study at the SAGES 2006 Annual Meeting in Dallas and have successfully performed ESD using a TxHood for 20 lesions in 18 patients with superficial esophageal carcinoma.

We conclude from our experimental and clinical experiences of ESD using the newly devised TxHood and former experiences of endoscopic mucosectomy for EECs that the new ESD techniques with a TxHood provides a useful treatment for EEC, and may be applicable to all mucosal or submucosal tumors in the gastro-intestinal tract.

ETP030

RADIOFREQUENCY ABLATION FOR LUNG TUMORS, Ghulam Abbas MD, Arjun Pennathur MD, Rodney J Landreneau MD, James D Luketich MD, University of Pittsburgh Medical Center

Objective: Surgery remains the mainstay of treatment for early stage lung cancer. Almost 20% of patients with early stage lung cancer do not undergo surgery because of medical co-morbidities and poor pulmonary reserves. Radiofrequency Ablation (RFA) is an alternate to surgical resection.

Description and Method: RFA involves the application of high frequency electric current to heat and coagulate target tissue. RFA consists of an alternating current, which moves from an active electrode, placed within the tumor to dispersive electrodes (bovie pads) placed on the patient. As the RF energy moves from the active electrode to the dispersive electrode and then back to the active electrode, ions within the tissue oscillate in an attempt to follow the change in the direction of alternating current, resulting in frictional heating of the tissue. As the temperature within the tissue rises > 60° C, instantaneous cell death begins due to protein denat-



uration and coagulation necrosis. RFA probe is inserted in the tumor percutaneously using image guidance by thoracic surgeons. Results: Among all the patients who had RFA for pulmonary tumors over last three years, 19 had stage I lung cancer. Median age was 78 years (range 68-88). An initial complete response was observed in 2 patients (10.5%), partial response in 10 (53%), and stable disease in 5 (26%). Early progression occurred in 2 patients (10.5%). During follow-up, local progression occurred in 8 nodules (42%) and the median time to progression was 27 months. The remaining eleven (58%) are locally progression-free at a median follow-up of 13.5 months (3.5-44). There were no procedure-related mortalities. The median follow-up in the remaining patients was 20 months. The probability of survival at 1 year was estimated to be 95% (CI .68-.91), median survival was not reached. Conclusion: RFA is innovative alternate to surgical resection for pulmonary tumors in selected patients. Combination therapy with other modalities like cyberknife stereotactic surgery may achieve better results.

ETP031

THE ESTABLISHMENT OF A LARGE ANIMAL SURVIVAL MODEL OF LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS TO STUDY SUBSEQUENT GASTROJEJUNOSTOMY REDUCTION USING THE RESTORE SUTURING SYSTEM, David B Lautz MD, Cesar E Escareno MD, Ikram V Kureshi MD, Arthur Nedder, Ali Tavakkolizadeh MD, Kerri A Clancy RN, Ajay Maker MD, Michele Ryan MS, Christopher C Thompson MD, Brigham and Women's Hospital, Harvard Medical School, Boston MA

Objective: Large animal survival models for laparoscopic Roux-en-Y gastric bypass (LRYGB) do not exist. The objective of this experiment was threefold: 1) to create a reliable RYGB large animal survival model 2) to demonstrate that laparoscopic RYGB in a porcine survival model was technically feasible and 3) to safely and effectively reduce the gastrojejunostomy (GJ) outlet size in the surviving animals endoscopically, using a novel suturing device developed for this purpose.

Methods: LRYGB was performed in five Yorkshire swine with a baseline mean weight of 32.3KG. Pancreaticobiliary length was 100 cm and Roux limb length was 200cm. The GJ was constructed with a stapled linear cutter technique and was intentionally oversized, with a target size of 2 cm, to accommodate later endoscopic reduction. Animals were recovered and maintained on a 1200 kilocalorie, high protein liquid diet. At 5 weeks the animals underwent an endoscopic GJ reduction using the RESTORE Suturing System (Davol Inc, Cranston, RI). This prototype device can be used with a standard gastroscope, and provides multi-stitch capabilities with a single endoscope pass. The animals were euthanized immediately post outlet reduction procedure.

Results: Four of five animals tolerated the procedure, with one intra-operative death secondary to a cardiac arrhythmia. Average operative time was 222 minutes. There were no postoperative deaths or complications, and the remaining four animals survived the five week study period. Mean weight loss was 0.8kg, in contrast to the typical rapid weight gain seen in adolescent swine. GJ outlet size ranged from 16-25mm on follow-up endoscopy. All GJ anastomoses were successfully reduced to an average diameter of 5.7mm with an average procedure time of 26 minutes.

Conclusion: This early work indicates that laparoscopic Roux-en-Y in a porcine survival model is technically feasible; and that the RESTORE Suturing System is safe and appears to be effective in the reducing GJ size in the model. This model will allow for future histologic studies of suture depth, which are not available from human clinical studies, but are very relevant to the efficacy, safety and longevity of post-RYGB endoscopic GJ reductions.

ETP032

LTS3E AUGMENTED REALITY LAPAROSCOPIC SIMULATOR, Andrée Sansregret MD, Paul Yarin MS, David Hananel BS, Harri M Hasson MD, Univ. of Montreal, Blackdust Design, Medical Education Technologies, Inc., Univ. of New Mexico

Objective of Technology: A turnkey augmented reality simulator capable of training and assessing laparoscopic technical skills.

Description of Technology: The LTS3e (LTS) is an integrated, self-contained computer enhanced interactive training system. Users are trained/tested performing validated exercises. Sensors embedded within physical modules assess performance based on metrics validated at McGill. The LTS, designed for ease of set-up and operation, is stored and transported in a compact configuration. Standard laparoscopic instruments are used. A digital camera captures and records video. Rotating the carousel provides access to 10 tasks including some that are repeated with the non-dominant hand. The tasks assess basic laparoscopic coordination skills, cannulation, cutting and suturing skills, including one that verifies knot integrity with a disruptive force of 1 kg. The administrative software supports enrolling users in a database, selecting and performing tasks, viewing and printing past and present test reports, watching tutorials and shutting down.

Results: The LTS-ISM60 (precursor to LTS3e model) was validated and compared with MISTELS in a study conducted at 3 Canadian universities: Montreal, McGill, and Dalhousie. It involved 124 participants including medical students, residents, fellows and attendings from surgery, gynecology and urology. They were grouped based on laparoscopic experience: novices, intermediates, competents and experts. All were tested on LTS, 66 also tested on MISTELS. A satisfaction questionnaire was filled after each performance. The LTS showed progression of scores with level of laparoscopic experience ($p=0,001$). Good correlation was found between LTS and MISTELS (0,82). Level of satisfaction was highest with LTS.

Conclusion / Future Directions: The LTS-ISM60 had a comparable discriminating capability for level of performance to MISTELS according to laparoscopic experience, with a higher degree of satisfaction among participants. The LTS3e model retains all exercises and embedded metrics of the LTS-ISM60 with all components integrated in a self-contained unit to better fit the needs of a skills lab. Future directions include evaluations of recorded performances and addition of features, i.e. camera navigation.

ETP033

DX PH MEASUREMENT SYSTEM. A SENSITIVE RADIOTELEMETRY DEVICE FOR DETECTING LIQUID AND AEROSOLIZED SUPRAESOPHAGEAL GASTRIC REFLUX (SEGR), Harry S Miller MD, Tomas Garibaldi-Hardy, H.G.R.#20 of The Instituto Mexicano del Seguro Social & Restech Corp. USA

1. Objective of the technology or device

As Laryngopharyngeal reflux becomes more prevalent, it is still challenging to diagnose it definitively. The Dx pH Measurement System was developed in response to the poor sensitivity of traditional pH catheters when used outside of the esophagus. The Dx minimally invasive catheter for Supraesophageal Gastric Reflux detection is able to measure pH in either liquid or aerosolized droplets at the posterior oropharynx.

2. Description of the technology and method of its use or application

While we began evaluating a mask-based system initially, after performing over twenty concurrent esophageal pH studies with the mask, it became clear that the reflux had usually been completely neutralized before reaching the sensor that was held outside the mouth in a modified anesthesia mask. The engineers decided to change the design of the device completely, and they incorporated the sensor into the end of a nasal cannula that would be worn for the entire study period. This made it possible to monitor patients con-



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tinuously for up to forty-eight hours during their eating periods, while they were talking and while they were performing their normal activities. Characteristics of the probe - 1.5 mm diameter oropharyngeal catheter with wireless digital ZigBee transmitter that transmits to a monitor that is worn by the patient on the belt. The tip is a tear drop shaped tip with 3.2 mm diameter has a colored Light Emitting Diode (LED), for oral visualization. The tip of the probe (the sensor face) is oriented to face downward to better detect rising gaseous reflux.

3. Preliminary results if available

Basically Dr. Gregory Wiener's, study found that supraesophageal gastric reflux does exist and that it is usually a weakly acidic (pH 4-7).

4. Conclusions/Future directions

To further understand the role of reflux in conditions such as chronic cough, asthma, sleep apnea, and voice disorders. Clinical trials are being held, to further validate the system.

ETP034

ENDO-LAPAROSCOPIC INTRAGASTRIC TUMOR EXCISION (ELITE) - AN EMERGING CONCEPT OF SYNCHRONIZED LAPAROSCOPY-ENDOSCOPY APPROACH, Simon K Wong MD, Michael Li MD, Department of Surgery, Pamela Youde Nethersole Eastern Hospital, Hong Kong

Background: In parallel with technology advancement is the changing concept of minimally invasive surgery. It is no longer confined to body cavity (laparoscopy) and modern surgical operating suite should equip and prepare for interventional endoscopy like endoluminal surgery, or even natural orifice transluminal endoscopic surgery (NOTES). Under the same contest, laparoscopic surgeons should fully utilize the technology in minimally invasive surgery and expand its application.

Aim: We propose an emerging concept in combining laparoscopic surgical technique and instrument in complex endoscopic procedure like endoluminal excision of gastric wall tumor.

Method: A case of large 4cm dysplastic gastric polyp was selected for Endo-Laparoscopic Intra-gastric Tumor Excision (ELITE). Operation was performed in Endo-Lap OR (Olympus). Stage I: Gastroscope (Olympus, GIF 2T160) was inserted and stomach was distended with carbon dioxide insufflation. Anterior gastric wall was anchored to anterior abdominal wall with transgastric sutures. Atraumatic detachable vascular clamp (Aesculap) was applied at proximal jejunum to avoid small bowel distension. Stage II: Three laparoscopic trocars (Autosuture, VersaStep) were placed into stomach by percutaneous method. Stage III: Endoluminal intra-gastric excision of gastric polyp was performed with laparoscopic instruments (ValleyLab, LigaSure II) under both laparoscopic and endoscopic image guidance. Intra-gastric homeostasis was achieved by both endoscopic and laparoscopic instrument, and mucosal defect was closed with intra-gastric suturing. Plastic bag was placed into the stomach and specimen was retrieved transorally by endoscopy. Stage IV: Transgastric trocars were removed and gastric wall defects were closed with laparoscopic suturing.

Results: The operating time was 95 minutes and procedure was performed without complications.

Conclusion: ELITE is a promising method for excision of both mucosal and submucosal gastric wall tumors.

ETP035

MICROWAVE ABLATION OF LIVER TISSUE: THE FUTURE OF HEPATIC TUMOR ABLATION, John P Cullen MD, David W Easter MD, Sonia Ramamoorthy MD, Brian Datnow MD, Santiago Horgan MD, Mark A Talamini MD, Yoav Mintz MD, University of California at San Diego

Introduction: Microwave (MW) ablation has several advantages over radiofrequency (RF) ablation including less charring, less pain, self-contained temperature control, decreased collateral damage, wider range of heating, less heat loss due to nearby blood vessels, and no need for a grounding pad. The Medwaves Microwave Ablation system

® features an array of disposable catheters of varying sizes (5 Fr to 12 Fr in diameter and up to 2 meters in length) and flexibility to facilitate ablation in a number of modalities.

Objective: To evaluate the Medwaves system's ability to ablate liver tissue in open, laparoscopic and natural orifice approaches

Methods: 4 farm pigs were anesthetized. Catheters were placed via laparoscopic, MIS, and NOTES approaches. Various powers, times, and temperature ranges were used. The Pringle maneuver was applied during several attempts to determine the effect of reduced blood flow. The lesions were evaluated macroscopically after surgery and microscopically by histology. Preliminary Results: Lesions ranged from 1-3 cm. The best results were obtained at ten minutes time with 25 watts and max temperature 120 degrees C. There was no hemorrhage or other complication. Placement of multiple catheters in parallel increased the volume of necrosis.

Conclusions: The Medwaves MW ablation system can be easily used in an open, laparoscopic, or natural orifice surgical approach to treat liver lesions. MW has several distinct advantages over RF ablation. Survival studies and ablation of lesions under US guidance will guide future endeavors. Figure 1 shows sections of ablated liver.



ETP036

EVALUATION OF THE USE OF A NEW IMPEDANCE CONTROLLED BIPOLAR DEVICE WITH MONOPOLAR CAPABILITY, Thomas M Schmelzer MD, William W Hope MD, William L Newcomb MD, Keith S Gersin MD, David A Iannitti MD, B. Todd Heniford MD, Carolinas Medical Center

This study evaluates a new electrosurgical device that combines an advanced electrosurgical bipolar sealing device with a monopolar electrode. This combination of devices in a single instrument facilitates dissection and improves surgical time by eliminating the need to exchange instruments. A single instrument can be used for tissue dissection as well as blood vessel and lymphatic sealing in several laparoscopic and open operations. Examples include colon and small bowel resections, splenectomy, appendectomy, cholecystectomy, and liver resection. Traditionally, these operations require the use of multiple devices. We have successfully used this device for these operations in a porcine model. We have evaluated the ability of this multiple capability device to seal human cystic ducts ex vivo following a cholecystectomy. Bursting pressures were measured (n = 4) with a mean bursting pressure of 262.4 mmHg (range 110-381 mmHg). The mean time needed to seal and cut the duct was 6.3 seconds (range 5-8 seconds). Sealed ducts also underwent histologic evaluation for thermal spread and demonstrated 1.1 mm of thermal spread. In vivo survival testing is required to evaluate the efficacy and the integrity of the bile duct seal over time. The speed and versatility of this new device make it useful for a variety of laparoscopic and open surgical procedures

ETP037

IRREVERSIBLE ELECTROPORATION FOR THE ABLATION OF MALIGNANT HCC TUMORS, Brett Sheppard MD, Douglas Faigel MD, Gary Long PhD, Dave Plescia MS, Christie Cunningham BS, Phil Long PhD, NOTES Development Group, Oregon Health Sciences University (OHSU), Portland OR Ethicon Endo-Surgery Cincinnati OH, Vet Path Services, Inc Mason, OH

Background: Patients with non-resectable hepatocellular carcinoma (HCC) and colorectal metastases in the liver are cur-



rently being treated with radio frequency ablation (RFA). RFA techniques rely on the input energy to raise the temperature of the tissue for a sufficiently long period of time to cause necrosis of the entire tumor (tens of minutes). Irreversible electroporation (IE) is a technique by which an increase in the trans-membrane voltage of a cell can cause a rupture of the cell wall leading to apoptosis and subsequent cell death. The rapid treatment (1 to 2 seconds) allows for quick re-deployment of simple needle electrodes to treat large volumes of tissue. A side effect of IE is stimulated contractions of muscle.

Methods: A finite element (FE) model of tissue was built to map electric field lines. Three experiments were performed on in-vivo porcine livers with a two-needle probe which applied short period pulses (0.1-20 milliseconds) at high DC voltages (500-700VDC). The animals were survived for 3 and 6 hours. The histological results of the extent of damage in the porcine liver were compared to the FE model.

Results: Shorter, higher voltage pulses reduced the intensity of muscular contractions (observation). No heart arrhythmias were observed during the treatments. Histological analysis showed that a zone containing apoptotic/necrotic cells of approximately 1 cm by 0.7 cm by 1 cm deep into the tissue was achieved with multiple 0.4 millisecond pulses at 700 VDC. This treatment took approximately 1 second and could be quickly repeated as the electrodes were redeployed. A laparoscopic device is under development to continue testing this technique.

ETP038

A COMPARISON OF BURST PRESSURES OF GASTROJEJUNAL ANASTOMOSES WITH OR WITHOUT BUTTRESSING IN A PORCINE MODEL, William W Hope MD, Marc Zerey MD, B. Lauren Paton MD, William L Newcomb MD, Albert Y Chen MD, Jessica J Heath BS, Richard D Peindl PhD, Amy E Lincourt PhD, Timothy S Kuwada MD, B. Todd Heniford MD, Keith S Gersin MD, Carolinas Medical Center

Anastomotic leaks and bleeding cause the greatest concern for the gastrointestinal surgeon. Anastomotic staple line buttressing materials could possibly reduce these complications. The purpose of our study was to compare the bursting pressure of a buttressed versus a non-buttressed gastrojejunostomy anastomosis in a porcine model.

Antecolic antegastric gastrojejunostomy anastomoses were constructed using a Proximate ILS® mechanical circular stapling device (Ethicon Endo-Surgery, Cincinnati, OH) with and without a buttressing material, polyglycolic acid/trimethylene carbonate (W.L. Gore, Flagstaff, AZ). Half of the animals (acute) were euthanized after the anastomosis was created and burst pressure testing was performed. The remaining half (chronic) underwent a Roux-en-Y procedure and were survived for one week. The gastrojejunostomy anastomoses were then resected and burst pressure testing performed.

Acute and chronic burst pressure testing with buttressing was performed on 5 animals with an average burst pressure of 1.37 and 2.24 PSI respectively. Acute and chronic burst pressure measurements without buttressing were performed on 6 animals with an average burst pressure of 0.39 and 3.86 PSI respectively. Initial burst pressures were significantly higher with polyglycolic acid/trimethylene carbonate (1.37 vs. 0.39 PSI, $p=0.0075$). Burst pressures at one week were significantly lower with polyglycolic acid/trimethylene carbonate (2.24 vs. 3.86 PSI, $p=0.0353$), however, both readings were well above expected normal physiologic intestinal pressures.

A significant increase in staple line strength is noted acutely when polyglycolic acid/trimethylene carbonate is applied as a buttress to a circular stapled anastomosis. Further study is needed to evaluate long term effects of buttressing material on anastomoses.

ETP039

EARLY CLINICAL RESULTS USING GORE SEAMGUARD® BIOABSORBABLE STAPLE LINE REINFORCEMENT (CBSG) FOR CIRCULAR STAPLERS, Wesley B Jones MD, Katherine M Myers, Eric S Bour MD, Greenville Hospital System University Medical Center, Department of Surgery, Greenville, SC, USA

Linear surgical staple line reinforcement has been shown to increase anastomotic tensile strength and reduce the incidence of staple line bleeding and anastomotic leaks. The benefits of staple line reinforcement on circular stapled anastomoses in foregut surgery remain unreported in the literature. The purpose of this study was to compare the incidence of anastomotic bleeding, leak, and stricture in laparoscopic gastric bypass patients with circular staple line reinforcements to those with no circular staple line reinforcement.

Since May, 2006, 90 consecutive patients have undergone laparoscopic Roux-en-Y divided gastric bypass with a 25mm circular stapled gastrojejunostomy anastomosis using GORE SEAMGUARD® staple line reinforcement. The incidence of anastomotic bleeding, leak, and stricture was compared to 269 patients who underwent surgery prior to May 2006 without gastrojejunostomy reinforcement.

In the patients with no circular staple line reinforcement, the incidence of anastomotic bleeding, anastomotic leak, and anastomotic stricture was 1.1%, 1.9% and 9.3%, respectively. There have been no incidents of anastomotic bleeding, anastomotic leak, or anastomotic stricture in patients with the GORE SEAMGUARD® circular staple line reinforcement over the 8 month course of this investigation.

In conclusion, early results indicate that the use of circular staple line reinforcement at the gastrojejunostomy anastomosis in patients undergoing laparoscopic gastric bypass decreases the incidence of anastomotic leak, bleeding, and stricture. On this basis, strong consideration should be given to the routine use of GORE SEAMGUARD® staple line reinforcement in patients undergoing laparoscopic divided gastric bypass with a circular stapled gastrojejunostomy.

ETP040

REPAIR OF INGUINAL HERNIA IN DEVELOPING COUNTRIES, Teheemton E Udwardia, Breach Candy and Hinduja Hospitals, Mumbai.

Objective: Tension free mesh hernioplasty, open or laparoscopic, is considered the ideal treatment for hernia. In large parts of the world commercially available mesh is way beyond the reach of a population whose average income would be \$1 - \$2 a day. To study application of the currently accepted ideal method of hernia repair – the tension free open mesh repair for the poor in the developing world, using mosquito-net which is freely available there.

Technology: The composition of mosquito-net is linear low density polyethylene, has a tensile strength of Newton 192n and a melting point of 122o C. One square yard of mosquito net costs Rs. 40 (90 cents). When cut to size for mesh repair the cost per mesh per patient would be Rs. 2/- (5 cents).

Method: No claims whatsoever are made of originality in the use of this material for hernia repair. Surgeons in rural India commenced using mosquito-net for tension free open mesh repair for their poor patients in 1996. (Indian J Surg (2003) 65:89-95). This study lacks adequate statistical analysis. A similar study with 20 cases in each arm has been reported (W.J.S.(2006) 30:1784-1789.) This mesh has anecdotally been used for laparoscopic hernia repair, but no study is reported. We are conducting a controlled trial of mosquito-net vis-à-vis commercially available mesh with meticulous statistical evaluation. Standard Lichtenstein repair is done in both arms.

Results: With 22 and 23 cases in the two arms in our study to date and a follow up of less than one year, our results, are at best, preliminary. All post operative evaluation parameters are identical for both mesh.

Conclusions: If controlled trials can convincingly demonstrate that mosquito-net has similar results as commercial mesh, this would help ensure that the poor in the develop-



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ing world could afford to have the benefit of what on current evidence is accepted as the best form of hernia repair. Laparoscopic surgery is well established in the developing world. This mesh would be compatible for use in laparoscopic hernia repair. For decades surgeons have pursued high technology which has propelled our science to reach for the stars. It may be appropriate to have the humility to accept a technology which permits our science to reach for needy humans.

ETP041

ARTICULATING NEEDLE HOLDER DESIGN, Tim Frank PhD, Stuart Brown PhD, Alfred Cuschieri, Department of Surgery and Molecular Oncology, University of Dundee, UK and Cuschieri Skills Centre, University of Dundee, UK

Objective: Suturing is one of the most difficult laparoscopic surgical tasks. Furthermore, standard straight instruments can only readily be used to suture a line that is approximately parallel to the instrument shaft. These problems may be alleviated if needle holders are designed to incorporate a distal joint that angulates and also transmits axial jaw rotation through the angulation. Such a device can be used for a wide range of suturing directions and may reduce the difficulty of complex manoeuvres such as knot tying.

Technology: The articulating joint is placed 20-40mm from the instrument jaws and adds two degrees of freedom to the four degrees that standard instruments have. Joint design must allow angulations of 70° or more with preferably continuous axial rotation. In common with most types of surgical needle holder, the jaws should be latchable. Design options are described that provide adequate needle latching force, maintain this force during rotation and angulation movements, and transmit force and torque across the articulation without excess laxity or frictional resistance. The instrument handle must provide control of the additional degrees of freedom and possible ways achieving this are discussed.

Conclusions: Typical specifications and specific designs are presented and discussed. Stress analysis and prototype construction demonstrate that an instrument of 10mm diameter can meet the specifications. Furthermore, it is shown that the instrument can be constructed at 5mm diameter within, but near to, the limit of construction material properties. It has been shown that six-degree-of-freedom robots are very effective for previously difficult laparoscopic suturing tasks. However, the cost and complexity of these will limit their widespread use. Thus the articulating needle holder, while being perhaps the most complex laparoscopic instrument to date, could have a very significant place in laparoscopic instrumentation.

ETP042

NEW 2 MM INSTRUMENTS NOT REQUIRING TROCARS FOR MINIMALLY INVASIVE SURGERY, Ashutosh kaul MD, Ravi Kumar MD, New York Medical College

Objective: These devices aims to aid minimally invasive surgery in a cost effective cosmetic manner.

Description: This line of 2 mm instruments made of special alloy can be introduced through a small skin nick into the abdominal or thoracic cavity without use of trocars. Introduction is aided by veress needle like mechanism and they can then be deployed. They have external stabilizers to support their deployment at the skin level, and locking mechanism, which allows them to be, used as self-retaining retractors they allow use of electric source via an insulated channel. The instrument line includes bowel graspers, dissectors, Maryland like tips, fan and rake like retractors and hook dissectors.

Preliminary results: We have used these instruments in an animal model to do the following procedures with the aid of a 5 mm camera, They include diagnostic laparoscopic, laparoscopic cholecystectomy, grasping and running the small bowel, appendectomy, tubal ligation, hemostasis after liver biopsies.

As they require no trocars they can be cost effective besides being cosmetically advantageous. As they have stabilizers

with locking mechanism they can aid solo surgeons by providing a stable retraction in easily adjustable directions. The use of veress like mechanism for introduction minimizes tissue trauma.

Conclusions: This line of instruments can be used to do procedures like cholecystectomy and appendectomy in a cosmetic and cost effective manner. As they are self stabilizing they can also be used for temporary tissue retraction instead of introducing another trocar and the need for additional personal.

ETP043

EFFICACY OF FULLY COVERED SELF-EXPANDING NITINOL STENTS IN THE TREATMENT OF DYSPHAGIA FOR PATIENTS WITH REFRACTORY ANASTOMOTIC STRICTURES AFTER ESOPHAGECTOMY, Rajnish Mishra MD, Paul Yeaton MD, Michel Kahaleh MD, Vanessa Shami MD, University of Virginia Health System

Background: Esophageal stents have been widely used to treat malignant dysphagia. Fully covered stents offer the potential of removability, permitting treatment of benign esophageal stenosis. The purpose of this study is to assess the efficacy of this fully covered nitinol stent in patients with dysphagia due to refractory anastomotic strictures after esophagectomy for esophageal cancer.

Methods: Covered nitinol stents were implanted in five patients who had dysphagia after esophagectomy secondary to refractory anastomotic strictures (see table). All five patients had undergone esophagectomy for primary esophageal cancer and were unresponsive to serial (>3) endoscopic balloon dilations.

Study	Case 1 (64/M)	Case 2 (59/M)	Case 3 (77/F)	Case 4 (75/M)	Case 5 (52/M)
Surgery	Transhiatal	Transhiatal	Ivor-Lewis	Ivor-Lewis	Transhiatal
Prior Dilations	4	5	6	4	3
Stent Type (mm)	Allimax 18x70	Allimax 18x70	Allimax 18x70	Allimax 18x70	Allimax 18x70
Stent Duration	14 1/2 weeks	2.5 weeks	4 weeks	4 weeks	2 weeks
Complications	None	Upper Pain	None	None	Migration

Results: Placement of the stent was successful in all 5 patients. There was marked improvement in dysphagia in all 5 patients with 4 of these having long-term resolution of their symptoms after stent removal. In one patient the stent was found to have migrated distally into the stomach on two occasions, with resolution of the stricture and dysphagia the second time. In all patients, the stent was easily removed with a foreign body forceps.

Conclusion: Placement of covered nitinol stents in patients with refractory post operative benign esophageal anastomotic strictures appears safe and efficacious. Dysphagia was alleviated in all patients. Further studies need to be performed to define the duration of stent implantation to achieve resolution of the stenosis.

ETP044

A DIRECT DRIVE ENDOSCOPIC SYSTEM FOR COMPLEX ENDOLUMINAL AND NOTES APPLICATIONS, C C Thompson, R I Rothstein, N J Soper, M Ryou, D G Fong, R D Pai, P J Smith, B D Weitzner, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA; Dartmouth Hitchcock Medical Center, Dartmouth Medical School, Hanover, NH, USA; Northwestern University, Chicago, IL, USA; Boston Scientific, Marlborough, MA, USA

OBJECTIVE: This Direct Drive Endoscopic System is a multi-tasking platform created for endoluminal and NOTES applications. The system was developed to enhance the dexterity of the standard end-effectors required for complex endosurgical procedures, without the need for computer-assisted robotics.

DESCRIPTION: The unit consists of a rail platform and a three-lumen lockable, articulating guide sheath. The sheath accepts a small-caliber endoscope and two 4mm instruments. The drive handles are connected to long, interchangeable instruments that pass down the guide sheath. These handles run on the rail platform and transmit hand motion to the instrument tip, imparting five degrees of freedom. The guide sheath provides an additional two degrees

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of freedom, for a total of seven. The unit was initially used in a series of calibration and training exercises, including passing rings between forceps and placing them on spikes. Graspers, scissors, and needle drivers were then used in ex-vivo porcine stomachs to attempt more complex procedures, including EMR, accurately place sutures, and knot tying. Video records were maintained.

RESULTS: The independent instrument movement with wide range of motion allowed the device to perform several complex tasks. The direct drive system was able to grasp tissue and hold it under tension, cut through layers of porcine stomach in a controlled fashion, suture, and tie knots.

CONCLUSION: Preliminary results suggest the Direct Drive Endoscopic System can perform complex endoscopic tasks that have traditionally been impossible to perform. The system's ability to operate through narrow flexible channels puts new capabilities for endoluminal and NOTES procedures in the interventionalist's hands.

ETP045

BUILDING VIRTUAL REALITY HAPTIC INTERFACES: THE CONTRIBUTIONS OF OPERATIVE EXPERIENCE, Allan Okrainec MD, Heather Carnahan PhD, Liya Ni PhD, David Wang PhD, Adam Dubrowski PhD, University of Toronto and University of Waterloo

Objective: The "holy grail" of virtual reality simulation is the development of the most realistic representation of the operative environment. Psychophysics, which deals with the relationship between physical stimuli and their subjective percepts suggests that this may be a suboptimal approach. To date little is known about the tactile psychophysical experiences of practicing surgeons and how they should be represented in virtual reality simulators. The objective of our technology is to enable the experienced surgeon to determine the "feel of the tissues" to be simulated.

Technology: Hardware: a laptop and a PHANTOM 3 Degrees of Freedom Omni haptic device. Software (proSENSE and MATLAB): a 3D virtual organ model and representation of the PHANTOM (surgical) device. The user interface has slider-bars with which the surgeon can create haptic effects of the virtual tissues by first selecting a region of interest (such as a tumor) on an organ with a stylus and then adjusting psychophysical parameters such as "stiffness" and "roughness" corresponding to the physical parameters "compliance" and "texture". The values of these estimates for a selected organ region are recorded in a lookup table.

Preliminary results: We have recently presented a set of preliminary results at Medicine Meets Virtual Reality (Ni et al., 2007) conference. In summary, the pilot data show that four general surgeons adjust parameters of normal and cancerous tissues differently with low inter and intra-individual variability.

Conclusions/Future directions: Our haptic interface and software allows a surgeon to use memorial representations of the psychophysical properties of tissues to assist in the design of virtual reality haptic devices. Future technological development will focus on increasing the number of degrees of freedom of the device, to include rotations and opening and closing of simulated pincers. We will also aim to increase the number of psychophysical parameters describing the tissues. Future uses of this technology will include placing our haptic device and software in the operating room, allowing surgeons to correlate their intraoperative assessment of tissue properties with the haptic parameters set on our device. This would allow us to validate memory based psychophysical properties with intraoperative judgment of tissue properties.

ETP046

EFFECTIVENESS OF VIRTUAL INSTRUCTOR FEEDBACK ON NOVICE LEARNER PERFORMANCE USING THE GI MENTOR II GASTROINTESTINAL ENDOSCOPY SIMULATOR, James G Bittner IV MD, Adeline M Deladisma MD, Michael A Edwards MD, Edward J Kruse DO, John D Mellinger MD, Mary Anne Park MSc, Bruce V MacFadyen Jr. MD, D. Scott Lind MD, Department of Surgery, Medical College of Georgia School of Medicine

OBJECTIVE: SAGES is currently addressing the need for a comprehensive, standardized basic endoscopic assessment tool complete with a validated curriculum and appropriate real-time feedback. The overall goal then is to develop, evaluate, and refine an innovative, virtual endoscopy simulator with a validated curriculum and a skill-enhancing, interactive virtual instructor. These two educational tools, an interactive life-sized virtual instructor and high-fidelity endoscopy simulator, will synergize to produce an innovative, fully immersive, curriculum-based training environment with skill-enhancing feedback. Surgical and endoscopic simulation combined with real-time, interactive virtual instructors and feedback will increase trainee exposure to difficult or uncommon cases. This educational technology, based on validated curricula and simulation equipment, will improve basic laparoscopic and endoscopic operative skills, serve a crucial role in minimally invasive and endoscopic surgery curricula, and identify trainees who will require more training based on measured outcomes of simulated tasks and procedures. Simulation with interactive virtual instructors may decrease patient exposure to untrained individuals thereby lowering overall risk and lessening the time and financial burdens on attending faculty involved.

METHODS: Thirty medical students at the Medical College of Georgia School of Medicine will be randomly assigned to one of three groups. All participants will complete the same three simulated cases in sequential order using the GI Mentor II (Symbionix USA Corp., Cleveland, OH). The control group (n=10) will complete three cases with no real-time or summative feedback during or after each simulated case. Group 1 (n=10) will receive real-time, virtual and summative feedback currently provided by the GI Mentor II. Group 2 (n=10) gets real-time, virtual and summative feedback plus a digitally projected, interactive, virtual instructor. Data collected for the groups will include time to complete each virtual module, percent amount of mucosa visualized on each virtual module, efficiency of performance, and percent pathologies identified.

CONCLUSION: We believe that a real-time, interactive virtual instructor and simulator-based feedback employed simultaneously during simulated upper gastrointestinal endoscopy using the GI Mentor II will improve novice learner performance in all evaluated metrics compared to complete absence of feedback or simulator-based feedback alone.

ETP047

DECISION AIDS IN LAPAROSCOPIC CHOLECYSTECTOMY, Dawit Worku Gebrehiwot MD, St. Bartholomew's and The London School of Medicine and Dentistry

Over the last two decades, laparoscopic cholecystectomy (LC) has gained worldwide acceptance and considered as "gold standard" in the surgical management of symptomatic cholelithiasis. However, despite the expertise gained in performing the procedure, complications such as bile duct injuries continue to occur at unacceptable rates, higher than that for open cholecystectomies.

Dynamic decision study in Laparoscopic Cholecystectomy has identified Situation Awareness (SA) and Recognition-Primed Decision (RPD) as important mental models utilized by surgeons performing LC. Such studies also highlight the need for decision support techniques and technologies for use in difficult cases of LC and by inexperienced surgeons. A number of practical and innovative techniques have been suggested that could help as decision aids, in order to reduce some of the complications related with LC. One such technique is direct coloration of the cystic duct, the common



bile duct and the gallbladder with intraoperative injection of methylene blue dye into the gallbladder fundus. The clinical use of ultrasonic doppler instrument (SonoDoppler (R)) for detection of blood flow during laparoscopic procedures also has an important potential in accessing and clarifying anatomical structures. Finally, intraoperative transillumination of the extrahepatic biliary ducts and vessels can be helpful in identifying the structures better.

ETP048

2-DIMENSIONAL GEL PLASMA PROTEOMICS: A TOOL FOR THE ASSESSMENT OF THE PLASMA PROTEIN RESPONSE TO ILLNESS AND SURGICAL INTERVENTION, John M Bennett BA, Abigail C Polley PhD, Mike Rhodes MD, Jan T Johnson PhD, Fran Mulholland PhD, Institute of Food Research

Objective: To develop techniques to optimise the detection and analysis of plasma proteins, ranging from global analysis of plasma protein expression to more focused analysis of protein sub-classes. The analysis of these plasma protein responses to both acute and chronic illness, and to medical and surgical interventions can reveal new information about the metabolic response to disease and treatment. We describe the development and optimisation of proteomic techniques for the analysis of changes in the plasma proteins in patients undergoing laparoscopic adjustable gastric banding for the treatment of morbid obesity.

Description: A variety of techniques are available for the separation and identification of plasma proteins but plasma samples must first be depleted of high abundance proteins (e.g. albumin) that would otherwise saturate the detection system. We compared two different methods for protein depletion: the Amersham Albumin/IgG depletion kit® and the Beckman plasma depletion column, which removes an additional eight abundant proteins. The depleted plasma was then subjected to isoelectric focusing on pH gradient strips followed by gel separation on 10% homogenous polyacrylamide gels. The pH gradient can be varied in the range 3-11 to enable more complete separation of different protein groups. The resultant images were digitised and examined using ProteomWeaver® software. Selected protein "spots" were then removed from the gels using a robotic spot-picking system and identified by MALDI-TOF and Q-TOF mass spectrometry. Differences in protein expression (spot-density) between controls and trial subjects, controls and disease groups, and individual subjects over time following surgical intervention were quantified and assessed statistically.

Preliminary Results: Our initial results demonstrate both the feasibility and importance of achieving consistent patterns of protein depletion using the commercial kits currently available for processing human plasma. Having optimised this approach we have obtained evidence for consistent changes in plasma protein expression in a pilot group of 5 morbidly obese patients before, and at three and six months post laparoscopic adjustable gastric banding.

Conclusion and Future Direction: Proteomic analysis can be utilised to develop a "systems biology" approach to the plasma metabolic changes related to diseases and medical interventions. We are conducting further development of plasma depletion techniques to allow analysis of less abundant proteins, and work also continues on the development of gels with pH ranges tailored for the optimal separation and quantification for different target proteins.

ETP049

TROCAR FOR LAPAROSCOPIC PLACEMENT OF CATHETER FOR PERITONEAL DIALYSIS, Zoran Cala PhD, Ivo Soldo PhD, Irena Senecic-Cala MSc, Visnja Neseck-Adam MSc, Univ Dpt of Surgery GH Sveti Duh, Univ Dpt of Pediatrics CH Rebro, Zagreb, Croatia

Aim: The aim of our work is to improve the technique of peritoneal catheter placement substituting open with endoscopic operation. For this purpose we constructed original device Cala's trocar. After several models, now we have trocar that fulfills all our needs for this operation. This trocar consists of two essential parts. The outer part is a cannula

which can be separated longitudinally in two symmetric parts. The inner metal part has pyramid shaped tip.
Method: Endoscopic placement is performed under general anesthesia in the operating room using equipment for laparoscopic operation. After pneumoperitoneum is achieved and laparoscope introduced, the catheter trocar is passed obliquely through the abdominal wall and directed into the pelvis, with the laparoscopic monitoring of the trocar tip. The catheter is introduced through trocar cannula. The cannula is dismantled longitudinally and removed while the catheter tip is kept into the pelvis by the forceps.
Results: From December 1993 until January 2007 catheter for peritoneal dialysis was placed laparoscopically in 198 cases using our own trocar constructed for this purpose. There were no intraoperative or postoperative complications.

Conclusion: Laparoscopic placement of catheter for peritoneal dialysis using specially constructed Cala's trocar is a simple, quick, efficient and patient convenient technique.

ETP050

THORACOSCOPIC AND MINI-LUMBAR VERTEBRAL BODY STAPLING USING SHAPE MEMORY ALLOY (NITINOL) IN THE TREATMENT FOR SCOLIOSIS IN CHILDREN, Harsh Grewal MD, Randal R Betz, Linda P D'Andrea, Section of Pediatric Surgery, Temple University Children's Medical Center and Orthopedic Surgery, Shriner's Hospitals for Children, Philadelphia

Introduction: In skeletally immature children (< 13 years in girls, <15 in boys) with progressive scoliosis (but curve <45 degrees) vertebral body stapling of the anterior spine may keep the curve from progressing while preserving movement and flexibility and provide a better alternative to bracing or fusion.

Objective: To describe initial results of thoracoscopic and mini-lumbar vertebral body stapling using a shape memory alloy (NITINOL) staple for the treatment of scoliosis in children.

Description: A retrospective review of children undergoing vertebral body stapling using a shape memory alloy (NITINOL) staple. Thoracic curves were stapled using a thoracoscopic technique with single lung ventilation, fluoroscopic control, usually requiring 3 to 4 ports. Lumbar curves were stapled using a mini-incision retroperitoneal exposure with fluoroscopic control.

Results: A minimally invasive vertebral body stapling was performed in 59 children with 78 curves (thoracic-30, lumbar-7, both curves-22). The curves stapled ranged from T2-L4. All children had their curves successfully stapled without any intra-operative neurological injuries. Mean estimated blood loss was 255 ml (50-1500). Postoperatively there were 6 complications (chyllothorax-1, pancreatitis-1, diaphragmatic hernia-1, atelectasis-3). None of the staples were dislodged, there were four broken staple, and none of the staples moved. In one patient staples were removed because of persistent pain. Preliminary results reveal stability of curves (< 10 degrees) in 75% of the adolescent idiopathic scoliosis patients at one year.

Conclusion: A new treatment in children utilizing thoracoscopic and mini-lumbar vertebral body stapling appears to be a safe alternative to bracing or fusion in skeletally immature children with idiopathic scoliosis.

ETP051

A NOVEL DEVICE FOR DEFOGGING, HEATING, WHITE-BALANCING, PROTECTING AND CLEANING THE LAPAROSCOPE, Sandy Heck MD, Alexander Gomez, Brian Jacob MD, Alfons Pomp MD, Weill Cornell Medical College, New Wave Surgical Corp.

OBJECTIVE: Considerable efforts are spent during laparoscopy to maintain adequate visualization, including lens wiping, defogging and color balancing. We hypothesized that a multifunction device capable of addressing these problems could significantly improve surgical efficiency. To meet this demand, we developed a single-use Defogging Heated Endoscopic Lens Protector (DHELP) device.

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DESCRIPTION: DHELP contains a reservoir of heated anti-fog solution, a white-balancing target that blocks light interference, a microfiber surface for cleaning the lens, and a foam shell to protect the scope from damage and eliminate the fire hazard when the scope is outside of the body. Upon activation, a reservoir of anti-fog surfactant heats above body temperature in one minute, and remains heated for five hours. An adhesive bottom flap secures the device to the drapes so that the scope can be quickly inserted, defogged, and cleaned at any point.



RESULTS: In a porcine animal study that measured time-to-fog after scope insertion into the abdomen, DHELP was compared in a randomized fashion to an anti-fog solution, heated water, and controls. At all time points and at all temperatures, time-to-fog was longest for DHELP. In trials where the scope remained inside DHELP for >5 sec, no fogging resulted at all. A prospective, controlled human study is underway to further study DHELP's potential for improving efficiency.

CONCLUSION: To our knowledge, DHELP is the first device to combine heat and anti-fog solution to definitively address the fogging problem. DHELP is also the first device specifically intended for white-balancing, protecting or cleaning the laparoscope during the procedure. By focusing on the most pervasive visualization problems, DHELP may significantly increase laparoscopic surgical efficiency.

ETP052

THE LAPAROSCOPIC VASCULAR TRANSILLUMINATOR: EFFICACY OF A BLOOD VESSEL IDENTIFICATION DEVICE USING INFRARED EMISSION DIODE, Kozo Konishi

MD, Kazuo Tanoue MD, Satoshi Ieiri MD, Shohei Yamaguchi MD, Etsuko Kobayashi MD, Ichiro Sakuma MD, Takeyoshi Dohi MD, Makoto Hashizume MD, 1. Graduate School of Medicine, Kyushu University; 2. Graduate School of Information Science and Technology Medicine, The University of Tokyo

Background: In the laparoscopic surgery, because of the lack of tactile sensation, it is difficult to recognize and localize blood vessels intraoperatively. Especially in the surgery for obese or fatty patients, if we can identify the blood vessels which are buried among fat tissue and cannot be seen with normal laparoscopy, operative safety is expected to improve. The device which we applied mechanism of pulseoxymetry is newly developed for the detection and recognition of blood vessels in laparoscopic surgery. The purpose of this study was to investigate the performance and possibilities of the device.

Method: The device's performance and features were tested in ex vivo conditions and in simulated laparoscopic surgical conditions. We installed LED array in the back of a piece of meat buried with vascular model and photographed a transmitted light image with a CCD camera and analyzed by image processing software. We also evaluated the usefulness in vascular detection using organs of a pig.

Results: In ex vivo study with pieces of meat, the vascular detection up to 20mm in tissue thickness and up to 4mm in depth were possible. In animal study, the blood vessels which were invisible to the naked eye were detected with a transmitted light image by back irradiation of infrared LED array. The thickness of tissue which could allow infrared transmission was up to 10mm.

Conclusion: The blood vessel detecting device that we had developed was feasible to be supplemented the lack of information on laparoscopic surgery, and to contribute to the improvement of the safety of laparoscopic surgery.

ETP053

EFFECTIVE APPETITE MANAGEMENT BY PROXIMAL GASTRIC ELECTRIC STIMULATION, B. A Zikria MD, Leaque

Ahmad MD, Joseph F Zikria BA, M Al-Sawwaf MD, Arthur Cooper MD, Harlem Hospital Medical Center, Columbia University, New York

Morbid obesity has become the third killer in the United States. \$39 billion are spent for its treatment and another \$38 billion dollars are spent for weight reduction annually.

Objective: The purpose of our device is to depress the appetite center by electric stimulation via gastric fundus (upper top) in deference to the earlier attempts of distal stomach (lower bottom) stimulations which have not been very effective.

Methodology: Research has supported the hypothesis that the afferent vagal stimuli from the stomach via the Nucleus Tactus Solitarius are relayed to the medial nucleus of satiety center in the hypothalamus which in turn depress the lateral nucleus of appetite center, thus turning off the appetite and achieving the state of satiety. Normally when an empty stomach is filled with air, fluid and food, distends and stretches more the fundic wall, the upper top with air, thus stimulating the stretch fundic receptors sending the message via left vagus to the hypothalamus to say, "I am full. I have to stop!"

Preliminary Results: Laparoscopic placement of two leads to the fundus of the stomach and stimulation with a pace maker in a hungry dog has given us impressive results. Further research is required to prove the validity of this hypothesis.

Future Directions: By such a method, if proven effective, we could achieve eating behavior modification with lasting weight loss results, less invasively and with less cost in lives and finances.

ETP054

ROBOTIC TELEPRESENCE OFFERS AN ALTERNATIVE PARADIGM FOR POST-RESIDENCY SURGICAL EDUCATION, Alex Gandsas MD, John S Koppman MD, Christina Li MD, Stuart

Shindel MD, Michael Schweitzer MD, Sergio Cantarelli MD, Gabriel Egidi MD, Sinai Hospital of Baltimore and Johns Hopkins Bayview Medical Center

Introduction: Traditional post-residency surgical training programs, which teach new procedures/techniques, are offered as didactic courses assisted by live video or as on-site preceptorship programs. This usually requires travel to an out of town facility that can be both time consuming and expensive. Using the RP7 robot (Intouch Health, Santa Barbara, USA) as a mobile, real-time telecommunication platform, the surgical education paradigm can be changed to one where actual attendance is replaced by robotic telepresence.

Methods: The system consists of a robotic unit placed in the operating room which is accessed remotely by the student using client software running on a Windows® based control station computer. The robot, equipped with a 15 inch flat screen, uses an advanced proprietary video conference system to access the public internet over a 802.11G wireless network. Video and audio stream from the robot is rendered by the client software in a 320 X 240 pixels window, with an encoding rate that ranges from 300 to 700 kilobits-per-second displaying video images up to 30 frames-per-second. This technology allows the student surgeon to log in to an operating room from his/her office and experience a individualized, on-site preceptorship of a given surgical procedure. Students watch live surgery, interact with an expert surgeon in real-time, and ultimately acquire the surgical knowledge necessary to meet surgical competency benchmarks for a given procedure/technique.

Results: From September 2006 to December, 2006 two laparoscopic surgeons in Bahia Blanca, Argentina logged in to a robot located in an operating room in Baltimore, USA and experienced customized preceptorships on laparoscopic gastric bypass. After completing a total of 19 sessions, the surgeons were expected to safely and independently perform a laparoscopic gastric bypass procedure at their own facility.



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Conclusions: By using robotic remote telepresence, barriers associated with traditional forms of education may be minimized while enhancing the educational experience by tailoring it to the students' needs in terms of content and timing. Widespread dissemination of this technology promises to change the paradigm for post-residency surgical education.

ETP055

COMPARISON OF TASK PERFORMANCE BETWEEN ARTICULATING AND CONVENTIONAL LAPAROSCOPIC INSTRUMENTS, Prakash Gatta MD, Peter M Denk MD, Bin Zheng PhD, Lee L Swanstrom MD, Legacy Health System

OBJECTIVE: A new type of laparoscopic instrument was introduced recently with an ability to articulate the tip. While this instrument may offer the possibility of performing more complex tasks, the control of this instrument may be hampered by increased maneuverability. A study was designed to compare the task performance between the articulating instrument and conventional laparoscopic instruments. We also note that task performance on this new instrument may be a function of surgical experience. Tasks were therefore undertaken comparing two groups with distinct skill levels.

DESCRIPTION: Two teams of 8 each were tested based on skill level. One team had extensive surgical experience (surgeon) and the other with no experience (novice). Both groups were given 3 tasks to perform in a laparoscopic training box. The tasks were Peg transfer, left-right suturing & up-down suturing. Scoring on these tasks was based on movement speed and accuracy. These tasks and the scoring were adapted from the well validated Fundamentals of Laparoscopic Skills program. Both groups performed these tasks using conventional and articulating instruments. Novices and experts alike were then given a basic orientation on how to use the articulating instrument after which they were retested.

RESULTS: Not surprisingly the expert group scored significantly better than the novice group, (87 vs 53, $p < 0.001$). Both groups combined, performed better with conventional instruments. However, after a basic orientation was given on use of the articulating instrument, the novice groups outscored the expert group in terms of net improvement of performance (47 to 59 for novice vs 81 to 80 for expert, $p = 0.166$). This was a 25% improvement in the novice group.

CONCLUSIONS: Articulating instruments can be used effectively by a surgeon experienced with use of conventional laparoscopic instruments. Adding flexibility to a laparoscopic tool did not degrade performance of surgical tasks in an expert group. Also, training using the articulating instrument can be started at an early stage of surgical training as lack of surgical experience does not affect the acquisition of new surgical skills using the articulating instrument. Further study is needed to determine the learning curve to achieving proficiency on the articulating instruments. An intriguing follow up to these studies would be to compare the performance of this flexible instrument to that of the surgical robot.

ETP056

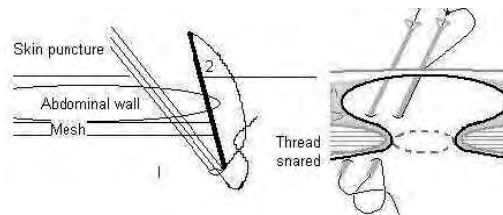
MINIMALLY TRAUMATIC SUTURING DEVICE FOR LAPAROSCOPIC VENTRAL HERNIA REPAIR (LVHR), Brij B Agarwal MS, Krishna A Agarwal, Nayan Agarwal, Manish K Gupta MS, Sneha Agarwal MS, Krishan C Mahajan MS, Sir Ganga Ram Hospital, Lady Hardinge Medical College & DPS, RK Puram, India

BACKGROUND- Transabdominal fixation of mesh in LVHR with a "suture passer" traumatizes parietal wall, pain at suture sites & significant morbidity. We propose to design a minimally traumatic instrument to pass sutures in laparoscopic surgery.

DESIGN- The instrument's Part-1 is 18 gauge metallic tube with a sharp tip to penetrate the abdominal wall through a skin puncture. A number 1 monofilament non absorbable suture can core through this tube to enter the peritoneal cavity from the skin puncture site. The tube is then withdrawn over the external portion of suture. Part-2, a 22 gauge stilet like rod with a flexible wire fused at its both ends to make a loose bow like a violin string. The sharp end of rod

goes through the abdominal wall with its wire loop. The intraperitoneal end of suture passed earlier is snared through the loop of part-2 and pulled out through the skin puncture site. The suture ends are now tied and buried in subcutaneous tissue. The skin puncture site doesn't need any closure. Trauma to parietes is negligible as only a needle like puncture is there. Pending production of this instrument we are using the same mechanism with the help of two spinal needles as explained in our paper on laparoscopic "Vest over Pant" closure of defect in LVHR. (abstractID:14215)

FUTURE DIRECTION- This instrument ensures atraumatic suture fixation and ease of defect closure in LVHR.



ETP057

OBJECTIVE MEASUREMENT OF FLS PRECISION CUTTING TASK, Derek Young, Fiona Slevin, Derek Cassidy, Donncha Ryan, Haptica Inc

The Precision-Cutting Task in the SAGES/ACS FLS Program requires the user to dissect a circle of specific size and shape from a marked piece of mesh.

Currently, measurement of the accuracy and area dissected is done by observation and by measuring the dissected mesh on a measurement grid.

Using advanced vision-tracking, the ProMIS surgical simulator takes an image of the dissected mesh and automatically generates a metric, indicating the accuracy of the shape and area dissected.

Method

1. Once the user has completed the Precision-Cutting Task, ProMIS takes an image of the dissected mesh. The image is converted to binary image and then scanned using a blob detection algorithm which produces a list of blobs.
2. The blob with the largest area is taken as the cut out area and the number of pixels are counted inside this area.
3. The actual measurement for area is given in cm². This is calculated by counting the number of pixels in a known area of the image and then using ratios to determine the area of the cut out. (Note: this calibration step is achieved by taking the tissue off the tray and running the blob detection and pixel count on the uncovered black foam of which the exact area is known)



Results: Initial trials of the metrics on the FLS Precision-Cutting Task show that ProMIS is as accurate — and frequently more accurate — than the current human observation method.

ETP058

THE NOVEL USE OF SELF-EXPANDING, COVERED, PLASTIC ESOPHAGEAL STENTS (SEPS) IN THE MANAGEMENT OF BENIGN COLORECTAL ANASTOMOTIC STRICTURES,

William J Peche MD, Kirsten B Wilkins MD, Kelly M Tyler MD, Theodore E Eisenstat MD, Gregory C Oliver MD, Joseph R Notaro MD, Daniel Simon* MD, Bertram T Chinn MD, Department of Colon and Rectal Surgery, UMDNJ-Robert Wood Johnson University Hospital, New Brunswick, NJ and *Department of Radiology, Solaris Health Systems, Edison, NJ

Purpose: Colorectal anastomotic strictures occur in 3-30% of patients and carry significant morbidity including obstruc-

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tion, fistula formation, and perforation. Treatment includes dilatation, stent placement, or surgery. Endoscopic dilatation is highly successful, but may be complicated by perforation and recurrent stricture. Reoperative surgery is usually successful, but it is not without morbidity and ostomy creation may be required. Self-expanding metallic stents (SEMS) have proven efficacy for malignant colorectal strictures, but are associated with tissue ingrowth and restenosis, and are considered permanent or are retrievable only by surgery. SEMS in benign disease is controversial, and may be associated with high complication rates. Retrievable SEPS have been developed and used in benign esophageal disease with low complication and high patency rates. We extrapolated the use of SEPS to treat benign colonic anastomotic strictures.

Methods: Two patients with strictures following diverticular resection had 3 SEPS placed. Each patient presented with obstructive symptoms due to stricture. Patient 1 was initially treated with endoscopic balloon dilatation followed by SEPS. Patient 2 required emergent hospitalization due to obstruction. CT demonstrated an anastomotic stricture/contained leak. This patient was initially treated with SEPS. In each case, SEPS were placed under endoscopic and fluoroscopic guidance.

Results: Initial successful placement was achieved in each patient without immediate complication. Both patients passed the SEPS spontaneously. Patient 1 passed the SEPS on the day of placement. One month later a second SEPS was successfully placed for a recurrent stricture. Patient 2 avoided emergent surgery for the obstruction/contained leak after SEPS placement. After 3 months, the stricture recurred and was successfully managed with endoscopic balloon dilatation.

Conclusion: We describe the novel use of SEPS for the relief of obstruction in two patients with benign colorectal anastomotic stricture without short-term complications. Due to the ease of placement and relief of symptoms, we advocate further studies to evaluate both short and long term complications and success of SEPS in benign colonic strictures. In select patients, SEPS may alleviate the need for redo surgery. Unlike SEMS, SEPS are potentially useful for the treatment of benign anastomotic strictures and fistulae due to their retrievable and covered nature.

ETP059

SURGICAL STAPLERS WITH MAGNETICALLY SECURED COMPONENTS, Stephen Van Lue, DVM, DACVS, University of Copenhagen, Faculty of Life Sciences, Copenhagen, Denmark

Background: Surgical staplers in use today can be difficult to maneuver and position around tissue in many surgical applications. The necessity of having the anvil and cartridge components on opposing jaws, within a framework, or as separate components which must be manipulated by the operator to mechanically connect and align is problematic. Regarding circular staplers, the presence of the anvil rod limits mobility within the bowel lumen, and typically requires the hollow viscous to be perforated, as well as placement of a purse string suture, before the anvil and cartridge components are coupled.

Objective: The objective is to eliminate the use of opposing jaws, frames, anvil rods, and the necessity of purse string sutures in the use and application of surgical stapling devices.

Description: Magnetism may be utilized to provide a means of aligning and coupling stapler components across a tissue interface such that the components may be introduced from different access points (even dropped off endoscopically within a tissue space or lumen). With regard to circular staplers, the methods provide for an anvil without an anvil rod, and means of coupling components without the prior perforation of a luminal structure.

Preliminary results: Preliminary results in a porcine cadaver showed it was possible to fit the anvil portion of a circular stapler with a magnetic component, remove the anvil rod, place the anvil within the bowel, steer the anvil to a location with a magnetic laparoscopic probe, and connect the anvil

to a stapler cartridge component across the bowel wall. The cartridge component was similarly fitted with a magnetic component.

Conclusions: The ability to deploy stapler components independently from one another, without the need for anvil rods, purse string sutures, or the use of opposing jaws and frames for alignment may have utility in the development of new, or refinement of existing, stapling procedures. Final mechanical alignment of the anvil and cartridge may take place after general alignment and coupling of the mechanically independent magnetic components. The methods may be applied to various tissue fixation devices apart from surgical staplers, including catheter based devices. The use of magnetic forces for the initial coupling and general alignment of these components, and transillumination as a targeting modality, may shorten procedural times, have value in reducing patient morbidity, and contribute to advancements in tissue stapling and repair.

ETP060

MAGNETIC OPTICAL SUTURING, Stephen Van Lue, DVM, DACVS, University of Copenhagen, Faculty of Life Sciences, Copenhagen, Denmark

Objective: The objective of the technology is to enable the coaxial passage of a suture and needle across a tissue boundary, such that the needle may be captured on a "blind side" of the tissue, and then re-introduced at a desired location on the visible side of the tissue boundary, using a bead of light as a targeting modality.

Description: Using a columnar shaped magnetic element with a central lumen, an elongate surgical needle will tend to orient itself to the central lumen when brought proximate to the magnetic element. When on the blind side of a tissue interface, the central lumen of the magnetic element is utilized for the conduction of light, which serves as a targeting modality for both the introduction, and subsequent retrieval of the needle from the "blind side". In addition, the central lumen of the magnetic component may be utilized to pass suction, to stabilize the capture, or receiving component on a desired tissue plane.

Preliminary results: Depending on tissue thickness and magnetic field strength, the needle was oriented easily such that when the needle was urged toward the bead of light which was transilluminating the tissue, the needle oriented to the light, and the lumen of the magnetic component on the blind side of the tissue boundary was penetrated. In order to allow the needle to orient properly, the suture was held just behind the swedge point of the needle.

Conclusions: Magnetic optical suturing is plausible and facilitates coaxial suturing, blindly across a tissue boundary, as the respective components may be uncoupled - not necessarily relying on opposing jaws for passage and capture. The methods also have application on a larger scale for end-effector guidance - for example, inserting a laparoscopic instrument into a trocar without looking away from the video monitor. A relatively straight needle configuration was most effective, with modifications needed to enable the needle to be returned from the blind side of the tissue interface. The concepts may also enhance the application of minimally invasive suture techniques, where the suturing devices being utilized are currently limited to having the needle capture mechanism within the construction, or as part of, the opposing jaw of a single instrument.

ETP061

SUPPORT WHERE IT'S NEEDED: SMART ARM, Stuart I Brown PhD, Ian Rutherford, University of Dundee, UK

Objective: An important role in endoscopic surgery is simply holding instrumentation: retractors or laparoscopes, for example. This may be done by a junior surgeon who is susceptible to fatigue, tremor and lapses of concentration. Some sort of assisting device may be employed, but these are often heavy, awkward, prone to slipping and difficult to sterilize. Most current assisting arms depend on friction to lock the arm in position. High forces are required in the mechanism to maintain this friction, particularly at the prox-



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imal end, and any slippage results in scratches – a haven for infective organisms. Adjustment is usually made using knobs or levers.

The objective of the Smart Arm is a light, strong and useable assisting device with modular construction, suited to various surgical uses.

Description of the technology: The Smart Arm avoids the pitfalls of friction by using a number of modular units with interdigitating features. The units may be assembled to create arms in any configuration required by the procedure. Adjustment of the joints may be made manually or, by using an optional simple pneumatic actuator, at the push of a button.

An optional distal joint uses a clamped ball and socket, again operated either manually or by pneumatics. Activation and release of the clamp has been automated with a touch sensor. This permits free motion of the surgical instrument when grasped by the surgeon, but locks in position immediately upon release. This functionality may be particularly useful for holding laparoscopes, for example, where frequent changes in position are required.

The entire system clips together without tools and is manufactured from lightweight materials. Tear-down for cleaning or re-configuration is easily accomplished. The pneumatic “tube actuator” is disposable.

Preliminary results: A 6 DoF Smart Arm system weighs 1.20 kg and will easily support an applied torque of 10Nm, while an equivalent system used at our Institution weighs 1.95kg but cannot support more than 1.5Nm. The tube actuator and touch sensor mechanisms work faultlessly.

Using interdigitating joints means that the arm is limited to discrete positions. In practise however, even a 4DoF arm offers eight hundred and ten thousand alternative positions, so this presents no problem in use.

Conclusions/Future directions: The prototype Smart Arm continues to be evaluated in our training facility. The IP is protected by patent application.

ETP062

NEW CURRICULUM FOR ACQUIRING “SURGICAL SKILLS” USING VIRTUAL REALITY SURGICAL SIMULATION., S Ivanova MD, N Iqbal, T Albrani, B Patel, Academic Department of Upper GI Surgery, Barts and The Royal London School of Medicine and Dentistry, Queen Mary, University of London, Institute of Cancer, Old Anatomy Building, Charterhouse Square, London, United Kingdom, EC1M 6BQ.

Objective of the Technology or Device: Taking time-off surgical training in order to do a research for higher degree has always been accompanied with apprehension due to lack of contact with clinical work and deterioration of surgical skills. To date most academic centers offer limited exposure to clinical work during the research period. Surgical skills during and at the end of the research period are seldom assessed and if so had been shown to deteriorate.

We designed this curriculum in order to afford the candidates opportunity to develop technical skills by simulation in Diagnostic Endoscopy, Laproscopic surgery and Intestinal Anastomosis during the research period.

Description and Methods: 10 students enrolled in a newly developed, intensive one year MSc course for surgical training, by simulation and research programme at Barts and The Royal London Hospital – Queen Mary University of London. In the course of the first six months the students were allocated to spend on an average 4 hours per week acquiring technical skills on simulators for Endoscopy and Laproscopic Skills and synthetic bowel for practicing bowel anastomosis. The remaining six months were focused on research activities for the MSc. Computer generated data of objective assessment obtained from Symbionix Lap-Mentor and GI-Mentor during the training period was retrieved at the end of the study period for analysis. Data was analysed by SPSS15 statistical package.

Preliminary Results: 10 MSc students training on simulators spent on an average 4 hours per week acquiring technical skills to perform Diagnostic Endoscopy and Laparoscopic Cholecystectomy. One of the criteria for successfully completing MSc was safely performing a Laparoscopic

Cholecystectomy on a simulator, which was observed by experienced internal and external examiner. In addition all the participants successfully completed the course.

Conclusions/Future Directions: The combination of Research and Virtual Reality Training, that this intensive 1 year MSc course offers is a unique opportunity for acquiring surgical skills on simulators and completing research for Higher degree.

ETP063

DEVELOPMENT OF SIMULATION FOR PRACTICING LAPAROSCOPIC HERNIA REPAIRS AND GASTRIC BYPASS, Yael Friedman PhD, Symbionix Corp.

Symbionix has developed two new modules of simulation enabling the real-time interactive practicing of Laparoscopic Hernia Repairs and Gastric Bypass. The modules will be add-on to the LAP Mentor, multi-disciplinary LAP surgery simulator enables simultaneous hands-on practice for a single trainee or a team. Symbionix Laparoscopic Incisional Hernia Repair module allows surgeons to perform a Hernia Repair procedure in a safe, controlled, real-life simulated environment. The module is designed to train surgeons with the necessary skills required to perform laparoscopic hernia repairs procedures, including adhesiolysis and handling and fixating intraperitoneal prosthetic mesh in a choice of shapes and sizes. It includes a variety of Hernia Repair Procedures in real-life scenarios. Surgeons perform simulated surgical procedures to treat a variety of hernia pathologies such as umbilical, periumbilical and epigastrium hernia. This virtual experience provides clinicians with an essential tool for practicing on realistic environment, using actual tools and choosing from a selection of mesh types and sizes. Additionally, the module provides a complete virtual environment of the external maneuvers required to learn and assess the principles of port placement, followed by the insertion and operation of the suture passer, that are unique to the incisional hernia repair procedure. The module features tools to measure skills assessment and training success. During the training session, all data is recorded and presented in a file. Important procedure information such as choice of mesh handling, safe dissection and complication management are measured during the session in order to assess skill levels. Symbionix Gastric Bypass module helps surgeons in performing and mastering the specific tasks of this procedure in a safe and monitored environment. This module provides real-life visual and tactile simulation of the key stages of the Gastric Bypass procedure: simulations of internal organs and bodily fluids, manipulation of tools and tool-organ interaction and deformation, including tissue cutting and anastomosis using a linear cutter. It also features an assisting tool that allows the introduction of three or even four instruments into the scene at once. The user is guided, case by case, through the entire gastric bypass procedure- creation of the gastric pouch, measurement and division of the jejunum, gastrojejunal anastomosis and enteroenterostomy anastomosis. A full array of virtual surgical instruments duplicates the activity and sensation of manipulating instruments in the various stages of the procedure. Video clips of the actual procedure are accessible throughout the simulation.

ETP064

ANTIMICROBIAL NANOPARTICLE SURFACE FUNCTIONALIZATION TO PREVENT BIOFILM FORMATION ON MEDICAL DEVICES, Roger Massengale, Bruce Gibbins PhD, Alan Dine BS, I-Flow Corporation, Acrymed Inc.

Background and Objective: Surgical site infections (SSI) impart a heavy financial burden, costing U.S. hospitals in excess of \$1.5 billion in additional medical treatment. The surfaces of medical devices do not normally have any inherent resistance to microbial colonization. The use of a novel process that causes the formation of nanoparticles of silver on the surface of a Soaker® Catheter used for the continuous administration of regional anesthesia to surgical wounds may reduce the risk of SSI.

Technology and method of Application: This new technology is a wet immersion process whereby medical devices are

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submerged in an aqueous mixture of ionic silver salt, stabilizers. The addition of a catalyst initiates the formation of nanoparticles of silver that grow and bind tightly to the surface. The Soaker catheters are exposed to this process to impart antimicrobial properties due to the release of ionic silver through oxidation of the nanoparticles.

Results. Soaker catheters were treated to a range of 6-10 µg Ag/cm². The silver was in the form of mono-dispersed 10 nm diameter nanoparticles. Microbial challenge testing showed the catheters possessed equivalent antimicrobial activity on both the external surface and lumen. Treated catheters showed 3 log reduction of bacterial counts after 10 days of saline elution. Testing against 6 strains each of 6 types of clinical isolates showed that the treated surfaces prevented biofilm formation. A biodistribution study in mice showed the majority of silver stayed either on the catheter or local skin site and that none accumulated in tissues.

Conclusion. Continuing investigation of the biology of infection at the surgical site and methods of prevention may allow us to further reduce the frequency, cost, and morbidity associated with SSI. This wet immersion technology is a novel method for deposition antimicrobial silver nanoparticles to the surface of a Soaker catheter used to deliver continuous incisional pain management. Nanoparticles serve as an ideal reservoir for sustained release of sufficient silver to prevent biofilm formation. This technology platform has been successfully commercialized in the ON-Q® PainBuster regional anesthesia delivery device.

ETP065

RADIOFREQUENCY ASSISTED LAPAROSCOPIC LIVER RESECTION: INITIAL EXPERIENCE WITH THE LAPAROSCOPIC HABIB DEVICE, Alejandro Mejia MD, Stephen Cheng MD, THE LIVER INSTITUTE - METHODIST DALLAS

INTRODUCTION: The laparoscopic approach for resection of liver tumors is a technique in evolution. A limiting factor for wider applicability of the procedure has been the lack of efficient tools for parenchymal transection. The Habib device has offered new options in open resections and a newly released laparoscopic variation of the instrument has been tested at our center. **METHODS:** Five patients underwent a hand-assisted laparoscopic liver resection using the laparoscopic Habib device.

RESULTS

Patient #/AGE	Lesion/Location	EBL(cc)/OR time	LOS (days)
1/ 64	Hemangioma/Rt l	500 / 342 min	4
2/ 48	FNH/Left lobe	200 / 381 min	4
3/ 47	FNH/Left lobe	250 / 248 min	2
4/ 52	FNH/Rt Lobe	600 / 432 min	3
5/ 37	Abscess/R lobe	200 / 411 min	3

CONCLUSION: The new laparoscopic Habib device offers a promising alternative for a safe parenchymal transection during laparoscopic liver resection cases. In our preliminary limited experience, the best results with the device are obtained when used in combination with a saline-enhanced electrocautery and endo-stapling techniques. Larger series may be warranted to maximize the safety of the laparoscopic approach for liver lesions.

ETP066

TEMPORARY STENT PLACEMENT AFTER COLORECTAL ANASTOMOSIS USING POLYFLEX SYSTEM: AN ANIMAL MODEL, Zurab Tsereteli MD, Tim M Geiger MD, Christopher Edwards MD, Sharon Backman MD, Nitin Rangnekar MD, Brent Miedema MD, Klaus Thaler MD, University of Missouri-Columbia, Columbia, MO, Department of General Surgery

Background: The anastomotic leak rate after colorectal surgery continues to be clinically relevant. It goes further up with chemoradiation, low anterior resection and surgery for colorectal emergencies. Creation of a protective stoma requires a two-stage procedure with its intrinsic morbidity and increased costs. A temporary stent could protect anastomosis and eliminate the need for diverting stoma.

Objective: Test the feasibility and efficacy of temporary self-expanding covered stent to protect healing of a colorectal

anastomosis in an animal (porcine) survival model.

Methods: 12 adult pigs (80-120lbs) were used for this study. Under general anesthesia, all animals underwent an open transection of the rectum 15-20cm above the anal verge followed by reanastomosis with a 21mm circular stapler. Each animal then underwent endoscopic or fluoroscopic placement of a 21mm Polyflex self-expandable covered plastic stent with 25mm proximal flare and 12cm length. Stent placement was standardized with equal distance on both sides of the anastomosis. In the first 4 animals (Group A) anastomosis was left intact, but two of the stents were secured with 3 chromic sutures at the proximal end; in Group B (8 pigs), 1-2cm leak was created along the anterior portion of the anastomosis, and all stents were secured with 3 non-absorbable sutures. The animals were sacrificed after 2 weeks.

Results: In Group A, two pigs w/o suture fixation expelled stents on POD1 and the other 2 with chromic sutures sometime between POD3-14. All anastomotic sites were well healed. In Group B, one pig with 1cm leak was sacrificed on POD8 due to wound dehiscence; the stent was still in place and no clinical signs of leakage. Another pig with 2cm leak was sacrificed on POD7 because of bladder necrosis of unknown etiology; the stent was in place with remaining anastomotic defect <5mm. All other pigs from Group B expelled their stents between POD6 and 9. At necropsy, all anastomoses were healed clinically and none of the animals had signs of intrabdominal infection or fistula formation.

Conclusion: Preliminary data suggest that placement of a removable endoluminal covered stent across colorectal anastomosis is technically feasible and can be very efficient to protect anastomosis if stays in place until completion of the healing phase. Migration is most likely due to forceful physiologic peristalsis in this region. Further investigation needs to focus on improvement in fixation and stent design.

ETP067

PRELIMINARY RESULTS UTILIZING A BIOABSORBABLE OMEGA-3 FATTY ACID COATED LIGHTWEIGHT POLYPROPYLENE MESH FOR OPEN AND LAPAROSCOPIC VENTRAL AND INGUINAL HERNIA REPAIR, Richard A Pierce

MD, Margaret M Frisella RN, Laura M Todt BS, Brent D Matthews MD, Washington University School of Medicine and Institute for Minimally Invasive Surgery, Saint Louis, Missouri, USA

Introduction: The purpose of this preclinical market outcomes study is to evaluate an FDA-approved, bioabsorbable omega-3 fatty acid coated lightweight polypropylene mesh (C-QUR, Atrium Medical Corp., Hudson, NH) for open and laparoscopic ventral and inguinal hernia repair. This novel, bioabsorbable adhesion barrier remains intact for more than 90 days, eventually undergoing hydrolysis in vivo, with conversion to naturally occurring components and resulting in absorption by local tissues and consumption via normal lipid metabolism.

Methods: The records for patients undergoing laparoscopic or open ventral or inguinal hernia repair with C-QUR mesh from May 2006 through December 2006 were evaluated. The type of hernia, technique for repair and short-term follow-up (4 - 8 weeks) were recorded. All handling and implantation characteristics were rated by the participating surgeons.

Results: Preliminary results from this multi-institutional study are based on 129 patients with 122 ventral/incisional hernias and 7 inguinal hernias. Twenty-six (20.2%) patients were treated for recurrent hernias. Laparoscopic hernia repair was performed in 88 patients and open hernia repair in 41 patients. Ninety-two (71.3%) patients have completed an 8 week follow-up visit. Seromas developed in 24 (26.1%) patients, hematomas in 2 (2.2%) patients, and wound infections in 8 (8.7%) patients. Six (6.5%) patients were still requiring treatment for postoperative pain. There were no recurrences. Surgeons rated the mesh to meet or exceed expectations when compared to commercially available meshes in regard to rolling the mesh and passing it through a trocar, unraveling the mesh after laparoscopic intra-abdominal placement, enhanced visibility through the mesh



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while positioning/fixating, and manipulation and/or conformation to position in 99%, 93%, 98%, and 96% of cases, respectively. The textured side was distinguishable from the smooth side during positioning in 94% of cases.

Conclusion: Preliminary results demonstrate this novel, bioabsorbable adhesion barrier coated lightweight polypropylene mesh is safe and effective in short-term follow-up with favorable handling and implantation characteristics compared to other currently marketed meshes in this clinical market evaluation.

ETP068

TWIN INPUT INSUFFLATOR, Krishna A Agarwal, Brij B Agarwal MS, Nayan Agarwal, Sneha Agarwal MS, Krishan C Mahajan MS, Sir Ganga Ram Hospital, Lady Harding Medical College & DPS-RKPuram, India

BACKGROUND - We do not use energy sources as a mandatory routine in laparoscopic surgery. We keep them as "stand by" for control of bleeding. Peritoneal insufflation is synonymous with capno-peritoneum. Carbon di-oxide is used for its anti-combustion property.

TECHNOLOGY DESIGN - We do not use energy sources routinely but keep them ready for any need. We would like to study the feasibility of using air or nitrous oxide in place of carbon dioxide. We propose to have an insufflator that can handle two gases simultaneously at the input level. The output option should be available to the surgeon. He should be able to switch between two gases. This can be achieved with a Y-attachment at the input. The two open stems of "Y" can take in one gas each i.e. air/nitrous oxide and carbon dioxide. The stem of "Y" can feed the output. The output can have a lever-switch to enable the flow of either gas, one at a time. This will allow the surgeon to operate under nitro/aero-peritoneum as long as he is not using energy sources like electrosurgery. If the surgeon needs to use the energy source he can shift to capno-peritoneum by moving the lever-switch to put on the required gas. The twin input insufflator should have a lit indicator to show the gas being supplied at the output and being used. The indicator lights should follow the colour codes of the gases. It will add to its advantage if the outflow control switch is in the sterile zone and operable by the operating surgeon. This machine will help the surgeon avoid or limit the insult from capno-peritoneum and its related physiological disturbances.

FUTURE DIRECTION / CONCLUSION - Development of a dual input insufflator with a selective output will help in avoiding the harmful effects capno-peritoneum.

ETP069

TRANSGASTRIC ENDOSCOPIC DIAGNOSTIC PERITONEOSCOPY IN HUMANS, Jeffrey W Hazey MD, Scott Melvin MD, Vimal K Narula MD, Peter Muscarella MD, Christopher Ellison MD, The Ohio State University

Objective: Natural Orifice Translumenal Endoscopic Surgery (NOTES) has been proposed as a possible advancement for surgical interventions. We initiated a pilot study in humans to investigate the feasibility and develop the techniques and technology necessary for this type of surgery. Reported herein, is the first human clinical trial of NOTES, performing diagnostic peritoneoscopy via the transgastric route.

Methods: Patients participating in this IRB approved human trial were scheduled to undergo diagnostic laparoscopy for evaluation of presumed pancreatic cancer. The findings of traditional laparoscopy were compared to that of transgastric endoscopic peritoneoscopy after diagnostic evaluation of the abdomen was performed by a second surgeon, blinded to the previous findings, using an orally placed gastroscope. Diagnostic findings, operative times and clinical course were recorded. Definitive care was rendered based on the findings of standard laparoscopy.

Results: Ten patients have completed the protocol with an average age of 67.6 years. All patients underwent diagnostic laparoscopy followed by successful transgastric access and diagnostic peritoneoscopy. The average time of diagnostic laparoscopy was 12.3 minutes compared to 24.8 for the transgastric route. Transgastric abdominal exploration corroborated traditional laparoscopic intra abdominal findings

in 9 of 10 patients. Peritoneal or liver biopsies were obtained in 4 patients by traditional, and in 1 patient by transgastric access routes. Nine patients underwent pancreaticoduodenectomy and one underwent palliative gastrojejunostomy.

Conclusions: This study demonstrates the feasibility of a transgastric approach to diagnostic peritoneoscopy. Technical issues, including visualization, intraabdominal manipulation and gastric closure need further development. Advances in instrumentation and experience are necessary before recommending NOTES for routine human therapeutic interventions.

ETP070

GUIDELINE FOR CHOLECYSTECTOMY BY NOTES, Kiyoshi Hashiba PhD, Sergio Roll PhD, Marco A D'Assuncao MD, Pablo R Siqueira MD, Hospital Sirio Libanes, Gastrointestinal Endoscopy Unit, Sao Paulo, Brazil

Objective: the study was conducted in experimental sessions to find a way to perform a successful and totally endoscopic transgastric cholecystectomy by NOTES technique.

Description of the technology and method of its use or application: nine experimental sessions were conducted using different places and different techniques to perform the stomach perforation, its closure, and the cholecystectomy complemented by gallbladder removal through the stomach. The hot biopsy forceps and the probe for cystostomy were used for the gallbladder and the cystic duct dissection. One Maryland forceps was placed in the right upper abdomen. A 0,035-wire guide and a dilation balloon to treat biliary ducts stenosis allow to obtain the cholangiography. The closing of the gastric wall was performed using endoscopic clips placed after the presentation made by a foreign body extraction endoscopic forceps and an end adapter for the endoscope. The conventional one working channel endoscope was used.

Preliminary results: after nine experimental sessions with pigs the results allow us to bring up some viewpoints and suggestions. The preferential point in the stomach to gain access to the peritoneal cavity, to perform the procedure was the anterior wall of the gastric antrum. It allowed making the operation with a not-inverse image and always placing the endoscope distal end just near the gallbladder. The endoscopic accessories used allow performing the management of the organ, but they have to be improved or new instruments must be created, like aspirator and devices to grab the stones. A bag to keep the organ and an extractor will be fundamental in most cases. It is possible to close the gastrotomy with clips, but the placement of the devices is not easy when the perforation is in the gastric distal part. A local previous suture was desirable in this situation. Despite the visual absence of air or secretion from the stomach to the abdominal cavity, a local fence around the endoscope was planned.

Conclusions/Future directions: The transgastric endoscopic surgery is a new and involving approach that will require the cooperation of endoscopists and surgeons. The NOTES cholecystectomy is feasible with few desirable devices. The procedure would not lose the endoscopic characteristics and advantages due to the placement of only one transabdominal forceps.

ETP071

ANALYSIS OF PARAMEDIAN ABDOMINAL WALL DEFECTS FOLLOWING INTENTIONAL ACCESS CANNULA MANIPULATION IN SWINE, Rich Schiretz MS, Steve Izzo BS, Greg Okoniewski BS, Russell Heinrich PhD, United States Surgical,

Introduction/Objective: After laparoscopic surgery, the size of the body wall defect left by trocars is thought to be positively correlated to herniation rate and is often used clinically to determine whether fascial closure is necessary. The rationale for analyzing size and character of the body wall defects was to develop a method of reliably quantifying the abdominal fascial sheath defect left by (1) the trocar - size, shape, bladed vs bladeless and (2) manipulation of the indwelling cannula.

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Materials and Methods: Various bladed and bladeless 12mm and 15mm trocars with ribbed cannulas were inserted using direct visualization in designated subcostal regions along the insufflated abdominal wall of female swine. Dilating tips were removed and cannulas were manipulated over a 3 hour period. Desufflation was then performed under anaesthesia. Cannulas were removed. Abdominal wall tissue preparation included euthanization, tissue excision with unhindered normal contraction, and preservation in formalin under no tension. Both anterior and posterior fascial defects were carefully exposed. Digital images were taken of the exposed defect sites and analyzed further using AxioVision LE 4.2 software for quantification of defect cross sectional area.

Results: Amongst device groups, preliminary data suggest no significant difference in anterior rectus sheath defects

(ANOVA ($P>0.05$). Differences between 12mm Excel clocking versus 12mm Excel no clocking and 15mm Prototype Radial Dilating Cannulas (PRDC) are noted in the posterior transverse sheath defects. (ANOVA ($P<0.05$).

Conclusion/Future Direction: This study demonstrates that tissue harvesting, sectioning and digital imaging are promising methods for measuring abdominal defect size. Preliminary data show that 15mm PRDC create similar (anterior) and significantly smaller (posterior) defects vs 12mm device(s). Future studies will involve similar evaluations including real time defect analysis, chronic defect healing, and histopathological studies to better understand the clinical need for fascial closure and differentiating defects related to various trocar dilating tip and cannula designs.

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