



LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING (LAGB):

PREOPERATIVE BMI AFFECTS THE RESULTS, Maria V Gorodner MD, Carlos A Galvani MD, Federico Moser MD, Santiago Horgan MD, University of Illinois at Chicago
Background: selection of the optimal bariatric procedure for each patient remains controversial. Treatment of superobese patients is in fact challenging. BMI > 50 kg/m² has been proposed as a predictor of bad outcomes after LAGB. Our goal is to assess the effect on preoperative BMI on the outcomes after LAGB.

Methods and Procedures: Between March 2001 and June 2005, 539 patients underwent LAGB at our institution. Patients were divided in groups according to their preoperative BMI. A: 33-39; B: 40-49; C: 50-59; D: 60-69; E: >70. Percentage excess weight loss (%EWL) was evaluated.
Results: 443 (82%) were female. The average age was 41±10 years.

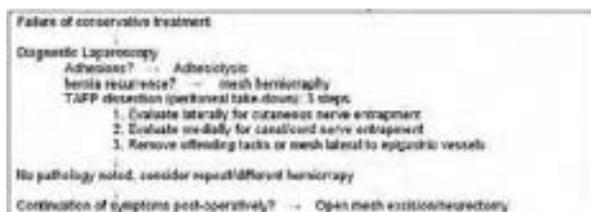
	A	B	C	D	E
# of patients	96	271	138	29	6
% EWL					
• 12 months	40±10	41±13	33±17	33±12	13±7
• 18 months	40±11	37±12	39±14	41±11	8
• 24 months	55±32	40±11	34±16	44±13	-
• 36 months	64±23	31±19	34±18	22±25	-

At 12 months, statistically significant difference was found between group A and E (0.001). Although not statistically significant, an important trend was observed among the other groups, showing that the higher the BMI, the lower the %EWL. Conclusion: our preliminary results showed that at 1 year, the higher BMI seems to be a predictor of bad outcome, with a clear statistically significant difference between those patients with BMI ≤ 40 and those with BMI >math>70</math>. Long term follow up would be necessary to evaluate the weight loss among these different subgroups of patients.

POST-HERNIORRAPHY INGUINODYNIA: A TREATMENT ALGORITHM FEATURING DIAGNOSTIC LAPAROSCOPY, Sharon L Bachman MD, Mercedesh Baghai MD, Gregory J Mancini MD, Bruce J Ramshaw MD, Missouri Center for Advanced Techniques in Surgery, Department of Surgery, University of Missouri-Columbia

Objective: Inguinodynia remains a significant complication of all types of inguinal herniorraphy, and can be frustrating for both patient and surgeon. We present a treatment algorithm utilizing initial diagnostic laparoscopy (DL) for patients with inguinodynia.

Description: One surgeon's database of hernia repairs was reviewed. Patients identified with inguinodynia were selected and treatment and follow-up data were evaluated. The following algorithm was utilized:



Preliminary Results: 10 patients with inguinodynia had DL performed between 1/1/2003 and 7/31/2005. 4 had complete resolution of all pain, 5 had significant improvement of pain and required no narcotics and 1 had persistent pain without change. DL led to the identification of recurrent hernia in 1 (10%), mesh contraction or migration with possible nerve entrapment in 8 (80%), 2 patients (20%) had tacks causing neuralgia and one patient (10%) had developed a suture granuloma.

Conclusion: Mesh contraction and displacement is the most frequent finding during DL performed for persistent groin pain. DL improved or resolved pain in 90% patients with chronic inguinodynia, and is an effective first step in a treatment algorithm for this difficult problem.

INSULIN-GLUCOSE METABOLISM IS NOT AFFECTED BY ROUX-LIMB LENGTH Ih-Ping Huang MD, Nana Gletsu PhD, Scott A Lynch MD, Thomas R Ziegler MD, Leena Khaitan MD, C. Daniel Smith MD, Edward Lin DO, Department of Surgery, Division of GI and General Surgery, Emory University School of Medicine, Atlanta, Georgia

INTRODUCTION: We have previously demonstrated that improvements in insulin-glucose metabolism following roux-en-Y gastric bypass (RYGB) is associated with reduction in C-reactive protein (CRP) levels, an acute phase protein produced primarily by hepatocytes. This study prospectively seeks to determine if such improvements are associated with the length of the roux-limb, which has important implications in determining the optimal procedure for patients with insulin-resistant diabetes undergoing weight-loss surgery.

METHODS: Twenty-eight patients with morbid obesity were enrolled in this General Clinical Research Center study at baseline, 1 month post-op and 6-months post-op. Along with CRP measurements, parameters derived from frequently-sampled IV glucose tolerance test were insulin-secretion, insulin-resistance, and HOMA-index (hepatic insulin sensitivity). These patients either had a 150-cm roux-limb (n=8) or a 100-cm roux-limb (n=20). Differences were compared with the student t-test and reported as mean ± SEM.

RESULTS:

	0 month	1 month	6 months
HOMA (100cm)	3.42±0.67	1.60±0.25	0.95±0.14*
HOMA (150cm)	3.11±0.45	1.38±0.26	0.82±0.18*

* p<0.05

Although there were overall improvements, HOMA-index, insulin-secretion and insulin-resistance were virtually identical between patients with the 100-cm and 150-cm roux-limbs (p=NS) at every time point. Contrary to our hypothesis, patients with shorter roux-limbs manifested lower CRP levels than the longer roux-limb group at 6 months (0.24±0.03 vs. 0.80±0.18, p<0.04).

CONCLUSIONS: Insulin-glucose metabolism does not appear to be affected by the length of the roux-limb. Whether the roux-limb affects insulin-resistant diabetes at all remains to be determined. The lower CRP levels associated with shorter roux-limb lengths suggest that a gut-liver interaction exists following intestinal malabsorption procedures.

LONG TERM OBJECTIVE FOLLOW-UP AFTER LAPAROSCOPIC REPAIR OF LARGE TYPE II-III HIATAL HERNIAS: THE USE OF MESH ALLOWS LOWER RECURRENCE RATE, Giuseppe Portale MD, Giovanni Zaninotto MD, Mario Costantini MD, Emanuela Guirrolli MD, Loredana Nicoletti RN, Ermanno Ancona MD, Department of Medical and Surgical Sciences, Clinica Chirurgica III, Padova, Italy

Introduction: Laparoscopic repair of large paraesophageal or mixed (type II-III) hiatal hernias (HH) with prosthetic hiatal closure is now considered feasible and effective with similar results to open surgery. However, in most studies, the outcome analyses are based on symptomatic assessment and relatively short-term follow-up (F-up); concerns remain on possible high recurrence rates in the long-term F-up with objective tests. We retrospectively evaluated the outcomes of laparoscopic repair of large type II-III HH, with or without prosthetic hiatal closure, in the long-term F-up, by means of both symptomatic and radiologic or endoscopic evaluation.

Methods and procedures: From January 1995 to August 2005, 56 pts (10M:46F, mean age 63 yrs) with a diagnosis of large type II-III HH (>1/3 radiographic/intraoperative stomach in the chest) underwent laparoscopic repair at our Department. Principles of surgical technique included reduction of the hernia, complete excision of the sac, primary closure of the crura (with/without mesh reinforcement) and antireflux procedure. Laparoscopic fundoplication (Nissen or Toupet) with simple sutured crural closure was performed in 19 pts (group A); a double mesh was added in 37 pts (group B).

Results: There were 5 conversions to open surgery. The mean length of radiographic/endoscopic F-up was similar in the two groups [31 mos (±32) group A, 23 months (±26) group B, p=n.s.]. Recurrences occurred in 7/19 (37%) group A pts and in



3/37 (8%) group B (p=0.02). They were classified as ?early? (total disruption of the hiatal closure on POD 5, 1 pt), ?mid-term? (1-12 mos post-op, 3 pts) and ?late? (12-72 mos post-op, 6 pts). 4 of these pts underwent reoperation and 1 is scheduled for surgery. Additional 3 (5.4%) pts presented a small sliding hernia (<3 cm ?telescoping?) on post-op barium swallow and did not require reoperation (asymptomatic at 73 mos F-up). 1 group B pt had severe dysphagia on POD 2, due to both obstruction from the mesh and tight fundoplication: she underwent reoperation.

Conclusions: Laparoscopic repair of large type II-III hiatal hernia is a safe and effective treatment. Short-term symptomatic results are excellent, but long-term objective radiologic and/or endoscopic evaluation reveals a significant percentage of recurrence: the main reason for failure of hiatal repair is tension. The use of prosthetic mesh effectively reduce the incidence of postoperative hernia recurrence or wrap migration in the chest.

ROUTINE UPPER GI SERIES FOLLOWING GASTRIC BYPASS DOES NOT ACCURATELY IDENTIFY LEAKS OR PREDICT STRICTURES.

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INTRODUCTION: Most centers performing Roux-en-Y gastric bypass for morbid obesity obtain a routine upper GI series (UGI) in the early postoperative period to evaluate for anastomotic leaks and delayed pouch emptying. We hypothesized that routine UGI does not accurately identify leaks or predict strictures.

METHODS: From December, 1998 to April 2005, 569 gastric bypass procedures were performed at our center (60% laparoscopically). Routine UGI was obtained in 546 (96%) patients. We compared radiographic findings (leak or delayed emptying) with patient outcome (leak or stricture) to calculate the sensitivity and specificity of the study. Univariate modeling identified risk factors for anastomotic leak or stricture; the low number of events precluded multivariate modeling.

RESULTS: Of 546 routine UGI studies, anastomotic leaks were reported in 5 (0.9%); 2 of these were later interpreted as artifact. UGI failed to identify 3 leaks, yielding an overall sensitivity of 50% and PPV of 60%. In univariate analysis, only institutional experience was associated with anastomotic leak (odds-ratio (OR) 6.5 for the first 100 cases, p=0.02). Delayed emptying of contrast was observed in 109 (19%) studies, was more frequent in laparoscopic cases (26.8% vs. open 9.0%, p<0.01) and when a GIA stapler was used for the gastrojejunostomy (31.7% vs. EEA 13.6%, hand-sewn 18.9%; p=0.01). Only 10 (1.7%) patients developed strictures requiring dilatation. The PPV of delayed contrast emptying for eventual stricture formation was 6%. Risk factors for stricture formation included stapled anastomosis (OR 9.4, p<0.01), long Roux length (>100cm OR 5.4, p=0.03), antecolic Roux (OR 10.2, p=0.03), and delayed contrast emptying (OR 6.3; p<0.01).

CONCLUSIONS: Due to the overall low incidence of complications and low sensitivity/specificity, routine UGI does not accurately identify leaks or predict strictures after Roux-en-Y gastric bypass. A selective approach, reserved for patients with clinical evidence of leak or stricture, is more appropriate and cost-effective

NISSEN FUNDOPLICATION (NF) AS A SALVAGE PROCEDURE AFTER FAILURE OF MEDICAL MANAGEMENT FOR GASTROESOPHAGEAL REFLUX DISEASE (GERD): DETAILED ANALYSIS OF CLINICAL OUTCOMES OVER SEVEN YEARS,

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Surgical literature suggests that NF has inferior outcomes in patients with severe GERD who fail medical management. We report a single surgeon experience in a group of 123 patients

who underwent NF as a salvage procedure after failed symptom control with medical management. Patients undergoing NF between 1998 and 2004 were included in this retrospective analysis. Pre- and post-operative symptom scoring (SS) in 7 categories was carried out using a standard questionnaire. Patients were asked to quantitate their symptoms on a scale of 0 to 3 based on severity (0=none, 1=mild, 2=moderate, 3=severe). A total SS was calculated as the sum of scores in all symptom categories.

Demographic characteristics included a male:female ratio of 2:3, mean age of 49 years and a lengthy mean duration of symptoms of 80 months before NF. The group included patients with prior failed NF (16%), those on combined PPI and H2 blocker therapy (14%) and patients with Barrett's esophagus (8.7%), peptic stricture (6.5%) and hiatal hernia (56%). The most severe symptoms were in a sub-group of 72 patients (59%) with positive SS in 3 or more categories despite medical management. Forty-one patients underwent 24-hr pH testing with a mean DeMeester score of 56 (33%), 95 had an upper endoscopy (77%) and 88 had manometry (72%) prior to NF. NF was completed laparoscopically in 102/103 patients while 20 patients were treated open. The average hospital stay was 3.3 days in the laparoscopic group and 8.7 days in the open group. Forty one patients (33%) were discharged within 24 hours of the procedure. The mean duration of follow-up was 1 year. There were 12 minor complications and 1 death in the group (0.8%).

Whereas only 15% of patients were free of all symptoms after NF, there was a significant postoperative improvement in SS for heartburn (1.84 ± 1.08 vs. 0.63 ± 0.91, p<0.0001), regurgitation (0.89 ± 1.09 vs. 0.45 ± 0.88, p<0.0003), vomiting (0.77 ± 1.09 vs. 0.07 ± 0.28, p<0.0001), nocturnal cough (0.74 ± 1.08 vs. 0.45 ± 0.80, p<0.005) and chest pain (1.01 ± 1.22 vs. 0.59 ± 0.89, p<0.0012). Of the 72 patients with more than 3 positive symptoms before NF, the majority (60%) showed elimination or improvement of all preoperative symptoms and reduction in total SS (8.6 ± 2.5 vs. 3.8 ± 4.0, p<0.0001). Our results show that NF is an effective ?salvage procedure? in patients with severe GERD who fail medical management. It can be safely performed laparoscopically with minimal morbidity.

A COMPARISON BETWEEN 399 OPEN AND 568 LAPAROSCOPIC GASTRIC BYPASSES PERFORMED DURING A 4 YEAR PERIOD.

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Intro: Laparoscopic RYGB was introduced at our institution 4 years ago. We reviewed the short and long term results of the 2 procedures over the same time period.

Methods: Retrospective review of prospectively collected bariatric database.

Results: From 1/01 to 7/05, 568 laparoscopic gastric bypasses and 399 open gastric bypasses were performed. Hospital length of stay in the laparoscopic group was significantly shorter (2.5 ± 2.4 days) than in the open group (3.7 ± 3.7 days), p=0.001. Procedure time was significantly shorter in the laparoscopic group (164 ± 50 min.) versus the open group (195 ± 50 min.), p=0.0001. Follow up at 2 years was 76.6%. Two years excess weight loss (EWL) was significantly greater in the laparoscopic group (71.3 ± 18.4 %) versus the open group (67.3 ± 15.3 %), p=0.03. Wound infection rate was significantly higher in open group (9.2%) versus laparoscopic group (1.7%), p=0.001. There was no significant difference in 30-day mortality, open (0.50%) versus laparoscopic group (0.17%), p=0.371. There was no significant difference between 30-day reoperation rate in the open (2.4%) versus laparoscopic group (2.6%), p=0.705. Thirty day readmission rate was similar in the open (5.0%) versus laparoscopic group (5.2%), p=.852. The rate of leakage from the gastrojejunostomy was similar in the open (0.50%) versus laparoscopic group (0.35%), p=0.127. The conversion rate from laparoscopic procedure to laparotomy was 1.7%.

Conclusion: In our institution, a laparoscopic bariatric surgery program has been introduced with a very low rate of morbidity and mortality. Wound complications, operative time and hospital stay are reduced with the laparoscopic approach. The



procedures are equally safe with equivalent 30-day mortality, readmission, reoperation and gastrojejunostomy leakage rates. This large series demonstrates the advantages of the laparoscopic approach for the treatment of morbid obesity.

VENTRAL HERNIA REPAIR WITH SURGISIS GOLD. THREE YEARS EXPERIENCE, Valentine N Nfonam MD, Stacy Brethauer MD, Adrian Dan MD, Adheesh Sabnis MD, Alan Siperstein MD, Bipan Chand MD, Steven Rosenblatt MD, Cleveland Clinic Foundation, Cleveland, Ohio

INTRODUCTION: An ideal prosthetic material for difficult ventral hernia repair has not yet been developed. However, Surgisis Gold may be beneficial in hostile or non-ideal situations such as contaminated cases. Surgisis Gold is a four- or eight- ply acellular, bioactive prosthetic mesh that is derived from porcine small intestine submucosa. We review our experience with the use of Surgisis in ventral hernia repair and compare its effectiveness in clean and contaminated cases.

MATERIALS AND METHOD: Retrospective analysis of patients who underwent laparoscopic or open repair of ventral hernias with Surgisis mesh was performed. In the laparoscopic group, the mesh was secured with tacks and four transfixation sutures. In the open group, the mesh was sewn to the edges of the fascial defect. Patients were classified by wound: clean (Group A), clean contaminated (Group B) and contaminated (Group C). Patients presented with primary, incisional or recurrent hernias.

RESULTS: From October 2001 to March 2005, 34 patients underwent ventral hernia repair with Surgisis mesh. There were 16 females (52.9%) with an average age of 54 years (34-79). Fifteen patients (44.1%) were operated on for recurrent ventral hernia. Classification according to groups is as follows: Group A, 13 patients (38.2%), Group B, 13 patients (38.2%) and group C, 8 patients (23.5%). Sixteen patients (47.1%) underwent an open procedure and 18 (52.9%) had a laparoscopic repair. Post operative findings include seroma in 30 patients (88%) and recurrence in 4 patients (11.8%). All recurrences were in group C and all had an open hernia repair. One of the four patients had ongoing sepsis and had the mesh removed. The median follow up period was 16 months (3-36 months).

CONCLUSION: Surgisis mesh can be safely utilized in clean contaminated and contaminated cases. In contaminated cases, the recurrence rate was found to be 50%, yet this still offered a permanent repair in difficult, high risk cases.

REMOTE STEREOSCOPIC ROBOTIC TELESURGERY USING THE PUBLIC INTERNET, Eric J Hanly MD, Brian E Miller PhD, Barry C Herman MSc, Michael R Marohn DO, Timothy J Broderick MD, Samuel P Shih MD, Joseph Sterbis MD, Charles Doarn BA, Brett R Harnett BS, Christopher J Hasser PhD, Mark A Talamini MD, Ozanan Meireles MD, Gerry R Moses PhD, Ron Marchessault BA, Noah S Schenkman MD, Walter Reed Army Medical Center, Johns Hopkins University, University of Cincinnati, Intuitive Surgical, Telemedicine and Advanced Technology Research Center

INTRODUCTION: Providing surgeons the ability to mentor and perform procedures from remote locations will have a profound impact on the quality and type of care that rural patients receive in their towns and that soldiers receive on the battlefield. Remote telesurgery using monoscopic vision has been performed clinically with the Zeus surgical robot, but at a great financial cost (>\$1M). Because of its complexity, the daVinci Surgical System?an advanced surgical robot with stereoscopic vision?has never been used for remote surgical applications.

METHODS: The daVinci Surgical System was modified to enable network communication between multiple Surgeon?s consoles and a single patient-side cart (the robot). Two low latency video CODECs were used at each site to enable stereoscopic video streaming. Unlike previous telesurgery models, Internet-based connectivity was used to establish a cost-effective solution applicable to a wide variety of clinical settings (cost to lease for 6 months the telecommunications equipment and bandwidth used in this study is <\$100K). The utility of the system to facilitate remote collaborative stereoscopic

telesurgery was evaluated through a combination of dry lab exercises and animal lab surgery.

RESULTS: Surgeons located in Cincinnati, Ohio, and in Denver, Colorado, successfully operated with residents in Sunnyvale, California (approximate distances of 2,400 and 1,300 miles, respectively) to perform nephrectomies in six Californian swine. The modified daVinci system was capable of shared control between the remote surgeon and the local resident. Remote surgical task performance data is presented in detail. Round-trip latency was high (~550-980 ms), but remote surgeons quickly adapted and performed telesurgical nephrectomies in the pigs without complication.

CONCLUSIONS: This low-cost, proof-of-concept study represents a number of surgical and telemedicine milestones including the first U.S.-based telesurgery, the first telesurgery using the daVinci Surgical System, the first use of stereoscopic (3D) surgical video streaming, the first robotic collaborative telesurgery (two consoles), and the first telesurgery over the Internet using non-dedicated lines. In this configuration, the daVinci Surgical System offers a unique opportunity to develop a network of machines at various remote locations which may all be used to extend the reach of expert specialty surgeons.

A REVIEW OF LAPAROSCOPIC DONOR NEPHRECTOMY: 498 CASES, Edward H Chin MD, Michael Edye MD, Daniel M Herron MD, David Hazzan MD, Scott A Ames MD, Jonathan S Bromberg MD, Mount Sinai Medical Center, NY

Introduction: Several large series have been published on the feasibility of laparoscopic donor nephrectomy, focusing on short-term success and immediate complications.

Objective: to examine the results of laparoscopic donor nephrectomy, with medium-term and long-term donor followup.

Methods: We examined the results of two surgeons performing almost 500 lap donor nephrectomies (LDN) from 1996-present. Prospectively collected databases were reviewed for 498 patients that underwent LDN. Demographics, medical history, intraoperative events, and complications were noted. Patients were followed between 6 months and 9 years after surgery to assess for delayed complications, especially hypertension, renal insufficiency, incisional hernia, small bowel obstruction, and chronic pain.

Results: 55% were female, and 45% male. Mean age was 40. Left kidneys were procured in 85% of cases, and right kidneys in 15%. Intraoperative complication rate was 2.8%, most commonly bleeding. Mean blood loss was 198 mL. Graft survival was 98.2%, and acute tubular necrosis was seen in 2%. Warm ischemia time averaged 3.4 minutes, and operative time 3 hours. Conversion rate was 1.6%. Immediate postoperative complications were seen in 3.8%. Average length of stay was 2.5 days. Mean donor creatinine at two weeks was 1.56. Long-term complications were rare, and included three cases of small bowel obstruction, two cases of incisional or leg pain, one case of hypertension requiring medication, and one case of renal insufficiency.

Conclusions: LDN can be performed safely with acceptable immediate morbidity. Better data is necessary to assess long-term risks faced by LDN.

APPENDICITIS IN ELDERLY- A CHANGE IN THE LAPAROSCOPIC ERA, Charudutt Paranjape MD, Samir Dalia BA, James Pan BS, Ann Salvator MS, Mark Horattas MD, Akron General Med. Ctr., NE Ohio Universities College of Medicine (NEOUCOM)

Introduction— Appendicitis in elderly patients is associated with significant morbidity and mortality. Early and correct diagnosis along with minimal invasive surgery can lead to more favorable outcomes as compared with pre-laparoscopic era.

Methods— Retrospective review of 116 elderly patients (age > 60) from 1999-2004 is compared with our previously published studies from 1978- 1988 (N=96) and 1988-1998 (N=113) respectively.



Results— In our present series (1999-2004), more cases were done laparoscopically (n=68) than open (n=48). Perforated appendicitis had significantly more Length of Stay (LOS), more complications and longer Operating time as compared with non-perforated cases. The laparoscopic cases had significantly less LOS, fewer complications and comparable Operating time compared with open cases.

Compared with our previous studies from (1978- 1988) and (1988-1998), the present series (1999-2004) has patients presenting with fewer classical symptoms. CT scanning was more accurate in the present study and was more routinely used. Patients in the present series had more correct pre-operative diagnosis. Perforated appendicitis was encountered less frequently and was associated with fewer complications. The 4% mortality rate in the previous two series decreased to less than 1% in this series.

Conclusion— Minimally invasive surgery combined with increased use and accuracy of pre-operative CT scans have changed the clinical management of acute appendicitis in elderly patients leading to decreased length of stay ,decreased mortality and more favorable outcomes.

COMPARISON OF CONVENTIONAL LAPAROSCOPIC VERSES HAND ASSISTED ONCOLOGIC SEGMENTAL COLONIC RESECTION, Chad D Ringley MD, Victor P Bochkarev MD, Corrigan L McBride MD, Jon Thompson MD, Dmitry Oleynikov MD, University of Nebraska Medical Center

Laparoscopic assisted segmental colon resection has evolved to be a viable option in the treatment of colorectal cancer. This study evaluates the efficacy of the hand assisted technique (HALS) as compared to the totally laparoscopic technique (LAP) of segmental oncologic colon resection in regards to

lymph node harvest, operative times, intra operative blood loss, incisional length and length of hospital stay in an attempt to help delineate the role of each in the treatment of colorectal cancer.

The prospective databases of three advanced laparoscopic surgeons were analyzed to acquire data for this evaluation. Forty patients underwent elective oncologic segmental colon resection between June 2001 and July 2005 (22 HALS, 18 LAP). Main outcome measures included lymph node harvest, operative times, intra operative blood loss, incisional length and length of hospital stay. Statistical analysis was performed via the SPSS statistical program to ascertain any differences between the two groups.

A total of forty patients were evaluated in the study, 22 in the HALS group and 18 in the LAP group. The two groups were comparable with regards to patient demographics. The tumor margins were clear in all patients. HALS resection resulted in a statistically significant higher lymph node yield than the LAP group (HALS = 16 +/- 6.5; LAP = 9.4 +/- 5.3; p = 0.009) and significantly shorter operative times (HALS = 125.5 min +/- 33.5; LAP = 169.1 min +/- 59.1; p = 0.009). Both groups were comparable in regards to length of hospital stay and intra operative blood loss. However, the LAP group yielded a statistically significant smaller incision for specimen extraction (LAP = 5.9 cm +/- 0.8; HALS = 6.8 cm +/- 0.7; p = 0.007).

This evaluation suggest that hand assisted laparoscopic oncologic segmental colonic resection is associated with shorter operative times, higher lymph node harvest and equivalent hospital stays and intra operative blood loss as compared to the totally laparoscopic approach. The totally laparoscopic technique was completed with a smaller incision; however, this less than a centimeter reduction in incisional length has doubtful clinical significance.



S001

MAJOR SURGERY INDUCES PROTEOLYSIS OF IGFBP-3 IN TRANSGENIC MICE, AND IS ASSOCIATED WITH A RAPID INCREASE IN SERUM LEVELS OF MATRIX METALLOPROTEINASE-9 (MMP-9), Avraham Belizon MD, Irena Kirman MD, Emre Balik MD, Moshe Karten, Suvinit Jain BA, Patrick K Horst BA, Richard L Whelan MD, Columbia University Medical Center, New York NY USA

We have previously demonstrated a significant decrease in the plasma level of intact Insulin-like Growth Factor Binding Protein 3(IGFBP-3) following major open surgery in humans and have postulated that this decrease may have an important effect on postoperative tumor growth. In contrast, the vast majority of patients that undergo laparoscopic surgery do not demonstrate an intact IGFBP-3 decrease after surgery. Our goal was to create an animal model which would allow further study of the effect of surgical trauma on IGFBP-3. In addition, we set out to determine whether MMP-9, a known protease of IGFBP-3, is responsible for the degradation of IGFBP-3 observed after open surgery.

Methods: 30 mice were divided into three groups. Sham Laparotomy(SL), CO2 Pneumoperitoneum(PP), and Anesthesia Control(AC). All mice were hIGFBP-3 transgenics on a CD-1 background. 48 hours prior and 24 hours following the procedure blood was drawn retroorbitally. Intact IGFBP-3 levels were measured using a combination of western blot analysis and ELISA at each time point. Serum and intracellular levels (mononuclear cell lysates) of MMP-9 were measured at each time point using zymography.

Results: Plasma levels of intact IGFBP-3 were significantly lower post SL when compared to preop levels. A mean decrease of 76.6% was found after laparotomy(P<0.05). Zymography analysis demonstrated significantly higher MMP-9-related proteolytic activity post SL when compared to preoperative levels(78.5RU vs. 42.3RU P<0.05). In the PP and AC groups no significant change was found between the preoperative and postoperative levels of intact plasma IGFBP-3 or MMP-9. Mononuclear intracellular levels of MMP-9 were significantly lower post SL when compared to preop(3RU vs. 37RU). Post procedure intracellular levels of MMP-9 were not significantly decreased in the PP or AC groups.

Conclusion: Plasma levels of intact IGFBP-3 were found to be significantly decreased following SL. This decrease was not seen following PP. Depletion of intact IGFBP-3 following SL correlated with a rapid release of MMP-9 from mononuclear cells and an increase in circulating serum MMP-9 levels. This suggests that MMP-9 may play an important role in IGFBP-3 proteolysis post surgical trauma and that circulating mononuclear cells are an important source. This provides a reliable animal model in which to further study the mechanism of IGFBP3 proteolysis following surgical trauma and its effect on postoperative tumor growth.

S002

EXPRESSION OF PPAR-GAMMA AND ENPP1 IN GASTROINTESTINAL TISSUE FROM MORBIDLY OBESE PATIENTS, Scott Celenski MD, Ryan Kar BS, Brian Kluk BS, Sidney Fu PhD, Fred Brody, MBA, MD, The George Washington University Medical Center, Department of Surgery and Department of Biochemistry and Molecular Biology

INTRODUCTION: Peroxisome proliferator-activated receptor-gamma (PPAR-gamma) and ectonucleotide pyrophosphate phosphodiesterase (ENPP1) are two genes linked to obesity and insulin resistance. We sought to characterize the expression of these two genes in gastrointestinal tissue from morbidly obese patients, with and without diabetes, undergoing bariatric surgery.

METHODS AND PROCEDURES: Gastric, small bowel, and omental samples from 15 morbidly patients (6 diabetic) were snap frozen in liquid nitrogen. Total RNA was extracted from the tissue and subsequently reverse transcribed into cDNA for each sample. Specific primers for PPAR-gamma and ENPP1 were designed for real-time quantitative PCR (QPCR) analysis. QPCR was then performed on the cDNA samples to quantitate the expression of PPAR-gamma and ENPP1. The 18S ribosomal gene was used as an internal control to normalize the expression levels for each gene.

RESULTS: Expression of PPAR-gamma and ENPP1 were present in all tissues. There was no significant difference in the level of expression between the different tissue types. The relative level of expression of PPAR-gamma was inversely proportional to BMI using linear regression analysis with a p=0.03 and r2=0.56. Analysis of ENPP1 expression levels did not reveal a correlation with BMI. There was no difference in gene expression between obese patients with and without diabetes.

CONCLUSION: Expression of PPAR-gamma is inversely proportional to BMI in morbidly obese patients, while ENPP1 expression does not correlate with BMI. These results suggest that increasing BMI is associated with decreased expression of PPAR-gamma. This decreased expression may be related to dysfunctional adipocyte differentiation, maturation, and function. The lack of correlation with ENPP1 suggests that glucose metabolism may be more complex than lipid metabolism. A larger sample size may be needed to reveal a difference in these two cohorts and further characterize the pathways associated with obesity and diabetes.

S004

VALIDATION OF ESOPHAGEAL DOPPLER FOR NON-INVASIVE HEMODYNAMIC MONITORING DURING PNEUMOPERITONEUM, Allan Okrainec MD, Simon Bergman MD, Liane S Feldman MD, Sebastian Demyttenaere MD, Franco Carli MD, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal

Introduction: Commonly used perioperative measurements of hemodynamics, like Swan-Ganz catheters, are invasive and may not be reliable under pneumoperitoneum. The purpose of this study was to validate the use of esophageal doppler (ED) for noninvasive hemodynamic monitoring under pneumoperitoneum in an experimental pig model.

Methods: Eleven female pigs were submitted to two 30 min study periods: 1) Baseline: no interventions, 2) Pneumoperitoneum: 12 mmHg CO2 pneumoperitoneum. One pig was excluded due to tachycardia >140 at baseline. A Swan-Ganz pulmonary artery catheter was used to measure cardiac output (CO-SG), CVP (CVP-SG), and pulmonary capillary wedge pressure (PCWP). An ED was inserted and stroke volume (SV-ED), cardiac output (CO-ED), and corrected flow time (FTc), an index of preload, were recorded. Transthoracic echocardiography was used to measure left ventricular end-diastolic diameter (LVEDD) and cardiac output (CO-TTE). Pearson correlation was used to assess individual associations between measured hemodynamic parameters.

Results: There was good correlation between CO-ED and CO-SG (R=.529, p=.000). There was excellent correlation between CO-ED and CO-TTE (R=.815, p=.000). SV-ED correlated well with SV-SG (R=.508, p=.002) and SV-TTE (R=.732, p=.000). These relationships were consistent when analyzed separately at baseline and under pneumoperitoneum (data not shown). There was no correlation between FTc and LVEDD or PCWP.

Conclusion: Esophageal doppler monitoring is a valid non-invasive method to measure cardiac output and stroke volume at baseline and during pneumoperitoneum in a porcine model. Corrected flow time did not correlate with other estimates of preload at baseline or during pneumoperitoneum.

S005

PROSPECTIVE HISTOLOGICAL EVALUATION OF INTRA-ABDOMINAL PROSTHETICS FOUR MONTHS AFTER IMPLANTATION IN A RABBIT MODEL, Andrew G Harrell MD, Yuri W Novitsky MD, Joey A Cristiano BS, Abby Connoy-Beltz PhD, H. James Norton PhD, Kent W Kercher MD, B. Todd Heniford MD, Carolinas Medical Center

Background: Intraperitoneal prosthetics are required for laparoscopic ventral hernia repair. The biocompatibility of these materials may affect the inflammatory response, scar plate formation, or tissue ingrowth. We evaluated the host response to intraperitoneal placement of several prosthetics used in clinical practice.

Materials and methods: A 4 x 4 cm piece of mesh was implanted on intact peritoneum in New Zealand white rabbits. The mesh types included: ePTFE (DualMesh®), ePTFE and polypropylene (Composix®, heavy weight polypropylene), polypropylene and oxidized regenerated cellulose (Proceed®,



mid-weight polypropylene), and polypropylene (Marlex®, heavy weight polypropylene). At 4 months, standard H&E and Masson's trichrome stains of the mesh-tissue interaction were analyzed by three observers blinded to the mesh types. Each specimen was evaluated for scar plate formation, inflammatory response, and tissue ingrowth. Each category was graded on a standard scale of 1 to 4 (1=severe inflammatory response and 4=normal tissue). The scores were analyzed with Wilcoxon Rank Sum test with p<0.05 significant.

Results: Ten samples of each mesh type were evaluated. There was no difference in tissue incorporation between the groups. The mean scar plate formation was greater in the heavy weight polypropylene meshes than for DualMesh, p = 0.04. Proceed had less scarring compared to Composix or Marlex that approached significance. The mean number of macrophages was greatest around the ePTFE when compared to mid-weight polypropylene, p=0.02. The heavy weight polypropylene meshes were intermediate.

Conclusions: These prosthetic materials demonstrate comparable host biocompatibility as evidenced by the tissue ingrowth. Statistically less scarring formed around DualMesh than the heavy weight polypropylene meshes. Interestingly, a larger number of macrophages were also seen around the DualMesh. Proceed, a reduced polypropylene content mesh, may have benefits over the heavy weight polypropylene Composix or Marlex. These favorable histologic properties have the potential for improved patient tolerance.

S006

REDUCING THE OXIDATIVE STRESS FOLLOWING PNEUMOPERITONEUM (PP), BY USING INTERMITTENT SEQUENTIAL PNEUMATIC COMPRESSION (ISPC) LEG SLEEVES, A

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Background: Increased intra-peritoneal pressure during laparoscopic operations may lead to decreased cardiac output (CO) and visceral perfusion, and possible ischemia-reperfusion effects. Using ISPC device was shown to improve CO and visceral perfusion during PP.

Aim: To validate ischemia-reperfusion mechanism during laparoscopic cholecystectomy, and to assess the reduction of oxidative stress by ISPC device. Patients and methods: Twenty patients undergoing elective laparoscopic cholecystectomy were enrolled in a randomized prospective controlled study and divided into two groups: 1. Study group (10 patients), activation of ISPC together with creation of PP. 2. Control group, without ISPC. Lipid peroxidation and glutathione levels (as indicators of oxidative stress) as well as liver and renal function tests, were measured before and at the end of PP, and at 30 minutes, 4 and 24 hours afterwards, together with hemodynamic and respiratory parameters.

Results: There was no significant difference between both groups concerning liver enzymes and bilirubin, as well as hemodynamic parameters. In the control group, increased lipid peroxides levels were noted 4 hours after PP termination, in comparison to pre-PP levels (560.4 to 649.2 mmol/liter, p=0.002). In the study group (ISPC) such changes were not inspected. Reciprocal decreased glutathione levels were noted in the control group.

Conclusions: Our study validates the ischemia-reperfusion mechanism following laparoscopic surgery. The use of ISPC device decreases the oxidative stress (secondary to relative ischemia-reperfusion insult) following PP, due to improved CO and visceral perfusion.

S007

LAPAROSCOPIC VERTICAL SLEEVE GASTRECTOMY FOR MORBID OBESITY IN 216 PATIENTS: REPORT OF TWO-YEAR RESULTS,

Crystone M Lee MD, John J Feng MD, Paul T Cirangle MD, Gregg H Jossart MD, Department of Surgery, California Pacific Medical Center, San Francisco, CA.

INTRODUCTION: The vertical gastrectomy (VG) is the restrictive part of the technically difficult biliopancreatic diversion with duodenal switch operation (DS). The VG was originally conceived of as an independent operation - the first stage of a

two-stage DS that would reduce mortality and morbidity in the high-risk superobese because of a shorter OR time and no anastomoses. This abstract presents the first two-year data after VG.

METHODS: Laparoscopic VG was performed in a non-randomized fashion in obese patients that met the NIH criteria for bariatric surgery. By using 5-7 firings of 45-60mm linear 3.5mm GI staplers along a 32 Fr bougie, a greater curvature gastrectomy is performed to create a 100-120 ml gastric tube.

RESULTS: Between Nov 2002 and Aug 2005, 216 patients underwent VG. The mean age was 44.7 years (range 16-64) and 173 (80%) were female. The mean prep weight and BMI was 302±77 lbs and 49±11 kg/m2, respectively. Of the 216 patients, 5 (2.3%) had a BMI >80 kg/m2, 6 (2.8%) had a BMI of 70-80 kg/m2, and 25 (11.6%) had a BMI of 60-70 kg/m2. The mean OR time was 66±11mins (range 45-180), the mean EBL was 29±13 cc, and the mean length of stay was 1.9±1.2 days. Complications occurred in 20 (6.3%) of patients (vs. 7.1% after lap band). Leaks occurred in 3 (1.4%) of patients, reoperations were performed in 26 (7.8%), and no conversions to open or deaths occurred. Weight loss on par with the DS and RGB was achieved with just the VG alone (see table). A weight loss plateau (<10lbs lost/6mos) was found in only 9 (4.2%) of patients.

	0 Mos	12 Mos	24 Mos
Weight (lbs)	302	242	179
BMI (kg/m2)	49.2	36.8	27.7
Wt Loss (lbs)	0	60	123
EWL (%)	0	58.5	83.1

CONCLUSIONS: The VG operation is able to achieve significant weight loss on with morbidity comparable to that of lap band placement. These two-year data suggest that very few patients require a second-stage operation for weight loss plateau. Further studies are needed to determine if these promising results are borne out with time.

S008

LAPAROSCOPIC GASTRIC ELECTRICAL STIMULATION FOR GASTROPARESIS,

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Introduction: Currently, the pathophysiologic mechanisms of gastroparesis are poorly understood. This study characterizes a cohort of diabetic and idiopathic gastroparetic patients before and after implantation of a gastric electrical stimulation (GES) for gastroparesis.

Methods: Twenty-three gastroparetic patients (10 diabetic and 13 idiopathic) were implanted with the GES device.

Gastroparesis was assessed using pre- and post-operative esophageal manometry, 48 hour Bravo, and 4 hour gastric emptying test (GET) studies. Frequency and severity of gastrointestinal (GI) symptoms were evaluated using the GI Symptoms Score and were measured pre- and post-operatively at 6 months.

Following laparoscopic implantation, mean severity scores were reduced significantly at 6-months-post op (t-value 2.365; 95% confidence; alpha< 0.05; 7 df; 0.02<P<0.05). A similar decrease in mean frequency scores was found also (t-value 2.365; 95% confidence; alpha< 0.05; 7 df; 0.02<P<0.05). Pre-operatively all patients showed an abnormal GET. Mean pre-operative GET at 2 and 4hrs were 65% (± 4 % SEM) and 34% (± 5% SEM), respectively. Post-operative GET at 2 and 4 hrs were 45 % (± 3 % SEM) and 13% (± 3 % SEM), respectively.

Although decreased, the post-operative values were not significant. Pre-operatively, abnormal esophageal manometric findings were present in 50% of patients. Post-operatively, esophageal function improved in the majority of patients. Pre-operative Bravo studies documented GERD in 57% of the patients based on DeMeester scores and % time <pH4. Pre-operatively, the mean DeMeester score measured 25.64 ± 6.45. Post-operatively, DeMeester scores and % time <pH4 were improved in 50% of the cohort. However, this decrease was not significant.



Conclusions: This limited, but unique, set of clinically relevant data describes the high degree of physiologic abnormalities apparent in idiopathic and diabetic gastroparetic patients. These findings may help unravel the complexities of this disease and further delineate the mechanisms of electrical stimulation for not only gastroparesis but obesity as well.

S009

THE RISE AND FALL OF ANTIREFLUX SURGERY IN THE UNITED STATES, Jonathan F Finks MD, Yongliang Wei MS, John D Birkmeyer MD, UNIVERSITY OF MICHIGAN

BACKGROUND: National rates of laparoscopic anti-reflux surgery grew steadily in the 1990s. Since then, a highly visible randomized trial has questioned the long-term effectiveness of anti-reflux surgery, several new endoscopic therapies have been developed, and proton pump inhibitors have become over-the-counter and less expensive. We examined the potential impact of these factors on surgical utilization rates.

METHODS: Using data from the Nationwide Inpatient Sample (NIS), we identified all patients over 18 years undergoing anti-reflux surgery between 1994 and 2003. The NIS is the largest all-payer inpatient care database in the United States, representing 20% of non-federal US hospitals. Sampling weights were used to estimate the total number of procedures performed in the US each year. Population-based rates were then determined using denominators from US census data.

RESULTS: Confirming the results of earlier studies, the annual number of anti-reflux procedures performed in the US grew rapidly during the 1990s, peaking at 32,907 (15.6/100,000) in 2000. After 2000, surgical rates declined steadily, falling approximately 27% by 2003 to 23,998 cases (11.2/100,000), [p<.0001]. Utility rates fell faster for people in the 30 to 50 age range than for those over 50. The large majority of anti-reflux surgery continues to be performed transabdominally, using laparoscopic techniques. Rates of mortality and splenectomy have remained stable and relatively low (0.5% and 0.9%, respectively, in 2003).

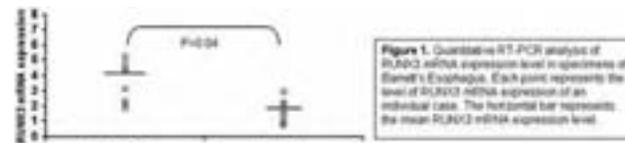
Conclusions: The use of anti-reflux surgery in the United States has declined substantially in the last several years. This shift in practice patterns may reflect new questions about the long-term effectiveness of surgery. These results suggest the need for prospective randomized clinical trials assessing current therapies.

S010

EFFECT OF LAPAROSCOPIC NISSEN FUNDOPLICATION ON RUNX3 GENE EXPRESSION IN BARRETT'S METAPLASIA, Alfonso Torquati MD, Anna Spagnoli MD, William O Richards MD, Vanderbilt University, Departments of Surgery and Pediatrics

RUNX3, a tumor-suppressor gene, is highly expressed in normal esophagus. We have previously demonstrated that SEG-1, a Barrett's adenocarcinoma cell line, lacks RUNX3. These findings suggest that RUNX3 plays a pivotal role in the progression from Barrett's esophagus to esophageal adenocarcinoma. The study tested the hypothesis that the inactivation of RUNX3 gene expression can be halted by antireflux surgery. **Material and methods:** Specimens of Barrett's metaplasia were obtained from 8 patients 2 years or more status post laparoscopic Nissen fundoplication and 10 patients (Control Group) on treatment with proton pump inhibitors (PPI). Quantitative reverse transcription-polymerase chain reaction (RT-PCR) was employed to measure RUNX3 mRNA expression in the Barrett's specimens. To minimize the errors arising from the variation in the amount of starting RNA among samples, amplification of beta-actin mRNA was performed as an internal reference against which RUNX3 mRNA was normalized. **Results:** RUNX3 mRNA was detected in all eighteen specimens of Barrett's metaplasia. However, significant quantitative differences were observed among the two groups as shown in Figure 1. Patients who underwent laparoscopic Nissen fundoplication had greater RUNX3 mRNA expression than patients treated with PPI. (4.1 ± 2.2 vs. 2.2 ± 1.2; P=0.04). **Conclusions:** Barrett's metaplasia specimens from patients status post antireflux surgery have higher level of RUNX3 gene than specimens from patient on PPI treatment. This finding suggests that antireflux surgery has the potential to halt RUNX3 inacti-

vation and ultimately to alter the malignant progression of Barrett's esophagus.



S011

NATURAL ORIFICE SURGERY WITH A WIRELESS ENDOLUMINAL MOBILE ROBOT, Mark E Rentschler MS, Jason Dumpert MS, Stephen R Platt PhD, Shane M Farritor PhD, Dmitry Olevnikov MD, Nebraska Medical Center

In vivo robotics has evolved to provide wireless endoluminal mobile robotic capability. Such an approach provides a distinct benefit compared to conventional laparoscopy where multiple entry incisions are required for tools and cameras. A miniature robot that is inserted through the mouth would then be able to enter the abdominal cavity through a gastrotomy thereby obviating the need for any skin incisions. In this study we developed an endoluminal robot capable transgastric exploration under esophagogastroduodenoscopic (EGD) control.

A miniature, wireless robot was developed and inserted into an 2 anesthetized pigs. The robot has a built in camera, wheels and biopsy capability. The robot measures 15mm by 75mm and is cylindrical. Under EGD control a gastrotomy was created and the miniature robot was deployed into the abdominal cavity under remote control. The robot was able to explore the porcine organs, perform a biopsy and was then retrieved.

The ability to explore the abdominal cavity through a natural orifice, allows the surgeon to perform procedures without an abdominal incision. The Miniature robot was able to provide an enhanced field of view of the abdominal cavity from multiple angles. The built in grasper was capable of obtaining a biopsy from a variety of abdominal organs. Ultimately, future procedures will include a family of robots working together inside the luminal and abdominal cavities after insertion through the esophagus. Such technology will help reduce patient trauma while providing surgical flexibility.

S012

EVALUATING AN OPTIMAL GASTRIC CLOSURE METHOD FOR TRANSGASTRIC SURGERY, Marvin Ryou MD, David W Rattner MD, William R Brugge MD, Reina Pai MD, Christopher C Thompson MD, Brigham & Women's Hospital, Boston, MA; Massachusetts General Hospital, Boston, MA

Introduction: We compared the effectiveness of various techniques for gastrotomy closure by assessing leak pressures in an ex vivo porcine stomach model.

Methods: Whole stomachs from adult white pigs were suspended in a plexiglass box to facilitate endoscopic technique. Standard gastrotomies were made by needle knife incision and dilation with an 18 mm CRE balloon. 5 stomachs were tested per arm (4 total). The first arm used standard QuickClips (Olympus); the second, a prototype device developed by LSI Solutions, which simultaneously makes an incision and places surrounding sutures; the third, hand-sewn (5 interrupted full-thickness sutures with 3-0 Prolene) by a senior surgeon; the final, a control with open gastrotomy. After closure, each stomach was inflated by an automated pressure gauge. The pressures to achieve air leakage (bubbles under water submersion) and liquid leakage (dye) were recorded.

Results: The unclosed controls demonstrated air leakage at a mean pressure of 15 mm Hg (95%CI: 14-16), representing baseline system resistance. The QuickClip closures leaked air at a mean pressure of 34.2 mm Hg (95%CI: 20.7-47.6). The prototype gastrotomy device yielded a mean air leak pressure of 98 mm Hg (95%CI: 23.9-172.0), while dramatically diminishing time for incision and hole closure to approximately 5 minutes. The hand-sewn closures leaked air at a mean pressure of 52.2 mm Hg (95%CI: 21.2-83.2). When comparing arms, all were statistically significant when compared to unclosed gastrotomies

(p-values 0.009 [clips]; 0.02 [sewn]; 0.018 [prototype]). The prototype compared to clips was also statistically significant (p-value 0.018). Liquid-leak pressures produced similar results to air.

Conclusions: The prototype gastrotomy device decreases procedure time and yields leak-resistant gastrotomy closures that are superior to clips and rival hand-sewn interrupted stitches.

S013

A RELIABLE METHOD FOR INTRA-ABDOMINAL PRESSURE MONITORING DURING NATURAL ORIFICE TRANSVISCERAL ENDOSCOPIC SURGERY (NOTES), Michael F McGee MD,

Michael J Rosen MD, Jeffrey Marks MD, Amitabh Chak MD, Raymond P Onders MD, Ashley Faulx MD, Anthony Ignagni, Steve Schomisch, Jeffrey Ponsky MD, Case Advanced Surgical Endoscopy Team, Case Western Reserve University, University Hospitals of Cleveland, Department of Surgery, Department of Gastroenterology, Cleveland, Ohio, USA

Background: Natural Orifice Transvisceral Endoscopic Surgery (NOTES) provides access to the peritoneal cavity to perform abdominal surgical procedures without skin incisions. NOTES requires pneumoperitoneum to visualize and manipulate abdominal organs, akin to laparoscopy. A reliable method to monitor pneumoperitoneum pressures during NOTES has not yet been identified. Accurate measurement of pneumoperitoneum is essential to avoid potentially deleterious effects of intra-abdominal compartment syndrome. This study evaluated several methods of monitoring intra-abdominal pressures with a standard gastroscope during NOTES.

Methods: Four female pigs (25kg) were sedated and a single channel gastroscope was passed trans-gastrically into the peritoneal cavity. Pneumoperitoneum was achieved via a pressure insufflator through a percutaneous, intraperitoneal 14-gauge catheter. Three other pressures were recorded via separate catheters. First, a 14-gauge percutaneous catheter passed intraperitoneally measured true intra-abdominal pressure. The second transducer was a 14-gauge tube attached to the endoscope used to measure endoscope tip pressure. The third pressure transducer was connected to the biopsy channel port of the endoscope. The abdomen was insufflated to a range (10-30 mmHg) of pressures, and simultaneous pressures were recorded from all pressure sensors.

Results: Pressure correlation curves were developed for all animals across all intraperitoneal pressures (mean error -4.25 to -1 mmHg). Endoscope tip pressures correlated with biopsy channel pressures ($R^2=0.99$). Biopsy channel and endoscope tip pressures fit a least-squares linear model to predict actual intra-abdominal pressure ($R=0.99$ for both). Both scope tip and biopsy channel port pressures were strongly correlative with true intra-abdominal pressures ($R^2 = 0.98$, $R^2=0.99$ respectively).

Conclusion: This study demonstrates that monitoring pressure through an endoscope is reliable and predictive of true intra-abdominal pressure. Gastroscope pressure monitoring is a useful adjunct to NOTES. Future NOTES procedures should incorporate continuous intra-abdominal pressure monitoring to avoid the potentially deleterious effects of pneumoperitoneum during NOTES. Future gastroscopes should integrate pressure monitoring abilities.

S014

COMPARISON OF INTRA-ABDOMINAL PRESSURES USING THE GASTROSCOPE AND LAPAROSCOPE IN TRANSGASTRIC SURGERY, Ozanan R Meireles MD, Samuel P Shih MD, Sergey V Kantsevov MD, Anthony N Kallou MD, Sanjay B Jagannath MD, Eric J Hanly MD, Donna M Beitler RN, Michael R Marohn DO, Johns Hopkins University

Introduction: Peroral transgastric endoscopic (PTE) approach for intra-abdominal procedures appears feasible, although multiple aspects of this approach need further development. Aim: To measure and compare intra-peritoneal pressure in a porcine model using the gastroscope and the laparoscope as insufflation sources.

Methods: All experiments were performed on 50-kg female pigs under general anesthesia. Standard upper endoscope was

advanced perorally through the gastric wall incision and peritoneal cavity was insufflated with operating room air. The intra-peritoneal pressure was measured by a standard laparoscopic insufflator manometer through the endoscope biopsy channel and through a 5mm trans-abdominal laparoscopic port. The source of insufflation was then switched to the standard laparoscopic insufflator, using CO₂ and intra-peritoneal pressures were measured again.

Results: Six acute experiments were performed. The pressure measurement showed good correlation regardless of measurement sites, independent of the type of gas used for insufflation; room air or CO₂. The hand-activated insufflation using the gastroscope revealed a wide variation of pressures (ranging from 4 to 32 mmHg) while the standard laparoscopic insufflator demonstrated minimal fluctuation (8 to 15 mmHg) around the predetermined value.

Conclusion: Use of a gastroscope as the single insufflation source revealed large amplitude of pressure variation that could potentially cause hemodynamic instability, compared with the well calibrated and controlled pressures generated by a standard laparoscopic insufflator. The PTE approach for intra-abdominal surgeries may promise a less invasive option, and although its underlying physiology needs further investigation, the already established insufflation from standard laparoscopy may minimize the risks of intra-abdominal hypertension in PTE.

S015

NATURAL ORIFICE TRANSVISCERAL ENDOSCOPIC SURGERY (NOTES) AS A DIAGNOSTIC TOOL IN THE INTENSIVE CARE UNIT (ICU), Raymond Onders MD, Jeffrey Marks MD, Michael Rosen MD, Michael McGee MD, Amitabh Chak MD, Ashley Faulx MD, Anthony Ignagni MS, Steve Schomisch BS, Jeffrey Ponsky MD, University Hospitals of Cleveland and CASE School of Medicine

Background: Autopsy studies confirm that many ICU patients die from unrecognized sources of abdominal sepsis or ischemia. CT scans can be of limited utility for these diagnoses and difficult to obtain in critically ill patients who require significant support for transport. Bedside laparoscopy has been described but still is cumbersome to perform. Bedside flexible endoscopy as a diagnostic tool or for placement of gastrostomy tubes is a standard ICU procedure. Natural orifice transvisceral endoscopic surgery (NOTES) can provide access to the peritoneal cavity as a bedside procedure and decrease the number of patients with unrecognized intra-abdominal catastrophic events.

Methods: Pigs were anesthetized and standard endoscopy was performed. Using a Seldinger technique a guidewire was placed into the gastric lumen at a standard site for a PEG and brought out through the mouth. The guidewire was maintained as an access point through the mouth, stomach, peritoneal cavity and skin throughout the procedure. Different methods of accessing the peritoneal cavity through the gastric wall were then attempted. The trans-gastric endoscope was used to explore all quadrants of the abdominal cavity. The small bowel was run to complete the exploration. The trans-gastric access location was then managed with the use of a gastrostomy tube. The animals were euthanized and analyzed. **Results:** Eight pigs were studied and complete abdominal exploration including diaphragm visualization was possible in all cases. Endoscopic guided biopsies were performed, adhesions lysed, and the gallbladder was successfully drained percutaneously. The small bowel was run successfully with percutaneous needlescopic suture graspers. A needle knife cautery along the guidewire and subsequent balloon dilation was determined to be the most consistent way to access the peritoneal cavity.

Conclusions: These animal studies support the concept that NOTES with management of the gastric opening with a gastrostomy tube may be another approach for finding unrecognized sources of abdominal sepsis or mesenteric ischemia in difficult ICU patients. These encouraging results warrant a prospective human trial to assess safety and efficacy.



S016

HYBRID MINIMALLY INVASIVE SURGERY - A BRIDGE BETWEEN LAPAROSCOPIC AND TRANSLUMENAL SURGERY, Samuel P Shih MD, Ozanan R Meireles MD, Sergey V Kantsevov MD, Eric J Hanly MD, Anthony N Kalloo MD, Sanjay B Jagannath MD, Donna M Beitler RN, Michael R Marohn DO, The Johns Hopkins University School of Medicine

Introduction: Peroral transluminal approach to the peritoneal cavity appears safe, feasible, and may further reduce the invasiveness of surgery. However, flexible endoscopes and current endoscopic devices have multiple limitations which include the lack of a stable platform, restrictions on retraction and spatial incongruity. These limitations inside the peritoneal cavity can potentially be overcome by blending the use of both a laparoscope and a flexible upper endoscope - a hybrid approach

Aim: To develop a hybrid minimally invasive technique for cholecystectomy in a porcine model.

Methods: Hybrid cholecystectomies were performed on 50kg pigs in acute experiments under general anesthesia. A modified PEG technique was used to access the peritoneal cavity through the anterior gastric wall. Upper endoscope was advanced into the peritoneal cavity to provide visualization for placement of a 10mm port. Further insufflation was maintained through this port. Visualization was augmented with a laparoscope. The cystic duct was identified, dissected, clipped and transected by the endoscope using a laparoscopic grasper for traction. The gallbladder was retracted into the stomach and the stomach closed with clips.

Results: Five hybrid cholecystectomies were performed without complications. The laparoscopic port enabled a stable pneumoperitoneum, improved spatial orientation and visualization, and provided good traction and counter-traction. Postmortem examination revealed secure clip placement.

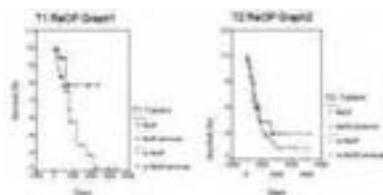
Conclusion: The hybrid approach facilitates peroral cholecystectomy and should be an initial step to the development of transgastric endoscopic procedures.

S017

INDICATION FOR AN IMMEDIATE REOPERATION AFTER A CHOLECYSTECTOMY FOR AN INCIDENTAL GALLBLADDER CARCINOMA., Paolucci Vittorio PhD, Goetze Thorsten MD, Ketteler- Krankenhaus Department of Surgery

Introduction: The immediate reoperation after a cholecystectomy for an incidental gallbladder carcinoma is discussed controversially. For a T1 tumor a cholecystectomy is enough. For T2 and more advanced stages a reoperation is permitted. The reoperation includes a resection of the liver and lymphnode exstirpation. In which T- stage such a reoperation should be undertaken is discussed controversially. Some authors recommend a reoperation in case of T1b- stage and improve the 5 year survival from 60 to 100%. Others recommend it only when the margins are positive or when the subserosal invasion is > 2mm. The question is, if T1 tumors profit from a reoperation or if this is only an additional lethality.

Material and method: To obtain data we use the CAES/CAMIC-register. Results: 417 cases of incidental gallbladder carcinomas a registered. In 64 patients with T1- tumor there was no reoperation. In 21 patients with T1- tumor there was a reoperation. Graph 1 shows survival according to Kaplan-Meier for T1- tumors. There is a prognostic advantage for T1- tumors with a reoperation. In 105 patients with T2- tumor there was no reoperation. In 75 patients with T2- tumor there was a reoperation. Graph 2 shows survival according to Kaplan-Meier graph for T2- tumors with a prognostic advantage for T2- tumors with reoperation. Graph 3/ 4 shows no better survival for T3/4- tumors after reoperation.



Discussion: There is a higher survival for T1 and T2- tumors after an immediate reoperation (log-rank <math>p < 0.05</math>) in our patients. For T3/4- tumors there seems to be no prognostic benefit according to the survival.

S018

LONG-TERM FOLLOW-UP OF ENDOSCOPIC STENTING IN PATIENTS WITH CHRONIC PANCREATITIS SECONDARY TO PANCREAS DIVISUM, Michael Vitale MD, Gary C Vitale MD, David S Vitale, John C Binford, Ben Hill, Center of Advanced Surgical Technologies, Department of Surgery, University of Louisville

Introduction: This study evaluated the efficacy of endoscopic stenting in patients with chronic pancreatitis due to pancreas divisum. Pancreas divisum is the most common congenital anatomic variant of pancreatic development and may lead to pancreatitis. Endoscopic stenting of the pancreatic duct through the minor papilla represents a nonsurgical treatment approach.

Methods and Procedures: Between 1995 and 2005, 32 patients with chronic pancreatitis due to pancreas divisum were treated with endoscopic stenting of the pancreatic duct through the minor papilla or combined major and minor papilla. Each patient underwent an endoscopic retrograde cholangiopancreatography to confirm the diagnosis of pancreas divisum prior to the endoscopic stenting.

Results: Twenty-four patients were followed up for an average period of 54 months. Eight patients were lost to long-term follow-up after successful endoscopic therapy and stent removal. 13 patients (55%) were treated with endostents without requiring surgery and 11 (45%) patients needed surgery after stenting. In the patients who improved after stenting, 10 (77%) decreased their pain level average 8.8 pre-stenting to 4.2 post-stenting on a scale of 1 to 10. 3 (23%) patients remained the same. Pain medication intake reported by patients and statewide narcotic electronic data found 8 (62%) patients with a decrease in pain medication intake, 3 (23%) unchanged and 2 (15%) with an increase in their pain medication intake. Nausea and vomiting improved in 10 (77%) patients after stenting with 3 (23%) patients reporting no improvement. Of the 13 patients, 11 (85%) are symptom free after a 5 year follow-up and 2 (15%) patients had recurrence after 24 months. 11 patients had surgery (pancreatectomy/Puestow/splanchnicectomy) an average of 25 months post-stenting. 10 (91%) of these patients had good results with no recurrence after a mean follow-up of 37 months. No mortality was reported in this study.

Conclusions: Endoscopic stenting of the pancreatic duct is a safe and effective first treatment for patients with pancreatitis secondary to pancreas divisum. Surgery, when performed for endoscopic stenting failure, is effective as an adjunctive treatment.

S019

LAPAROSCOPIC PYLORUS PRESERVING PANCREATODUODENAL RESECTION FOR PERIAMPULLARY MALIGNANCIES - AN OUTCOME OF 35 PATIENTS, Chinnuswamy Palanivelu MD, Senthilnathan P, Senthilkumar R, Parthasarathy R, Rajapandian S, Dept of Minimal Access Surgery and Surgical Gastroenterology, Gem Hospital, India

In this fast growing laparoscopic era more and more complex and challenging surgeries have been performed by laparoscopic method. The aim of this article is to emphasize the technical feasibility and safety of laparoscopic pylorus preserving pancreaticoduodenal (LPPD) resections. Patient is positioned in the semilithotomy reverse Trendelenburg position. The initial assessment, staging and resectability of the lesion are performed with laparoscopic ultrasound and Doppler. After Kocherisation, right gastroepiploic vein and artery are clipped, divided and the first part of duodenum is divided using endo GIA stapler, 1-2 cm distal to the pyloric. The CBD is divided 2 cm above the pancreatic border. Jejunum distal to the duodenojejunal flexure is divided using endo linear cutter. Neck of pancreas is divided using harmonic scalpel. All the lymphofatty tissue including the lymph nodes are dissected out skeletonising the vessels around the celiac plexus and IVC and are placed into an endobag which is removed through the extended umbilical port site. The camera port is extended and the



specimen is removed. The edges of the duodenum is trimmed freshly and end to side anastomosis is performed, 30-40cm distal to the divided end of the jejunum. After replacing the bowel inside the peritoneal cavity the wound is closed and camera trocar is reintroduced. Gastrointestinal continuity may be performed intracorporeally or by hand sewn technique. End of the CBD is trimmed and end to side choledochojejunostomy is performed with single layer interrupted 4-0 vicryl sutures. The pancreaticojejunal anastomosis is fashioned in an end to end fashion with polypropylene in single layer. We now prefer pancreatico gastric anastomosis in most of our patients. The total number of cases that we have performed is 35 (19 were male and 16 female). The age varied from 28 to 63 years. Mean age is 48.7years. The indications were ampullary growth (23), carcinoma head of pancreas (7) lower CBD growth (3) and duodenal carcinoma (2). Mean duration of surgery was 6.4 hours (400mts). The average blood loss was 395ml. The mean postoperative high dependency unit (HDU) stay was 3.2 days and the average hospital stay was 10.2days. All the patients had excellent recovery except for one who had prolonged gastric stasis. Then were 2 pancreatic leaks and one biliary leak in one. LPPD is technically feasible in a centre where advanced laparoscopic procedures are routinely performed.

S020

RESULTS OF LAPAROSCOPIC LIVER RESECTION. RETROSPECTIVE STUDY ABOUT 56 PATIENTS, Ibrahim Dagher PhD, H. Richa MD, A. Champault MD, J. Proske MD, A. Carloni MD, C. Smadja, D. Franco MD, Department of Surgery, Antoine Beclere Hospital, Paris, France

INTRODUCTION: Laparoscopic access is becoming an established technique for liver resection, but this advanced procedure is still limited to centers with considerable experience in both hepatic and laparoscopic surgery. Preliminary retrospective reports include essentially minor resections and show some advantage on postoperative recovery.

AIMS & METHODS: We report our experience in laparoscopic liver resection. From 1998 to 2005, 56 laparoscopic liver resections were performed. The liver parenchyma was normal in 26 patients and pathological in 30. 16 patients had cirrhosis. Tumors of 4.9 cm (ranging from 2 to 13) were located in all liver segments except segment I.

RESULTS: Liver resection was anatomical in 37 patients (>3 segments: 15 patients, 2 segments: 15, one segment: 7) and atypical in 19 patients. Operative time was 251+/- 113 minutes. Laparotomy was required in 4 patients (7%), 3 times for continuous diffuse bleeding and for anatomical difficulties in one patient. Significant gas embolism was observed and efficiently treated in one patient. Six patients (11%) were transfused. Operative complications (conversion to laparotomy, bleeding and transfusion) were significantly more frequent during atypical resections. Post operative complications occurred in five patients (9%): trocar site bleeding, cardiac failure, respiratory failure, one blood and one biliary collection. One patient died of a liver failure. The mean hospital stay was 5 days. No ascites and no transient liver failure occurred.

CONCLUSION: Laparoscopy is a feasible and safe access for liver resection. In our experience, operative difficulties are less common during anatomical resections including major hepatectomies. The postoperative morbidity rate is low and our results seem to be similar to laparotomy.

S021

LAPAROSCOPIC PANCREATIC RESECTION: A SINGLE INSTITUTION EXPERIENCE OF 31 CASES, David Hazzan MD, Edward H Chin MD, Daniel Labow MD, Michel Gagner MD, W-Barry Inabnet MD, L-Brian Katz MD, Demetrius Pertsemilidis MD, Mark Reiner MD, Barry Salky MD, Mount Sinai Medical Center, Division of Minimally Invasive Surgery

Background: The reported experience with laparoscopic pancreatic resections remains limited to case reports and series. As a result, substantive data on current indications and outcomes after laparoscopic pancreatectomies is lacking. Our study reviews the recent indications, complications, and outcomes after laparoscopic pancreatic resection.

Methods: A retrospective review was performed for all patients who underwent laparoscopic distal pancreatectomy or

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enucleation between November 1993 until September 2005 at the Mount Sinai Medical Center.

Results: 31 patients (11 men, 20 women) were identified. The mean age was 51 years (range 22 to 83 years). 2 cases (6.4%) required open conversion and 2 cases (6.4%) required conversion to a hand-assisted technique. The median operative time was 242 minutes (range 90- 396 minutes), and median blood loss was 220 cc. Overall morbidity was 22 %, with no mortalities. Postoperative complications included three pancreatic leaks (9.6%), one peri-pancreatic abscess (3.2 %), one prolonged ileus, one early small bowel obstruction and one case of superficial phlebitis. No patients required reoperation. The median length of stay was 5 days (range 1-26 days).

Conclusions: This study represents the largest reported single institution experience with laparoscopic pancreatic resection. The morbidity rate compares favorably with recently published open and laparoscopic series. Laparoscopic pancreatic surgery can be performed safely with all the potential benefits of minimally invasive surgery.

S022

EFFICACY OF PERCUTANEOUS TREATMENT OF BILIARY TRACT CALCULI USING THE HOLMIUM-YAG LASER, J W Hazey MD, M McCreary BA, G Guy MD, W S Melvin MD, The Ohio State University Medical Center

Introduction: Few western studies have focused on percutaneous techniques utilizing percutaneous transhepatic cholangioscopy (PTHC) and the Holmium-YAG laser (HYL) to ablate complex biliary calculi in patients unable or unwilling to undergo surgical or endoscopic removal. We report the efficacy of the HYL in clearing complex biliary calculi using percutaneous access techniques.

Methods and Procedures: We retrospectively reviewed thirteen non-asian patients with complex secondary biliary calculi treated percutaneously with the HYL. Percutaneous access was accomplished via the left, right or bilateral hepatic ducts and upsized to allow for passage of a 7 Fr video choledochoscope. Lithotripsy was performed via choledochoscopic vision using a HYL with 200 and 365 micron fibers generating 0.6 to 1.0 joules of energy at frequencies of 8 to 15 Hz. Patients underwent treatment until stone clearance was confirmed by PTHC. Downsizing and subsequent removal of percutaneous catheters completed the treatment course.

Results: Seven male and six female patients underwent treatment with an average age of 69. All thirteen patients had their biliary tract stones cleared successfully. Eight of the thirteen patients were treated as outpatients. Average length of percutaneous access was 108 days. One patient continues to have a catheter in place. The average number of HYL treatments required for clearance was 1.6 with no patients requiring more than three treatments. Eight of thirteen patients underwent a single HYL treatment to clear their calculi. Five patients underwent percutaneous access and subsequent removal as their sole therapy for biliary stones. Seven of thirteen patients underwent prior unsuccessful attempts at endoscopic removal. Five patients were cleared of their calculi after percutaneous laser ablation of large stones and percutaneous basket retrieval of remaining stone fragments. There was one complication of pain requiring admission and no deaths.

Conclusions: PTHC with subsequent HYL ablation is safe and efficacious but requires prolonged access to the biliary tree and often multiple procedures to ensure clearance of all calculi.

S023

TRENDS AND INSTITUTION-VOLUME BASED ANALYSIS OF GASTROINTESTINAL COMPLICATIONS FOLLOWING BARIATRIC SURGERY IN NEW YORK STATE, Mark Loewen MD, Michael Parker, MD, Thomas Sullivan BS, Thomas Cerabona MD, Edward Yatco MD, John Savino MD, Ashutosh Kaul MD, New York Medical College/Westchester Medical Center

Objective: Aim of this presentation is to analyze recent trends and institutional volume in its effect on gastrointestinal complications of bariatric surgery performed in New York State. **Methods:** We retrospectively analyzed data from 1991 to 2003 from the Statewide Planning and Research Cooperative Systems (SPARCS) database. DRG codes pertaining to bariatric surgery were scrutinized, as well as procedure codes relating to gastrointestinal complications.



Results: 24,535 patients underwent bariatric surgery during this period with volume jumping from 536 patients in 1991 to 7982 patients in 2003. Average length of stay decreased from 7 days in 1991 to 3.4 days in 2003. Incidence of postoperative gastrointestinal complications decreased from 13.1% in 1991 to 7.3% in 2003 with a significant trend ($r = 0.72$, $p = 0.006$). High volume versus low volume in its effect on postoperative complications was analyzed by choosing an arbitrary level of 50 cases per year. High volume institutions had an overall incidence of 8.1% for postoperative gastrointestinal complications versus 12.4% for low volume institutions; this was a significant difference ($p < 0.001$, see table).

Volume	Number of inst.	N	N, complic (%)
High	38	19998	1625 (8.1%)
Low	41	4536	561 (12.4%)*

* $p < 0.05$

Conclusions: The postoperative complication rate for bariatric surgery in New York State decreased over this 12-year period while overall volume increased. This implies that increased experience and advanced techniques in minimally invasive surgery has had a positive influence on postoperative complication rates. High volume centers had better postoperative complication rates over low volume centers, implying that learning curves and number of cases done are very important to preventing complications.

S024

AN INITIAL EXPERIENCE USING THE LAPAROSCOPIC ADJUSTABLE GASTRIC BAND IN 54 US TEENAGERS, G A Fielding MD, C J Ren MD, E Nadler MD, H A Youn RN, Department of Surgery, NYU School of Medicine

This is an analysis of an early US experience using the Laparoscopic Adjustable Gastric Band (LAGB) in US teenagers, assessing safety and efficacy.

Data has been prospectively recorded on all morbidly obese teenagers (13-19 years) treated at our institution by LAGB since 2001. This data has been analyzed for weight and BMI at presentation, age groups, operative morbidity, complications, follow-up and weight loss.

Fifty-four teenagers (12 males, 42 females), mean age 16.2 yrs (13-19), weight 299lbs (221-457), BMI 47.6 kg/m² (35-63), presented for bariatric surgery using LAGB since September 2001. The Age range was 13 yrs (5), 14 yrs (3), 15 yrs (7), 16 yrs (10), 17 yrs (16), 18 yrs (8), 19 yrs (5). Forty-five were Caucasian, 6 African American, and 3 Hispanic. There were no operative complications. All patients were discharged < 24 hrs. Weight-loss is as listed below:

Time	No.	BMI	%EWL
6 mths	25	40.8	35
1 Yr	13	35	55
2 yr	4	39	50
4 yr	1	30	82

Two patients had slips repaired (19 mths, 7 mths), one developed a symptomatic hiatal hernia, and one had a port leak. All were repaired as day cases.

LAGB is a safe, effective treatment for morbidly obese teenagers.

S025

BARIATRIC SURGERY IN ADOLESCENTS, Ricardo V Cohen MD, Jose S Pinheiro MD, Jose L Correa MD, Carlos A Schiavon MD, BAROS Surgical Associates and Hospital São Camilo, São Paulo, Brazil

Introduction: If teenage obesity is epidemic and adult bariatric surgery is safe and effective, why not offer gastric bypass to these younger patients who may benefit the most avoiding life-threatening comorbidities?

Methods and procedures: We reviewed the data of 42 adolescent patients who underwent laparoscopic Roux-en-Y gastric bypass in our Institution (2.7% of our patients). All patients went through psychiatric evaluation, understood the procedure and its life-long life style modifications, and had full parental support.

Results: Most were men (35) with ages from 13 to 18 years. Mean BMI was 45 (41-50). Preoperative comorbidities were as follows: hypertension in 16 patients, depression under treatment in 6, diabetes in 3, high serum insulin in 3, cholelithiasis in 3, arthropathy in 3, asthma in 2, and GERD in 1. Mean OR time was 55 minutes. There were no intraoperative or postoperative complications. Mean hospital stay was 30 hours. Mean follow-up is 48 months (3-60). 31 patients have a follow-up greater than 12 months. All patients are cured from all comorbidities and mean BMI is 23.5. No postoperative psychiatric problems were detected.

Conclusion: Adolescent patients benefit from laparoscopic gastric bypass with excellent weight loss and cure of comorbidities.

S026

TRANSNASAL SMALL-CALIBER ESOPHAGOGASTRODUODENOSCOPY FOR PREOPERATIVE EVALUATION IN THE HIGH-RISK MORBIDLY OBESE PATIENT, Ramzi S Alami MD, Rob Schuster MD, S Friedland MD, Myriam J Curet MD, Sherry M Wren MD, R Soetikno MD, John M Morton MD, Bassem Y Safadi MD, Departments of Surgery/Gastroenterology, Palo Alto Veterans Health Care System and Stanford University School of Medicine

Introduction: Esophagogastroduodenoscopy (EGD) is an important facet of the preoperative evaluation for bariatric surgery. Morbidly obese patients are at high-risk for airway complications during this procedure and an attractive alternative is transnasal EGD. We report a successful series of patients evaluated using this technique.

Methods: All patients undergoing preoperative transnasal small-caliber (5mm and 5.9mm) EGD for morbid obesity surgery between Sept. 2004 and June 2005 at a Tertiary Veterans Affairs Hospital were included in the analysis. The variables assessed were the adequacy of the exam, patient tolerance, need for sedation and the ability to perform interventions.

Results: There were 25 patients included in the study. All patients met the 1991 NIH Consensus Conference Criteria for bariatric surgery and were undergoing pre-operative evaluation. There were 25 patients (17 male/8 female) with an average age of 55 years, (range 44-63), and average BMI of 47, (range 38-69). The most common co-morbidities included hypertension (82%), diabetes mellitus (80%) and obstructive sleep apnea (68%). All 25 patients had successful cannulation of the second portion of the duodenum with excellent patient tolerance. There were no sedation requirements in 23/25 patients (92%). Significant pathology was found in 14/25 patients (56%) and consisted of hiatal hernia (28%), gastritis (16%), esophageal intestinal metaplasia (16%), esophagitis (12%), gastric polyps (8%), gastric ulcer (4%) and esophageal varices (4%). Biopsies were indicated in 12 patients and successful in all 12 (100%).

Conclusion: Transnasal small-caliber EGD is a feasible and safe alternative to conventional EGD in the preoperative evaluation of patients undergoing bariatric surgery. It requires minimal to no sedation in a population at high-risk of complications in this setting. In addition, this technique is effective in identifying pathology that requires pre-operative treatment and offers a complete exam with biopsy capabilities. This technique should be considered in all morbidly obese patients at high risk for airway compromise during EGD.

S027

FOREIGN MATERIAL EROSION AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS: FINDINGS AND TREATMENT, Sherman C Yu MD, Kenny Jastrow MD, Connie Klein, NP, Benjamin Clapp MD, Terry Scarborough MD, Erik Wilson MD, University of Texas Health Science Center Houston

Patients after laparoscopic Roux-en-Y gastric bypass (LRYGB) can have non-specific, upper gastrointestinal (UGI) complaints. Their work-up often involves an upper endoscopy to evaluate for causes of their symptoms. During endoscopy of these patients, we have noted the erosion of non-dissolvable material, such as Peri-Strips® or silk sutures, into the gastric pouch. This study reports the incidence and presentation of foreign material erosion into the gastric pouch after a LRYGB and the outcome after therapeutic endoscopy. From a prospective LRYGB database, postoperative endoscopies from February



2002 to June 2005 that found foreign material in the gastric pouch were reviewed. All endoscopies were performed by the bariatric surgery team. Presenting symptoms, time until endoscopy, and patient outcomes were evaluated. A therapeutic endoscopy was performed by using endo-shears and biopsy forceps to remove the foreign material. A total of 23 patients (mean BMI 50) underwent 29 therapeutic endoscopies, for a mean of 1.3 endoscopies (range 1-3) per patient. From February 2002 to November 2004, 208 LRYGB were performed using silk suture for the outer layer of the gastrojejunostomy, and 21 patients (10%) had silk suture found on endoscopy. Peri-Strips® were used from February 2002 to December 2003 (n=153) and endoscopy found 6 patients (4%) with erosions. Since converting to vicryl suture and Seamguard®, we have had 173 and 228 patients, respectively, without pouch erosion. The most common presenting symptom was abdominal pain (n=15, 65%). Other symptoms included nausea (n=13, 57%), vomiting (n=12, 52%), dysphagia (n=5, 22%) and melena (n=3, 13%). The initial endoscopy occurred at a mean of 29.6 weeks after surgery, with foreign material found by a mean of 34 weeks. A therapeutic endoscopy occurred at a mean of 37.4 weeks. Food attached to the foreign material was partially obstructing the anastomosis in 5 patients (22%). Out of 29 therapeutic endoscopies, 20 had symptoms resolved (69%), 4 had improvements (14%) and 5 remained unchanged (17%). There were no endoscopic complications and no anastomotic leaks. Non-absorbable material used during a LRYGB can migrate into the gastric pouch and cause UGI complaints. A therapeutic endoscopy will resolve most UGI symptoms and should be repeated if symptoms represent. Using absorbable material in the creation of the gastric pouch and the gastrojejunostomy will avoid foreign material erosion.

S028

RISK OF SECONDARY HYPERPARATHYROIDISM AFTER LAPAROSCOPIC GASTRIC BYPASS SURGERY IN OBESE WOMEN,

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Background: Metabolic bone disease is a potential complication of bariatric surgery. It is often undiagnosed, because of lack of physician and patient awareness. Abnormalities in calcium and vitamin D metabolism begin shortly after bariatric surgery; however, clinical evidence of metabolic bone disease may not be detected until years later. The aim of the study is to evaluate, during the first two postoperative years, the effects of laparoscopic gastric bypass on calcium and vitamin D metabolism, and to identify patients at high risk to develop secondary hyperparathyroidism (HPT).

Methods: Serum calcium, alkaline phosphatase, intact PTH, and 25-hydroxy vitamin D were measured at 3, 6, 12 and 24 months after laparoscopic gastric bypass in a cohort of morbidly obese women. Logistic regression was used in both univariate and multivariate model to identify independent preoperative variables associated with secondary HPT.

Results: The study enrolled 193 morbidly obese women. Mean age was 43.7±9.2 years. Mean preoperative BMI was 50.8±9.6. During the 2 years follow up period, the incidence of secondary HPT (PTH > 65 pg/ml) was 53.3% (103/193). The mean time elapsed between surgery and detection of secondary hyperparathyroidism was 9.1 months (range 3-24 months). Vitamin D deficiency (< 20 ng/ml) was observed in 20.2% (39/193) patients. African Americans (AA) were at higher risk of Vitamin D deficiency than their Caucasian counterparts (23.6±17.6 vs 35.6±12.6 ng/ml, P<0.001). On univariate analysis, the preoperative factors associated with secondary HPT were race (High PTH: 20.4% AA vs normal PTH: 11.1% AA; P<0.05), preoperative BMI (High PTH: 52.5±10.8 vs normal PTH: 48.9±7.5; P<0.01) and age (High PTH: 44.9±9.2 vs normal PTH: 42.3±9 yrs., P<0.05). Race and age remained independent risk factors for secondary HPT in the multivariate logistic regression model after adjusting for the covariate roux-limb length. AA were at more than 2.5 times greater risk to develop secondary HPT than Caucasian (OR 2.5; 95% CI: 1.03-6.17, P<0.05). Patients older than 45 years were at 1.8 times higher risk to develop secondary HPT than their younger counterparts (OR 1.8; 95% CI: 1.01-3.32, P<0.05).

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Conclusions: Women undergoing gastric bypass surgery have high incidence of postoperative secondary HPT. Earlier vitamin D replacement and aggressive calcium citrate supplementation should be at least implemented for African Americans and patients older than 45 years.

S029

SIZE MATTERS: GASTRIC POUCH SIZE CORRELATES WITH WEIGHT LOSS FOLLOWING LAPAROSCOPIC ROUX-Y GASTRIC BYPASS,

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Introduction: The identification of relevant components of successful weight reduction surgery is the most important endeavor in the latest research aiming to increase excess weight loss. Over the past twenty years there has been ongoing discussion about the importance of gastric pouch size as one of the key factors influencing weight loss after restrictive weight reduction surgery. The goal of our analysis is to determine the relationship between gastric pouch size and weight reduction following laparoscopic Roux-Y gastric bypass (LRYGB).

Methods: Between August 2002 and March 2005, 321 LRYGB were performed at the same institution. Patient demographics were entered into a longitudinal, prospective database. Upper gastrointestinal series was performed in all patients on post-operative day one. Assuming that pouch depth remained constant, pouch size was calculated as area (cm²) utilizing digital imaging technology and internal standardization for measurement. Linear regression analysis was performed to determine the association between pouch size and weight loss at 6 and 12 months postoperatively. Adjustment was made for age, gender, and preoperative BMI.

Results: Mean age was 41 years (range, 17-64); 262 patients were female (81.6%); mean preoperative BMI was 51.1 kg/m² (range, 36.1-89.9 kg/m²). Mean 6 month %EWL was 50.5 (range, 13.4-85.5%) and mean 12 month %EWL was 62.5 (range, 14.6-98.1). Mean pouch size was 63.9 cm² (range, 8.6-248.0 cm²). A statistically significant inverse correlation between pouch size and %EWL was found (at 6 month r = -0.40035, p<0.001 and at 12 month r = -0.43379, p<0.001). No significant correlation was found between pouch size and age or preoperative BMI.

Conclusion: Our analysis demonstrates that gastric pouch size is one important component for successful weight reduction following LRYGB. The creation of a small gastric pouch should be encouraged as the initial step towards ideal weight loss.

S030

DIABETES MELLITUS IS INVERSELY CORRELATED WITH POSTOPERATIVE FASTING GLUCOSE LEVEL FOLLOWING GASTRIC BYPASS,

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Introduction: Gastric bypass has been demonstrated to cure diabetes mellitus in the severely obese. However, there have been reports of profound hypoglycemia in patients who have undergone gastric bypass. These patients required curative distal pancreatectomy; pathology has revealed nesidioblastosis. Identification of the population at risk for postoperative hypoglycemia would be important in directing therapy for severe obesity. We present our research to identify factors inversely correlated with fasting glucose level (glu-fast) one year following gastric bypass.

Methods: This is a prospectively accumulated database from a consecutive series of 33 patients undergoing laparoscopic gastric bypass at an academic bariatric surgery program. Independent variables included preoperative age, weight, BMI, excess body weight (EBW), preoperative fasting glucose, preoperative fasting insulin, insulin resistance (as estimated by HOMA-IR), beta cell sensitivity (as estimated by HOMA-B) and percent of EBW lost at one year following surgery. Independent correlation coefficients were determined between these variables and glu-fast one year postoperatively. Student's t-test was used to identify whether presence of hypertension



(HTN), of diabetes mellitus (DM), or of dyslipidemia was correlated with fasting glucose one year postoperatively.

Results: Presence of DM was associated with lower fasting glucose level postoperatively (with DM = 78 + 13 g/dl, without DM = 90 + 10 g/dl; p = 0.02). No other factor investigated was associated with fasting blood sugar in the postoperative period.

Conclusion: Diabetes mellitus is inversely correlated with fasting glucose levels following gastric bypass. This is the first report of such a correlation, and should prompt investigation into the mechanism. If corroborated, this finding suggests that severely obese patients with diabetes are at risk for pathological hypoglycemia.

S031

LAPAROSCOPIC SURGERY FOR COLORECTAL CANCER: EXPERIENCE IN 500 SUCCESSFUL CASES, Hwei-Ming Wang MD, Joe-Bin Chen MD, Feng-Fan Chiang MD, Chou-Chen Chen MD, Taichung Veterans General Hospital

AIM: Controversial issues surrounding the use of laparoscopic surgery (LAP) for colorectal cancer include high conversion, high complication rate, port site recurrence and poor outcome than open surgery (OPEN) previously reported. The purpose of this single center, prospective study was to assess the oncological outcomes achieved after curative LAP for cancer.

MATERIALS & METHODS: We enrolled 514 consecutive patients with colorectal cancer undergoing LAP between July 1998 and May 2004. The data were including patient profile, operative complication, pathology and oncological outcome. We compared the oncologic outcomes achieved using LAP and OPEN during period from July 1998 to June 2001. Patient follow-up ranged from 36 to 72 months. The follow-up rate was 95%. We recorded the final status of all cancer patients as of June 30, 2004.

RESULTS: We attempted to perform LAP in 514 patients and 14 patients (2.7%) needed conversion to open surgery. The LAP was successfully in 500 patients with 308 males and 192 females, age from 26 to 96 years, av. 64.2 years. Of the 500 LAP patients, 85 (17.0%) experienced complications & 42 (8.4%) patients had major complications that required further surgery. Major complication of LAP for rectal cancer was higher than colon cancer: 11.4% (34/298) vs. 4.0% (8/202). There were three (0.6%) operative mortality due to sepsis, CVA and hepatic failure. We examined the oncologic results achieved in 185 patients who had curative LAP between July 1998 and June 2001. The 3Y-DFS between LAP and OPEN were no difference in stage I (94.2% vs. 93.9%), stage II (79.7% vs. 73.4%), stage III (57.2% vs. 56.7%) and over-all (75.8% vs. 70.3%). There were two (0.4%) port site recurrence found in LAP patients.

Conclusion: The LAP for cancer was feasible for the acceptable morbidity rate & operation time. The oncological results are encouraging and equal to OPEN.

S032

LAPAROSCOPIC (MEDIAL TO LATERAL) COLON RESECTION: A VIEW BEYOND THE LEARNING CURVE, Eric D Edwards MD, Wilbur B Bowne MD, Jiyoun E Kim MD, Palak Shah MD, Kell Juliard MS, Armando E Castro MD, Pratap K Gadangi MD, George S Ferzli MD, Lutheran Medical Center/SUNY Health Science Center, Brooklyn, N.Y.

INTRODUCTION: Since our report on the lateral approach to laparoscopic colon resection (LCR) (JACS. 2001; 193:105-108), medial to lateral (M-L) segmental resection continues to evolve. We analyze our learning curve experience with a standardized M-L technique to demonstrate influence of operative volume on proficiency and outcome.

METHODS: 100 consecutive patients underwent a standardized 3-trocar M-L segmental LCR from January 1999 to December 2004. Yearly patient demographics, indications for surgery, operative proficiency (time), and outcome (ie. blood loss, conversion to open, resumption of bowel function and diet, length of hospital stay, morbidity and mortality) were recorded. Learning curve analysis was performed using a t test and ANOVA method.

RESULTS: M-L/ LCRs included sigmoid (55%), right (34%), left (6%), and transverse (5%) approaches. Yearly recorded patient age, gender, indications for surgery, and perioperative param-

eters were similar. Overall learning curve proficiency was influenced by increasing operative experience (p=0.02). However, significant and consistent improvement in the learning curve occurred only after >38 (SEM +/- 3) LCRs (p < 0.006).

Notably, all open conversions (3%) occurred during the early (<38 cases) learning curve. Similarly, early LCR patients experienced a greater morbidity (mean: 21% vs. 11%) and mortality (5% vs. 1%) compared to their later (>38 cases) learning curve counterparts.

CONCLUSIONS: M-L/ LCR requires a minimum of 35 - 40 procedures to obtain optimum proficiency. Operative and patient outcomes improve beyond the early learning curve.

S033

ORAL-CS: A PROSPECTIVE RANDOMIZED TRIAL TO DETERMINE IF NSAIDS REDUCE HOSPITAL STAY AFTER LAPAROSCOPIC COLON SURGERY, C M Schlachta MD, S E Burpee MD, C Fernandez MSc, B Chan MD, J Mamazza MD, E C Poulin MD, Department of Surgery, St. Michael's Hospital, Toronto, Canada

Introduction: The objective of this study was to determine if NSAIDS reduce ileus following laparoscopic colorectal surgery thus shortening hospital stay.

Methods: This was a single centre, prospective, randomized, double blind, placebo controlled, clinical trial of patients undergoing laparoscopic colorectal resection. Patients who met the inclusion criteria received either intravenous ketorolac (group A) or placebo (group B) for 48 hours after surgery in addition to PCA morphine. Patients were assessed daily by a blinded assistant for level of pain control. Diet advancement and discharge were according to strictly defined criteria. Statistical analysis was performed with a 0.05 level of significance.

Results: From October 2002 to March 2005, 190 patients underwent laparoscopic colorectal surgery, of which 84 were eligible for this study and 70 consented. According to protocol, another 20 patients were excluded prior to and 6 after randomization leaving 22 patients in each group. Two patients who suffered anastomotic leaks in the early postoperative period were excluded from further analysis. Median length of stay for the entire study was 4.0 days with significant correlation between mg of morphine consumed and time to first flatus (r=0.422, p=0.005), full diet (r=0.522, p<0.001), and discharge (r=0.437, p=0.004). There were no differences between groups in age, body mass index or operating time. Patients in group A consumed less morphine (33±31mg vs. 63±41mg, p=0.011), and had less time to first flatus (median 2.0d vs. 3.0d, p<0.001) and full diet (median 2.0d vs. 3.0d, p=0.031). The reduction in length of stay was not significant (mean 3.6d vs. 4.5d, median 4.0d vs. 4.0d, p=0.142). Pain control was superior in group A. Three patients required readmission giving five anastomotic leaks (4 in group A vs. 1 in group B, p=0.15) of which two were re-operated.

Conclusion: Intravenous ketorolac was efficacious in improving pain control and reducing postoperative ileus when anastomotic leaks were excluded. This simple intervention shows promise in reducing hospital stay although the outcome was not statistically significant. The high number of leaks is inconsistent with this group's experience and is of concern.

S034

RETURN OF BOWEL FUNCTION FOLLOWING LAPAROSCOPIC COLON RESECTION IS FASTER WITH THORACIC EPIDURAL ANALGESIA, Ali Taqi MD, Franco Carli MD, Xi Hong MD, Shahram Zandi MD, Giovanni Mistracchi MD, Barry Stein MD, Patrick Charlebois MD, Department of Anesthesia and Surgery, McGill University Health Centre, Montreal, Quebec, Canada

Background: The use of epidural analgesia for laparoscopic colectomy has been questioned. However, no attempts have been made to standardize the epidural analgesia regimen and the perioperative surgical and nursing care program. The aim of this study was to determine whether thoracic epidural analgesia for laparoscopic colectomy favors the restoration of bowel function and provides superior analgesia when used within a traditional, non-accelerated, perioperative care program.

Methods: Fifty patients scheduled for elective laparoscopic



colon resection for benign and malignant lesions were randomized to patient controlled analgesia (PCA) with morphine (n=25) and thoracic epidural analgesia (n=25). All groups received general anesthesia and multimodal pain relief which included naproxen and acetaminophen for up to 4 postoperative days. A traditional, non-accelerated, perioperative surgical and nursing care program was implemented. Return of bowel function (time to passage of gas and bowel movements), dietary intake, postoperative quality of analgesia, and readiness for discharge and length of hospital stay were recorded by a blind researcher.

Results: Restoration of bowel function occurred sooner in the epidural group ($p<0.005$) by an average 1-2 days, and resumption of full fluid diet was achieved earlier ($p<0.05$). Intensity of pain during the first two postoperative days was significantly lower at rest, on coughing and on walking in the epidural group ($p<0.005$). Readiness for discharge and hospital length of stay was otherwise similar in both groups.

Conclusions: Thoracic epidural analgesia after laparoscopic colectomy, with a traditional, non-accelerated, perioperative care program, favors the return of bowel function and earlier dietary intake, and provides superior pain relief.

S035

LAPAROSCOPIC TOTAL MESORECTAL EXCISION FOR MIDDLE AND LOW RECTAL ADENOCARCINOMA WITH OR WITHOUT SPHINCTER PRESERVATION: A PROSPECTIVE STUDY, Elie Chouillard MD, Abe Fingerhut MD, Roberto Bergamaschi MPH, Centre Hospitalier Intercommunal Poissy France, Department of Surgery, Lehigh Hospital, Allentown, PA, USA

Goal: To assess the feasibility, safety, and effectiveness (perioperative and oncological outcomes) of laparoscopic total mesorectal excision (LTME) for rectum adenocarcinoma, with or without anal sphincter preservation

Material and methods: Between November 1998 and July 2004, 84 unselected patients had laparoscopic TME for rectal adenocarcinoma and were followed up prospectively. Survival probability analysis was performed using the Kaplan-Meier method.

Results : 41 women and 43 men (mean age 58 (range, 21-86)) underwent LTME. Four patients (5%) required conversion. Mean operative time was 210 min (range, 120-500). No patient required blood transfusion. Intra-operative complications included (3 patients (4 %)) 2 left ureteral injuries and 1 deferent duct section. There was no postoperative mortality. Postoperative complications included 5 deep abscess (6 %) associated with anastomotic leakage in 3 (4 %) and wound infection in 4 (5 %), pneumonia (n=3), urinary infection (n=3), sexual dysfunction (n=1), and hematoma (n=1).

66 sphincter-preserving procedures and 18 abdominoperineal resections were performed. Among the former, 22 were performed for very low tumors, located within 4 cm of the dentate line. The average length of distal margins was 5.5 cm (range, 0-11). The mean number of harvested lymph nodes removed was 15 (range, 0-45) and mean length of the resected specimen was 28 cm (range, 20-101). The distal margin (dentate line) was positive in one patient (1 %), who had reoperative abdominoperineal resection.

Average followup was 49 months (12-81). The most common late complications included incisional hernia (n=3 (4 %)) and intestinal obstruction (n=4 (5 %)). No port-site metastases occurred. Recurrence developed in 22 patients (26%): distant or peritoneal metastases (22 patients) with loco-regional recurrence (3 patients). Overall local recurrence was 4 %. Three year survival was 76%.

Conclusions: Laparoscopic total mesorectal excision for rectal cancer is feasible and safe. Oncological appropriateness can be respected. However, large scale randomized studies are still needed in order to evaluate its efficacy and efficiency more accurately.

S036

COMPARISON OF COLONIC STENTING VERSUS OPEN SURGERY FOR MALIGNANT LARGE BOWEL OBSTRUCTION,

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Objective: Colonic stents potentially offer effective palliation to those with bowel obstruction due to incurable malignancy, and a "bridge to surgery" for those in whom emergency surgery would necessitate a stoma. The present study compared the outcomes of stents and open surgery in the management of malignant large bowel obstruction.

Methods: A literature search of the Medline, Ovid, Embase and Cochrane databases was performed to identify comparative studies reporting outcomes on colonic stenting and surgery for large bowel obstruction. Random effects meta-analytical techniques were applied to identify differences in outcomes between the two groups. Sensitivity analysis of high quality studies, those reporting on more than 35 patients, those solely concerning colorectal cancer and studies performing intention to treat analysis was undertaken to evaluate the study heterogeneity.

Results: Ten studies satisfied the criteria for inclusion, reporting outcomes on 451 patients. Stent insertion was attempted in 244 (54.1%), and successful in 226 (92.6%). Length of stay was shorter by 7.72 days in the stent group ($p<0.001$), who also had lower mortality ($p=0.03$) and medical complications ($p<0.001$). Stoma formation at any point during management was significantly lower than in the stent group (OR 0.02, $p<0.001$), and "bridging to surgery" did not adversely influence survival.

Conclusions: Colonic stenting offers effective palliation for malignant bowel obstruction with short lengths of stay and low stoma rates, but data on quality of life and economic evaluation is limited. There is no evidence of differences in long term survival between those who have stents followed by subsequent resection and those undergoing emergency bowel resections.

S037

THE UTILITY OF THE MAGNETIC ENDOSCOPE POSITION DETECTING UNIT AS A VISUAL AID AND MEANS OF POLYP LOCALIZATION. T V Azarani BS, T D Arnell MD, D L Feingold MD, K A Forde MD, E Balik MD, N Sakellarios, C Bailey, D D Markowitz, R Rosenberg, O Lebowitz, R J Garcia-Carrasquillo, H Frucht, R L Whelan MD, New York Presbyterian Hospital-Columbia Campus, New York, NY, USA

Introduction The endoscope position detecting unit (EPDU) utilizes magnetic imaging and a specialized colonoscope to give a 3 dimensional view of the position of the colonoscope during colonoscopy. The objective of this study was to determine if the EPDU provides an accurate visual portrayal of the position of the colonoscope within the colon, thereby acting as a visual aid for the endoscopist in determining polyp location.

Materials and Methods The EPDU was used during colonoscopies by 9 experienced endoscopists over a period of 21 months. An external locating probe connected to the main unit was used to localize polyps by position of the scope tip against the abdominal wall and visualizing the probe location compared with the localized positions of the hepatic and splenic flexures. True polyp location was verified both surgically and in cecal polyps in which the ileocecal valve or terminal ileum were clearly visualized.

Results There were 348 patients who underwent colonoscopy with the EPDU. Patients having undergone colon resections were excluded (41) for a total of 307 study patients. A total of 235 polyps were located using the EPDU in 85 patients. There was one polyp in 55 patients (64.7%), 2 polyps in 16 (18.8%), and 3 or more polyps in 14 patients (16.5% range 3-9). The location of 35 were confirmed at the time of operation (12) or based on location within the right colon (23). There was 100% accuracy for the twelve polyps in 11 patients verified at the time of operation. Of those polyps confirmed via operation, 4 were hepatic flexure (30.8%), 4 sigmoid (30.8%), 1 rectosigmoid (7.7%), 1 descending colon (7.7%), 1 cecal (7.7%), and 1 distal transverse colon (7.7%). Two polyps, one in the sigmoid and the other in the descending colon were located with the EPDU and verified within the same patient at operation.

Discussion The EPDU accurately located all 12 polyps in patients undergoing operation. Additionally, the shape of the EPDU colonoscope was accurate in confirming the cecal and ascending location of polyps confirmed by anatomical markers (terminal ileum and ileocecal valve). The EPDU is a safe and effi-



cient way to locate lesions within the colon during colonoscopy.

S038

DOES COLLIS GASTROPLASTY REDUCE RECURRENCE RATE AFTER LAPAROSCOPIC TYPE III PARAESOPHAGEAL HERNIA REPAIR?, L Biertho MD, S Faidi MD, CJ Allen MD, M A PhD, Centre for Minimal Access Surgery, McMaster University, and Department of Medicine, St. Joseph's Healthcare, Hamilton Ontario Canada

BACKGROUND: Surgical repair of Type III paraesophageal hernias (PEH) is associated with high recurrence rate. One factor implicated is reluctance of surgeons to do a Collis gastroplasty when needed. The aim of this study was to evaluate the outcomes of laparoscopic repair of Type III PEH with or without Collis gastroplasty.

METHODS: 77 patients (25M:52F, mean age 62.4±12.0 yrs) with Type III PEH undergoing laparoscopic repair with Nissen fundoplication between 2000 and 2005 were prospectively followed. Patients who required a Collis gastroplasty (Group 1, n=11) are compared to those who did not (Group 2, n=66).

RESULTS: All procedures were completed laparoscopically. Mean operative time was 168.4±41.5 min in Group 1 and 102.5±30.2 min in Group 2 (p=0.0002). 35 patients (45%) had half the stomach or more in the chest. There was no major peri-operative complication or 30-days mortality. 3 patients in Group 2 had a post-operative intrathoracic stomach migration that required emergency redo surgery (0 versus 4.5%, p=0.4698). There was no significant difference in hospital stay between the two groups (3.2±1.4 in Group 1 versus 3.6±2.2 days in Group 2, p=0.4258) Patients were followed for a range of 0.5 to 51 months. There was a trend towards a higher post-operative complication rate in Group 2 (9.1 vs 18.2%, p=0.4549). There was no significant difference in rate of redo surgery (9.1 vs 6.1%, p=0.7008).

Long Term Postoperative Complications

	Group 1	Group 2
Hernia Recurred	1 (1 redo surg)	9 (2 redo surg)
Slipped Nissen	0	2 (1 redo surg)
Wrap Migration	0	1 (1 redo surg)

CONCLUSION: These data confirm that laparoscopic repair of type III PEH is feasible and safe. Collis gastroplasty increases operative time with no significant increase in hospital stay and peri-operative morbidity. Collis gastroplasty may also be associated with a decrease in recurrence rate.

S039

UPRIGHT, SUPINE, OR BIPOSITIONAL REFLUX: PATTERNS OF REFLUX DO NOT IMPACT OUTCOME AFTER LAPAROSCOPIC NISSEN FUNDOPLICATION, Alexander S Rosemurgy MD, Sam Al-Saadi MD, Desiree V Villadolid BS, Demetri Arnaoutakis, Sarah M Cowgill MD, University of South Florida, College of Medicine, Department of Surgery

INTRODUCTION: This study was undertaken to determine if body position in which reflux occurs before fundoplication, i.e., pattern of reflux, impacts symptoms before or after laparoscopic Nissen fundoplication.

METHODS: 401 patients underwent pH studies and the severity of reflux in the upright and supine positions was determined. The percent time with pH < 4 was used to assign patients to one of four groups: upright reflux (pH < 4 more than 8.3% of time in upright position, N=78), supine reflux (pH < 4 more than 3.5% of time in supine position, N=75), bipositional reflux (both supine and upright reflux, N=155) or neither (N=93). Before and after laparoscopic Nissen fundoplication, the frequency and severity of symptoms of reflux (e.g., dysphagia, regurgitation, choking, heartburn, chest pain) were scored by a Likert scale (0=never/not bothersome to 10=always/very bothersome). For each patient, symptom scores before vs. after fundoplication were compared using Wilcoxon matched pairs test; comparisons of symptom scores among patients grouped by reflux patterns were made using Kruskal-Wallis test.

RESULTS: Before fundoplication, the patterns of reflux did not impact the frequency and severity of reflux symptoms. After

laparoscopic fundoplication, symptoms of bipositional reflux improved, while nearly all symptoms of isolated supine or upright reflux or neither improved, except for frequency of dysphagia (Table).

	Upright	Supine	Bipositional	Neither
Dysphagia	Pre: 1.2, Post: 0.8			
Choking	Pre: 1.2, Post: 0.8			
Regurg	Pre: 1.2, Post: 0.8			
Heartburn	Pre: 1.2, Post: 0.8			
Chestpain	Pre: 1.2, Post: 0.8			

Note: Only symptom frequency data is shown. Data presented as median, mean ± SD.
* Less than Pre-op.
** P<0.05 when matched pairs test.
*** Different than other Diets/Meals when P<0.05, Mann-Whitney U-test.

CONCLUSIONS: Preoperatively, regardless of the pattern of reflux, symptoms among patients were similar. After fundoplication, symptoms improved uniformly for bipositional reflux. After fundoplication, symptoms of isolated upright or supine reflux or neither nearly uniformly improved, without discriminating differences. For patients with all patterns of reflux, laparoscopic fundoplication imparts dramatic and broad relief of symptoms and application of laparoscopic Nissen fundoplication is encouraged.

S040

SEVERELY DISORDERED ESOPHAGEAL PERISTALSIS IS NOT A CONTRAINDICATION TO LAPAROSCOPIC NISSEN FUNDOPLICATION, Yuri W Novitsky MD, Jason Wong MD, Kent W Kercher MD, Donald R Czerniach MD, Demetrius E Litwin MD, Lee L Swanstrom MD, B. Todd Heniford MD, Carolinas Medical Center; University of Massachusetts Medical Center, Legacy Health System

Background: In patients with esophageal dysmotility a full fundoplication is controversial. Although Laparoscopic Nissen fundoplication (LNF) is known to be superior to partial wrap in patients with weak peristalsis, its efficacy in patients with severe dysmotility is unknown. We hypothesized that LNF is preferable in patients with severe esophageal dysmotility.

Methods: Multicenter retrospective review of consecutive patients with severe esophageal dysmotility (distal esophageal amplitude [DEA] of ≤30 mmHg and/or ≥60% of non-peristaltic esophageal body contractions [EBC]) who underwent a LNF. Variables measured included demographics, symptoms, esophageal manometry and 24-hr pH studies, postoperative dysphagia and reflux recurrence.

Results: Forty-eight patients with severe esophageal dysmotility underwent LNF. All patients presented with symptoms of GERD. Nineteen (39%) patients had dysphagia. Ten had impaired EBC, 32 patients had an abnormal DEA, and 6 patients had both. Average abnormal DEA was 24.9 ± 5.2 mmHg (range, 6.0-30.0 mmHg). The mean number of non-peristaltic EBC was 69.4 ± 10.3% (range, 60-100%). There were no intra-operative complications and no conversions.

Postoperatively, early dysphagia occurred in 35 (73%) patients. Significant dysphagia remained unresolved after 8 weeks postoperatively in 8 (16%) patients. Four patients were successfully treated with esophageal dilations, one patient required a re-fundoplication and persistent dysphagia was found in 3 (6%) patients. Abnormal DEA was improved postoperatively in 11 (73%) of tested patients. At an average follow up of 25.4 months (range, 1-46 months) 8 patients (16%) were receiving anti-reflux medications, including 6 with documented normal esophageal pH studies.

Conclusion: LNF provides low rates of reflux recurrence with little long-term postoperative dysphagia in patients with severely disordered esophageal peristalsis. A 360° fundoplication is thus the preferred anti-reflux procedure in all patients, even in those with severe esophageal dysmotility.

S041

EVALUATION OF PATIENTS POST FUNDOPLICATION WITH AND WITHOUT DYSPHAGIA WITH COMBINED MANOMETRY AND IMPEDANCE, Leena Khaitan BA, Andrea Adams BA, C D Smith BA, Emory Endosurgery Unit, Emory University School of Medicine

Background: Following esophagogastric fundoplication (EGF), the incidence of dysphagia has been reported to be between 3-9%. Multichannel intraluminal impedance is a new technology that when combined with manometry (EFT study), allows



assessment of bolus transit simultaneous with contraction pressures within the esophagus. This allows better characterization of esophageal disorders. The purpose of this study is to further understand differences in manometry and bolus transport in patients with and without dysphagia following EGF.

Methods: Standard EFT studies with 10 liquid and 10 viscous swallows were performed in 287 patients between 12/01 and 8/05. (Sandhill Scientific, Highland Ranch, CO) Data regarding patient demographics, symptoms, manometric and impedance findings were maintained in a prospectively collected database. Results are reported as proportions and mean ± SD and data analyzed using t-test and chi square where appropriate. Results: Eighty three patients(pts) had previous EGF of whom 48 had dysphagia (Group 1) and 35 did not (Group 2). Other symptoms included heartburn (42 pts), chest pain (17 pts), regurgitation (23 pts), and extra-esophageal symptoms (17 pts). Seven patients had more than one prior EGF. Overall, patients had fewer completely transmitted swallows than peristaltic swallows (72% transmitted swallows vs86% peristaltic swallows with liquid material; 62% transmitted swallows vs 84% peristaltic swallows with viscous material). Lower esophageal sphincter (LES) pressure, LES relaxation, and esophageal peristalsis were not different between groups. By impedance, however, more patients with dysphagia had impaired bolus transit (43% vs 31%, p=0.14 with liquid swallows, 63% vs 51%, p=0.16 with viscous swallows, respectively). Furthermore, contraction amplitudes were significantly lower in the patients with dysphagia (82 mmHg, group1 vs 102 mmHg, group 2, p <0.02).

Conclusions: Despite normal manometry, more patients with dysphagia have impaired bolus transit compared to those without dysphagia. The combination of impaired esophageal clearance identified by impedance and lower distal contraction amplitudes may account for dysphagia symptoms in patients with prior EGF. EFT studies are more helpful in characterizing dysphagia following EGF than standard manometry alone and may aid in future care of these patients.

S042

ENDOSCOPIC ULTRASOUND (EUS) IN THE EVALUATION OF NISSEN FUNDOPLICATION INTEGRITY: A BLINDED COMPARISON WITH CONVENTIONAL TESTING, Charles Y Kim MD, Eugene Y Chang MD, Ann K Seltman MD, Brian Diggs PhD, John G Hunter MD, Raquel Davila MD, Blair A Jobe MD, Renee C. Minjarez, MD, Portland VA Medical Center; Oregon Health & Science University

Introduction: In patients who develop symptoms after Nissen fundoplication (NF), the precise mechanism of anatomic failure can be difficult to determine. In swine, we have previously reported the endosonographic hallmarks defining an intact NF and the known causes for failure. This clinical trial tests the hypothesis that a defined set of endosonographic criteria can be applied to determine fundoplication integrity in humans.

Methods: 16 subjects were enrolled at a mean of 6 yrs post-NF (range 1-30 yrs). A GERD-specific questionnaire and medication history were completed. Prior to EUS, all patients underwent complete conventional testing (EGD, esophagram, manometry, 24-hour pH). A diagnosis was rendered based on combined test results and for EGD alone. EUS was then performed by an observer blinded to symptoms, medication use, and conventional test diagnoses. EUS diagnosis was rendered based on the previously established swine criteria. Because EUS is uniformly performed in combination with EGD, the diagnoses were compared so as to examine the added contribution of EUS in this context.

Results: The technique and criteria defined in the swine model were easily applied to all subjects. All symptomatic patients had heartburn and were taking proton pump inhibitors (PPI). No asymptomatic patients were taking PPI. In symptomatic patients, EUS discovered 5 additional diagnoses compared to EGD alone, and 6 additional diagnoses when compared to combined conventional test diagnoses (Table). In asymptomatic subjects, EUS identified 2 diagnoses which were determined to be normal using conventional testing modalities.

Finding	Symptomatic (n=7)			Asymptomatic (n=9)		
	EGD	+EUS	Conventional testing	EGD	+EUS	Conventional testing
Slipped	0	2	0	0	1	0
Hemiation	5	6	5	1	1	1
Dehiscence	2	4	2	0	1	0
Loose	0	0	1	0	0	0
Normal	0	0	0	8	6	8

Conclusions: EUS examination of hiatal anatomic relationships is feasible. Combined EUS and EGD is a more sensitive alternative to the conventional set of tests in patients who present with symptoms after NF.

S043

ESOPHAGEAL BODY MOTILITY AFTER PARTIAL AND TOTAL LAPAROSCOPIC FUNDOPLICATION, Fernando A Herbella MD, Pietro Tedesco MD, Ian Nipomnick MD, Marco G Patti MD, Center for Study of Gastrointestinal Motility and Secretion, University of California, San Francisco, USA

INTRODUCTION: Gastroesophageal reflux disease can be associated to abnormal esophageal body motility. Laparoscopic fundoplication is an efficient method to control reflux. The effect of a successful fundoplication on esophageal motility is still controversial.

PATIENTS AND METHODS: Esophageal manometries of seventy-one patients who underwent laparoscopic fundoplication with reflux control (post-operative DeMeester score<14.7) were reviewed. Patients were grouped according to the type of fundoplication and pre-operative esophageal peristalsis: Group A, partial fundoplication and abnormal esophageal peristalsis (n=16); group B, total fundoplication and normal peristalsis (n=41); group C total fundoplication and abnormal peristalsis (n=14).

RESULTS: Pre- and post-operative results are outlined in the table below:

Group	A		B		C	
	pre	post	pre	post	pre	post
LES	8±3*	13±4*	12±12*	19±8*	9±3*	14±7*
DA	33±13*	50±23*	104±35	98±42	41±13*	95±36*

LES – lower esophageal sphincter pressure DA – distal amplitude
* statistical significant values given as mean ± standard deviation (mmHg)

Normalization of peristalsis was achieved in 31% of group A patients and 86% of group C patients.

CONCLUSIONS: Laparoscopic fundoplication increases lower esophageal sphincter pressure and distal esophageal amplitude in patients with abnormal pre-operative esophageal motility. A total fundoplication determines normalization of peristalsis in the majority of patients.

S044

LAPAROSCOPIC ADRENALECTOMY: OUR EXPERIENCE, Emanuele Lezoche MD, Mario Guerrieri MD, Francesca Crosta MD, Pamela Zenobi MD, Maddalena Baldarelli MD, Giovanni Lezoche MD, 1 Dpt of Surgery, Paride Stefanini, II Clinica Chirurgica University, La Sapienza, Roma, Italy ; 2 Dpt of General Surgery University of Ancona, Italy

Aim: to report our results in laparoscopic adrenalectomy by a retrospective evaluation .

Methods: 251 patients underwent laparoscopic adrenalectomy from January 1994 to September 2005 in our institution. 153 were female and 98 male with a mean age 52,8 years (range 19-75). In 119 cases the lesion was localized in the right gland, while in 142 in the left. In 10 patients the lesion was bilateral. The imaging study was performed with CT scan or MRI. 6,2 cm was the mean size of lesions (range 1,5-12). Endocrinology samples and scintigraphy completed preoperative patient workup. Surgical approach was in 213 cases anterior transperitoneal with supine patient, flank approach in 24 cases, anterior submesocolic in 23 cases and retroperitoneal approach in one. Associated surgical procedures were: cholecystectomy 13, ovariectomy 4, appendectomy 1, uterine myomectomy 1 and left kidney cyst fenestration 1.

Results: Mean operative time was 83 min. for right adrenalectomy (70-150), 114 min. for left (90-300) and 204 min. for bilateral adrenalectomy. Intraoperative major complications were observed in 6 patients : bleeding in 4 pts, splenic colonic flex-



ure tear in one and rhythm instability in one. Oral intake started in the first 24 hour and the mean hospital stay was 2,5 days (1-8). Definitive histology resulted as follows: Cushing adenoma 67, Conn adenoma 64, Pheochromocytoma 35, Incidentaloma 78, Metastases 9, Adrenogenital syndrome 2, Myelolipoma 4, Carcinoma 2. Mean follow-up was 62 months (3-132). The patients treated for metastases underwent postoperative Chemotherapy. Out of 9 pts, three died at 6 and 18 months after the procedure respectively. The patients treated for carcinoma underwent MR imaging controls every six months and are disease free at 18 months.

Conclusion: our experience as well as reported in the recent literature suggests that laparoscopic adrenalectomy is safe and effective. Clinical outcome benefits from minimally invasive technique in terms of short hospital stay, rapid return to work and best cosmetic results.

S045

THE LEARNING CURVE IN LAPAROSCOPIC ADRENAL SURGERY: COMPARISON OF RIGHT AND LEFT ADRENALECTOMY. S Perretta MD, A. M Paganini MD, M. Guerrieri MD, R. Campagnacci MD, A. Desanctis MD, F. Crosta MD, G. Lezoche MD, E. Lezoche MD, Dept. of General Surgery, University of Ancona, Ancona, Italy; *II Clinica Chirurgica, Università La Sapienza, Roma, Italy.

Background: Laparoscopic Adrenalectomy (LA) has become the procedure of choice for the surgical management of most adrenal tumors. Its learning curve varies among surgeons, it may be influenced by patients selection, operative complexity and technique, lesions side and size.

Aim: multidimensional analysis of the learning curve in LA: right-sided versus left-sided adrenalectomies.

Methods: This is a single-center study using prospective collected data from 241 patients who underwent LA between August 1992 and August 2005. The preoperative variables considered were patient-specific (age, gender, BMI, comorbid conditions) and disease-specific (histology, side and size of the lesion). The level of experience of the surgical and anaesthesia team and surgical approach (anterior, flank, submesocolic) was also considered. Outcome measures studied were: operative time (OpT), conversion rate (CR), intraoperative and postoperative complications. Multifactorial logistic Regression analysis was used to identify patient-, surgeon/anaesthesiologist-, and procedure-related factors associated with conversion. A risk-adjusted Cumulative Sum model was used for evaluating the learning curve for right and left-sided resections.

Results: There were 9 (3%) CR to open surgery: The CR for right-sided adrenal resections was 1.25% (n =3) compared with 2.5% for left-sided LA (n = 6). Independent predictors of CR were BMI (odds ratio [OR] = 3.46 per unit increase), and side (left versus right procedures, OR = 2.85). The level of experience of the surgical and anaesthesia team was also a significant predictor. Tumor histology and size, and surgical approach did not affect the CR nor OpT with any of the techniques used. Mean OpT for right (141 pts) and left adrenalectomy (100 pts) was: 91 min and 121 min. As the experience of the operative team increased, the OpT decreased significantly. OpT correlated significantly with BMI increase for both right and left LA. The learning curve, was of 28 and 41 cases for right and left LA respectively. Postoperative complications did not change throughout the series and were not dependent on operative experience and side.

Conclusions: Several preoperative factors, such as BMI, side of the adrenal tumor as well as surgeons experience and technique can significantly affect outcomes in LA. Consideration of these factors may help in case and approach selection, estimation of OpT, risk of CR and complications.

S046

LAPAROSCOPIC PARTIAL SPLENECTOMY, David Grossman MD, Laura Ludwig DO, Roberto Bergamaschi MD, Selman Uranues MD, Lehigh Valley Hospital, Allentown, Pennsylvania

Introduction: The aim of this study was to evaluate whether laparoscopic partial splenectomy is feasible and safe. The immunologic function of the spleen and its important role in immune defense has led to splenic-preserving surgery.

Methods: Data on consecutive patients presenting with localized benign or malignant disease of the spleen were included in a prospective database. Surgical technique consisted of six steps: patient positioning and trocar placement, mobilization of spleen, vascular dissection, parenchymal resection, and sealing / tamponading the transected edge, and removal of specimen.

Results: From 1999 to 2005, 38 patients underwent laparoscopic partial splenectomy. The indications included splenomegaly of unknown origin, splenic cysts, benign tumors (hamartoma, fibroma, schwannoma), metastasis from ovarian carcinoma, infarcts, and intrasplenic pancreatic cysts. The median operative time was 110 minutes. There was no postoperative mortality. Postoperative complications occurred in 1.7 percent of the patients. There were no reoperations. Three patients required blood transfusions.

Conclusion: Laparoscopic partial splenectomy is feasible and safe in patients with localized benign or malignant disease of the spleen.

S047

OUTCOMES ANALYSIS OF LAPAROSCOPIC RESECTION OF PANCREATIC NEOPLASMS, Richard A Pierce MD, William G Hawkins MD, Steven L Strasberg MD, David C Linehan MD, Valerie J Halpin MD, Christopher Eagon MD, Michael Brunt MD, Margaret M Frisella RN, Brent D Matthews MD, Department of Surgery, Washington University, St. Louis, Missouri

Introduction: Experience with laparoscopic resection of pancreatic neoplasms remains limited. The purpose of this study is to critically analyze the indications for and outcomes after laparoscopic resection of pancreatic neoplasms.

Methods: The medical records of all patients undergoing laparoscopic resection of pancreatic neoplasms from July 2000 to July 2005 were reviewed. Data are expressed as means \pm SD and ranges.

Results: Laparoscopic pancreatic resection was performed in 19 patients (M:F; 7:12) with a mean age of 55.7 years (range, 26-78) and mean BMI of 26 kg/m² \pm 3.6. Nine (47.4%) patients had previous intra-abdominal surgery. Indications for pancreatic resection were cyst (1), glucagonoma (1), gastrinoma (1), insulinoma (2), metastatic tumor (2), intraductal papillary mucinous tumor (3), nonfunctioning neuroendocrine tumor (4) and mucinous/serous cystadenoma (5). Mean tumor size was 2.5 cm \pm 1.7. Laparoscopic distal pancreatectomy was attempted in 16 patients and completed in 15 patients (spleen preserving, n=8). Laparoscopic enucleation was performed in 3 patients. Laparoscopic ultrasound (n=6) and a hand-assisted technique (n=1) were utilized selectively. Mean operative time was 225 min \pm 63.9 and mean blood loss was 310 ml (range, 20-2500). The mean postoperative LOS was 4.3 days \pm 2.2. There was one intraoperative complication (bleeding from splenic vein) requiring conversion to an open procedure. Five patients experienced postoperative complications including a UTI (1), bilateral lower extremity DVT and pulmonary embolus (1), peripancreatic fluid collection (1) and pancreatic duct leak (3). Two pancreatic duct leaks were managed by percutaneous drainage. The reoperation rate was 5.3% and the overall pancreatic-related complication rate was 26.3%. There was no 30-day mortality. One patient developed pancreatitis and a pseudocyst 5 months postoperative. An ERCP demonstrated pancreatic divisum with dorsal duct dilatation. This was managed successfully with a pancreatic duct stent.

Conclusions: Laparoscopic pancreatic resection is safe and feasible in selected patients with neuroendocrine tumors and cystic neoplasms of the pancreas. The rate of pancreatic duct leak was 16% and remains an area of development for the minimally invasive technique.



S048

INTRA-ABDOMINAL PRESSURE IN OBESE AND NON-OBESE INDIVIDUALS, B L Paton MD, W S Cobb, K Head RN, H J Norton PhD, T S Kuvada MD, K W Kercher MD, B T Heniford, Carolinas Medical Center, Charlotte NC

Objective: It is assumed that obese patients have higher intra-abdominal pressures (IAP) which may be a proposed mechanism to explain the increased risk of hernia formation following surgery. The purpose of this study is to compare the normal range of IAP in obese and normal weight individuals during routine activities.

Methods: After IRB-approval, 12 morbidly obese and 20 normal weight healthy individuals were enrolled in an IAP study. Pressure readings were obtained through a transurethral bladder catheter. Each subject performed 12 different tasks including bench pressing 25 pounds and arm curling 10 pounds. Statistics were performed by the Wilcoxon rank sum test and Spearman's correlation with a $p < 0.05$ considered statistically significant.

Results: The mean BMI in the obese group averaged 45.8 kg/m² (range, 39 to 55.3 kg/m²) and the mean BMI in the normal weight group averaged 24.6 kg/m² (range; 18.4-31.9 kg/m²). The obese group generated statistically higher IAP readings for all activities performed. Coughing and jumping generated the highest IAP for both groups. Using Spearman's correlation, increased BMI correlated with increased IAP for all activities including sitting, standing, bending at the waist and knees, coughing and performing a valsalva.

IAP in Normal weight and Obese Individuals

Maneuver	Normal (mmHg)	Obese (mmHg)
Standing	20 (15-27)	46 (22-90)
Jumping	171 (43-252)	212 (150-250)
Coughing	107.6 (64-141)	185 (80-255)
Bench press	7 (2-34)	22 (5-35)
Bend knees	20.6 (14-30)	56.7 (27-85)

Conclusion: Obese individuals have statistically higher IAP than those of normal weight regardless of activity, and in many activities increasing BMI directly correlates with increasing IAP. Coughing also generates considerable IAP. Based on our observations, weight reduction, by surgery or other means, and control of chronic cough prior to initial laparotomy or ventral hernia repair may decrease the incidence of hernia or recurrent hernia.

S049

A PROSPECTIVE RANDOMIZED STUDY WITH A 5 YEARS MINIMUM FOLLOW-UP OF TEM VS LAPAROSCOPIC TOTAL MESORECTAL EXCISION AFTER NEOADJUVANT THERAPY, Emanuele Lezoche MD, Mario Guerrieri MD, Angelo De Sanctis MD, Roberto Campagnacci MD, Maddalena Baldarelli MD, Giovanni Lezoche MD, Department of Surgery Paride Stefanini, II Clinica Chirurgica, University, La Sapienza, Rome, Italy, Department of General Surgery, University of Ancona, Ancona, Italy

Background: debate is still ongoing regarding the role of laparoscopy and Transanal Endoscopic Microsurgery (TEM): in rectal cancer surgery. Neoadjuvant therapy (NT) represent an integral part of the multidisciplinary approach to low rectal cancer treatment. Aim of this study was to compare the oncological results with a 5 years minimum follow-up of TEM and Laparoscopic Low Anterior Resection (LLAR) with total mesorectal excision in the treatment of T2 N0 rectal cancer following NT.

Methods: Seventy patients (pts) staged at the admission as T2 N0, G1-2 rectal cancer with a tumour diameter lower than 3 cm and located within 6 cm from the anal verge were enrolled: 35 were randomized to TEM and 35 to LLAR. The pts of both groups were previously underwent high dose radiotherapy (overall administration of 5,040 cGy in 28 fractions over 5 weeks) combined with continuous infusion of 5-Fluorouracil (200 mg/m²/day).

Results: At median follow-up of 68.3 months (60-108) in both

arms 2 local recurrence (5.7%) were observed after TEM and 1 (2.9%) after LLAR ($p=0.981$). One distant metastasis (2.9%) occurred after TEM and 1 (2.9%) after LLAR. The cumulative survival probability was 0.971 for TEM and 0.943 for LLAR. **Conclusion:** The study shows similar results between the two arms in terms of local recurrences, distant metastasis and cumulative survival probability. TEM should be a possible alternative to the rectal resection in the treatment of selected T2 rectal cancer.

S050

DIAPHRAGM PACING WITH NATURAL ORIFICE TRANSVERSAL ENDOSCOPIC SURGERY (NOTES): POTENTIAL FOR DIFFICULT TO WEAN INTENSIVE CARE UNIT(ICU) PATIENTS, Raymond Onders MD, Jeffrey Marks MD, Anthony Ignagni MS, Michael McGee MD, Michael Rosen MD, Amitabh Chak MD, Ashley Faulx MD, Robert Schilz DO, Steve Schomisch BS, Jeffrey Ponsky MD, University Hospitals of Cleveland and CASE School of Medicine

Background: Up to 50% of ICU patients require mechanical ventilation with 20% on a ventilator for over 7 days. Over 40% of time is spent weaning a patient from mechanical ventilation. Failure to wean from mechanical ventilation can in part be due to rapid onset of diaphragm atrophy, barotrauma, posterior lobe atelectasis, and impaired hemodynamics which are normally improved by maintaining a more natural negative chest pressure. We have shown that laparoscopic implantation of a diaphragm pacing system successfully provides adequate ventilation in spinal cord injured patients. Our preliminary data also suggests that DPS may benefit amyotrophic lateral sclerosis (ALS) patients with partial diaphragmatic atrophy. With the knowledge we have gained from these patients, we propose that acute ventilator assist with interventional neurostimulation of the diaphragm in the ICU is feasible and could facilitate weaning from mechanical ventilation. Current DPS implantation is carried out electively in the operating room but transfer of critically ill patients for procedures is not always possible or safe. NOTES has the potential to expand the benefits of DPS into this acute patient population by allowing it to be done at the bedside like the common gastrostomy tube. This study evaluates the feasibility of this approach in a porcine model.

Methods: Pigs were anesthetized and peritoneal access with the flexible endoscope was obtained using a guidewire, needle knife cautery and balloon dilatation. The diaphragm was mapped to locate the motor point (where stimulation provides complete contraction of the diaphragm) with a novel endoscopic electrostimulation catheter. An intramuscular electrode was then placed at the motor point with a percutaneous needle. This was then attached to the diaphragm pacing system. The gastrostomy was managed with a gastrostomy tube.

Results: Four pigs were studied and the diaphragm could be mapped with the endoscopic mapping instrument to identify the motor point. In one animal, under trans-gastric endoscopic visualization a percutaneous electrode was placed into the motor point and the diaphragm could be paced in conjunction with mechanical ventilation.

Conclusions: These animal studies support the concept that trans-gastric mapping of the diaphragm and implantation of a percutaneous electrode for therapeutic diaphragmatic stimulation is feasible. These encouraging results warrant a prospective human trial to assess safety and efficacy.

S051

ENDOSCOPIC ABLATION OF INTESTINAL METAPLASIA WITH HIGH GRADE DYSPLASIA (IM-HGD) IN ESOPHAGECTOMY PATIENTS USING A BALLOON-BASED ABLATION SYSTEM, C. Daniel Smith MD, Pablo Bejarano MD, Raman Muthusamy MD, Marco Patti MD, W. Scott Melvin MD, Brian J Dunkin MD, Emory University, Atlanta, GA, University of Miami, Miami, FL, Univ. of California, San Francisco, CA, Ohio State University, Columbus, Ohio

Objective: To determine the optimal treatment parameters for the ablation of IM-HGD using a balloon-based ablation system (HALO360, BARRX Medical, Inc.).

Methods: Immediately prior to esophagectomy, subjects underwent endoluminal ablation of 1 or 2 circumferential 3cm



segments of the esophagus containing IM-HGD using the HALO360 System. Treatment settings were randomized to 10, 12, or 14 J/cm² and 2 to 6 applications. Following esophagectomy multiple sections from each ablation zone were evaluated using H&E staining and microscopy.

Results: Eight male patients were treated and 11 treatment zones analyzed. There were no device-related adverse events. At resection, there was no evidence of periesophageal or transmural thermal injury. Gross examination of the ablation zones showed clearly demarcated sections of coagulated, sloughing epithelium. Maximum ablation depth was to the lamina propria or muscularis mucosae (MM) in 10/11 specimens. One section treated at the highest energy (14 J/cm², 4x) had edema in the submucosa. In the well overlapped areas of treatment 91% (10/11) of specimens had no evidence of IM-HGD remaining. In one specimen the majority of IM-HGD was ablated, but small focal areas remained. In 3 specimens there was IM-HGD at the edge of the treatment zones where overlap of the multiple energy applications was incomplete. Nine specimens had "ghost cells" of IM-HGD that did not appear viable.

Conclusions: Complete ablation of IM-HGD, without deep injury is possible using this device. A dose related increase in treatment depth is seen as energy density and application number increases, but this is limited primarily to the MM. Small residual foci of IM-HGD at the edges of some ablation zones appears to be from failure to thoroughly overlap the multiple treatment applications. Clinically this is avoided by treating all visible IM-HGD rather than a selected zone. This study, along with non-esophagectomy clinical trials currently underway, will identify the optimal energy density setting and applications number for treating HGD in patients who otherwise would be subjected to PDT or surgical esophagectomy.

S052

PERIOPERATIVE OUTCOME AFTER LAPAROSCOPIC RADIOFREQUENCY ABLATION OF LIVER TUMORS: AN ANALYSIS OF 521 ABLATIONS.

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Objectives: Radiofrequency thermal ablation (RFA) is gaining increased acceptance for the treatment of unresectable primary and metastatic liver tumors. Understanding the morbidity and laboratory changes after RFA is important for operative indications and the perioperative management.

Methods and Procedures: We prospectively analyzed the 30-day morbidity and mortality of patients undergoing laparoscopic RFA for liver tumors in a 10-year period. Laboratory studies included a complete blood count, electrolytes, liver function tests, prothrombin time /INR and tumor markers obtained preoperatively, on postoperative day (POD) 1, day 7 and at 3 months.

Results: A total of 521 ablations were performed in 428 patients. Three hundred and forty-six patients underwent a single ablation and 82 repeat ablations. The pathology was metastatic adenocarcinoma in 269 (52%), hepatocellular cancer in 106 (20%), metastatic neuroendocrine cancer in 77 (15%), and other tumors in 69 (13%). A total of 1636 lesions (mean 3.1 per patient, range 1-16) were ablated. The mean +/- SD tumor size was 2.7 +/- 1.6 cm (range 0.3-11.5 cm). All cases were completed laparoscopically. The 30-day mortality was 0.4 % (n=2) and morbidity 2.6 % (n=14) including liver abscess in 3 patients, intra-abdominal hemorrhage in 2 patients, trocar injury in 2 patients and flank abscess, arrhythmia, pulmonary embolism, post-procedure pain requiring admission, angioedema - urticaria, wound infection, and recurrent ascites in 1 patient each. The average length of stay was 1.0 day. Serum AST, ALT and bilirubin levels increased 14,10 and 2 folds, respectively, on POD 1 with return to baseline in 3 months. Serum alkaline phosphatase and GGT levels showed a 25% increase on POD 7 with return to baseline in 3 months. There were no significant changes in platelet counts or prothrombin times postoperatively.

Conclusions: To our knowledge, this is the largest series of patients with liver tumors treated with laparoscopic RFA. This

study allows us to understand the expected morbidity of the procedure. Despite significant patient comorbidities, this procedure was tolerated with a low morbidity and mortality. Postoperative coagulopathy was not observed. Postoperative rise of liver function tests is expected and reflects the liver injury response to RFA. This information can be used to expand the patient population that may benefit from laparoscopic RFA.

S053

EVALUATION OF ACELLULAR HUMAN DERMIS REINFORCEMENT OF THE CRURAL CLOSURE IN PATIENTS WITH DIFFICULT HIATAL HERNIAS.

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INTRODUCTION: Prosthetic repair of large hiatal hernias has not been widely accepted despite high reported recurrence rates with primary repair. AlloDerm (Lifecell Corp.) is an acellular human dermis preparation that may circumvent mesh-related complications at the hiatus by becoming remodeled by native cells.

METHODS: Records of 17 patients (pts) who underwent laparoscopic repair of difficult hiatal hernias (HH) using AlloDerm to buttress the crural closure from June 2004 to July 2005 were retrospectively analyzed. Hernias were paraesophageal (PEH) in 11 pts, large type 1 in 2 pts, and recurrent after prior HH repair in 4 pts. Follow-up (F/U) was by office visit and by phone. Barium swallow (BAS) was obtained 6-12 months postop. Data are mean ± SD.

RESULTS: Mean age of the 17 pts was 65 ± 12 years, BMI 31 ± 4, and ASA class 2.4 ± 0.5. Mean GE junction distance above the diaphragm in the PEH and type I HH's was 4.9 ± 1.5 cm; 9 of 12 patients had >50% of the stomach in the chest. Mean operating time was 273 ± 48 minutes. Average hiatal defect size was 5 x 3 cm; 4 ± 1 sutures were used to close the crura primarily followed by Alloderm onlay repair. Nissen fundoplication was performed in all patients, esophageal lengthening in 4 pts, and gastropexy in 3 pts. Complications were one intraoperative gastric perforation repaired laparoscopically, and one possible esophageal leak that resolved with conservative treatment. Mean follow-up was 8 ± 6 months (range 0.5 - 22 months). Postoperatively, only 1 (6%) patient had heartburn/regurgitation, 1 (6%) had dysphagia (from esophageal dysmotility), and only 2 (12%) take proton pump inhibitors. Follow-up BAS at an interval of 8 ± 5 months in 7 pts showed 1 (6%) possible anatomic failure of a redo Nissen in an obese patient. Reoperative conversion to a gastric bypass 15 months later showed an intact crural closure with a remodeled Alloderm buttress site.

CONCLUSIONS: AlloDerm may be an effective material to use to buttress the crural closure in pts with large or difficult hiatal hernias. Longer follow-up in larger numbers of patients is needed to assess the validity of this approach.

S054

MINIMALLY INVASIVE ESOPHAGECTOMY FOR CARCINOMA ESOPHAGUS IN INDIAN EXPERIENCE, Chinnuswamy

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Objective: The experience of minimally invasive esophagectomy (MIE) for malignant esophageal lesion is limited in world literature. The aim of this study was to evaluate the outcome of minimally invasive esophagectomy procedures viz., thoracoscopic esophagectomy, laparoscopic transhiatal esophagectomy and laparoscopic esophagogastrectomy for the treatment of esophageal cancer.

Method: From 1995 to 2004, we performed MIE in 130 patients of esophageal cancer. Indications for surgery was squamous cell carcinoma (n= 110) and adenocarcinoma (n=20). Squamous cell carcinoma was found in middle third (n=72)



and lower third (n=38) of esophagus while adenocarcinoma was found at lower end of esophagus and cardia only. Only one patient (0.77%) received neoadjuvant therapy. Thoracoscopic esophagectomy was performed for middle third lesions. Laparoscopic transhiatal esophagectomy was performed for lower third SCC (n=38) while all patients harboring adenocarcinoma at cardia underwent laparoscopic esophagogastrectomy (n=20) with intrathoracic anastomosis. **Result:** Of 130 patients, 102 (78.46%) were males and 28 (21.54%) females. Median age was 61.3 years (range, 30-79). Approach to esophagectomy combined with 2 field lymphadenectomy was thoracoscopic (n=72, 55.38%), laparoscopic transhiatal (n=38, 29.24%) and laparoscopic esophagogastrectomy (n=20, 15.30%). Minimally invasive esophagectomy was successfully completed in all patients. Mean number of lymph nodes harvested were 16 (range, 11-34). Median operative time was 210 +/- 80 minutes and mean blood loss 150 +/- 90 mL. Median intensive care unit stay was 2 days (range, 1-35), time to start oral intake was 4 days (range, 2-45) and hospital stay was 8 days (range, 6-55). 30 days postoperative mortality was 0.77% (n=1). Major morbidity occurred in 16.75% with anastomotic leak rate of 4.62% (n=6). In a mean followup of 16 months there were no neck or port-site recurrence. **Conclusion:** MIE is feasible, safe and oncologically acceptable procedure for malignant esophageal lesions with lower mortality rate (0.77%) and shorter hospital stay (8 days). It has potential to revolutionize the management of esophageal cancer.

S055

LAPAROSCOPIC VERSUS OPEN TRANSHIATAL RESECTION FOR MALIGNANCIES OF THE DISTAL ESOPHAGUS: A COMPARISON OF TWO COHORTS. J.J.G. Scheepers MD, D vd Peet PhD, C Sietses PhD, M.A. Cuesta PhD, Department of Surgery Vrije Universiteit Medical Center (VUMC), Amsterdam, Netherlands

Introduction: Resection of the esophagus remains the only curative therapy for esophageal cancer. Conventional resections are right sided thoracotomy in combination with laparotomy, and the transhiatal approach according to Orringer. An alternative approach is laparoscopic transhiatal resection, which combines perfect visualization of the esophagus during mediastinal dissection with the known advantages of laparoscopy.

This study evaluates the outcome of two groups of patients treated for distal esophageal cancer by means of a laparoscopic or open transhiatal esophagus resection.

Patients and methods: 50 laparoscopic transhiatal esophageal resections (between 2001-2004) were compared with a historical control group of 50 open transhiatal resections (between 1997-2001).

Results: Operating time was not significantly longer in the laparoscopic group (300 vs 280 minutes), but laparoscopic esophageal resection was associated with less blood loss 680 vs 1125 ml (p<0,05), shorter ICU stay 1,4 vs 4,3 days (p<0,05), and shorter hospital stay 14 vs 18 days (p<0,05). There were no differences in pathological staging, morbidity and mortality. The Kaplan Meier analysis of laparoscopic vs open resection at 5 years shows an overall survival of 24% vs 26% (p=NS) with the same disease free survival at 5 years (p=NS). In the laparoscopic group, conversion to an open procedure was necessary in 10 patients (20%).

Conclusion: Laparoscopic transhiatal esophagus resection is a safe procedure with important advantages to the open procedure such as less blood loss and shorter ICU stay. Moreover there are no differences in overall and disease free survival between both groups.

S056

DEFINING FAILURE AND ITS OUTCOMES AFTER HELLER MYOTOMY FOR THE MANAGEMENT OF ACHALASIA. Alessandro Stival MD, D. Lee Howell MD, Vickie Swafford RN, John G Hunter MD, C. Daniel Smith MD, Emory Endosurgery Unit, Emory University School of Medicine, Atlanta, GA 30322
OBJECTIVES: Heller myotomy for the management of

Achalasia has realized considerable success in 90-95% of patients. However, little is written about the failures, including long-term outcomes. Herein we report our experience with 209 patients undergoing laparoscopic Heller myotomy specifically focusing on failures.

METHODS: Data on all patients undergoing foregut surgery are collected prospectively. Between 1994 and 2004, 209 patients underwent Heller myotomy for Achalasia, with nearly all also receiving a fundoplication (99.5%). A management algorithm and standardized operative technique was followed by the two surgeons caring for the majority of these patients. Average follow-up was 21 months (1 to 91). Symptom questionnaires were used at different intervals during follow-up. Failure was defined as persistence or recurrence of severe symptoms, need for endoscopic intervention(s), repeat Heller myotomy or esophagectomy. In these 209 patients there were 26 failures (12%).

RESULTS: Among the 26 failures, all had a concurrent fundoplication: 76% Toupet, 20% Dor, and 4% a modified Dor. None experienced an intraoperative complication during initial procedure (i.e., perforation). Nineteen patients (73%) had undergone a preoperative endoscopic intervention (pneumatic dilation and/or botox injection) compared to only 7 (27%) of those without failure (p<0.05). Six patients (23%) had undergone a prior foregut operation compared with only 2.7% among the non-failure patients (p<0.05). Moderate to severe dysphagia was the main complaint for 92.3% of these patients, followed for regurgitation (50%), and heartburn (38.5%). Their control included expectant management and reassurance in 12 (46%), endoscopic dilation in 7 (27%), redo Heller myotomy in 3 (12%) and esophagectomy in 4 (15%).

CONCLUSION: Treatment of Achalasia with Heller myotomy is successful in the vast majority of patients. Among those who fail, prior endoscopic treatment and mismanagement with prior fundoplication is more common. Over 7% of those who fail will require some intervention for management. Prior to Heller myotomy patients should be specifically counseled about the consequences of failure, including the possibility of esophagectomy.

S057

LAPAROSCOPIC TRANSHIATAL AND THORACOSCOPIC ESOPHAGECTOMY FOR THE TREATMENT OF ESOPHAGEAL BENIGN DISEASES. LONG-TERM FOLLOW-UP. AUREO L DE PAULA PhD, ANTONIO L MACEDO MD, VLADIMIR SCHRAIBMAN MD, Hospital de Especialidades de Goiania e Hospital Albert Einstein

Indications for esophagectomy are limited in patients presenting benign diseases. These procedures are related to high morbidity and mortality, and also to adverse effects in short and long term follow-up. The objective of this paper is to present the results in long term follow-up in patients submitted to thoracoscopic esophagectomy (TE) and trans-hiatal laparoscopic esophagectomy (THLE).

Between July 1992 and July 2004, 62 patients were submitted to TE and/or THLE. Median age was 55,1 years (19-78). 23 were female and 39 male. Median weight was 67 kg (38-113). Main indications included: idiopathic advanced achalasia (12), Chagas disease (22), stenosing non-dilatatable esophagitis (3), antireflux surgery failure (5), Heller surgery failure (17), scleroderma (2) and caustic stenosis (1). All patients presented dysphagia, regurgitation and median weight loss of 18%. Median duration of symptoms was 11,8 years (3-35). All patients did upper endoscopy, upper GI series, esophageal manometry and 24 hour pH-metry.

First surgical option was THLE, done in 57 patients. TE was done in 5 patients. Conversion to open surgery in one patient. One patient was converted from THLE to TE. Median operative time was 216 min (185-392). Intra-operative complications included: unilateral pneumothorax (14) and bilateral (6), duodenal perforation during pyloromyotomy (2), tracheal lesion (1). Median in hospital stay was 7,2 days (4-21). Immediate post-operative complications included: bleeding without blood transfusion (2), pleural effusion (13), transitory dysphonia (4), slow gastric emptying (2) and esophagogastric anastomosis fistula (7). Mortality was 1,6% (pulmonary embolism). Mean post-operative follow-up was 88 months (7-151). After 6



months of surgery all patients were cured from dysphagia. Main post-operative complaint was regurgitation. Patients with TE showed intra-thoracic stomach with slower emptying time. Endoscopic pyloric dilation was done in 14 patients. Esophagectomies done by THLE and TE showed to be technically viable with low morbidity and mortality. There was a significant improvement in short and long term follow-up after the institution of a gastric tube as a routine.

S058

POSTMYOTOMY RECOLLECTION OF PREMYOTOMY SYMPTOMS OF ACHALASIA IS VERY ACCURATE, SUPPORTING LONGITUDINAL STUDIES OF SYMPTOM IMPROVEMENT,

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Introduction: Recollection of preoperative symptom frequency and severity may change postoperatively, thus invalidating longitudinal studies. This study was undertaken to compare symptoms of achalasia before myotomy to postoperative recollection of premyotomy symptoms.

Methods: 288 patients, 55% male, of median age 46 years, have undergone laparoscopic Heller myotomy and have been followed through a prospectively maintained registry. Preoperatively, patients scored the frequency and severity of their symptoms utilizing a Likert scale: 0 (never/not severe) to 10 (always/severe). After laparoscopic Heller myotomy, patients scored the frequency and severity of their symptoms, and rescored their preoperative symptoms. Data are presented as median, mean ± SD.

Results: Before myotomy, dysphagia, regurgitation, choking, chest pain, vomiting, and heartburn were particularly notable; symptom scores nearly globally improved after myotomy (p<0.05 for all, Wilcoxon matched pairs test), especially obstructive symptoms. Postmyotomy recollection of premyotomy symptom frequency and severity was not substantively different from before myotomy, with few exceptions (Table).

		Before Myotomy		After Myotomy		P-value
		Frequency	Severity	Frequency	Severity	
Dysphagia	Frequency	10.0±0.0	10.0±0.0	10.0±0.0	10.0±0.0	2.53E-27
Dysphagia	Severity	10.0±0.0	10.0±0.0	10.0±0.0	10.0±0.0	2.53E-27
Regurgitation	Frequency	5.7±2.7	5.7±2.7	5.0±3.0	5.0±3.0	0.82E-08
Regurgitation	Severity	7.7±3.2	7.7±3.2	5.0±3.0	5.0±3.0	0.34E-07
Vomiting	Frequency	5.4±3.5	5.4±3.5	5.0±3.0	5.0±3.0	0.57E-04
Vomiting	Severity	3.4±3.9	3.4±3.9	3.1±3.7	3.1±3.7	0.59E-03
Choking	Frequency	5.9±3.4	5.9±3.4	5.0±3.0	5.0±3.0	2.75E-11
Choking	Severity	10.0±0.0	10.0±0.0	10.0±0.0	10.0±0.0	2.75E-11
Heart Burn	Frequency	4.4±3.2	4.4±3.2	4.4±3.2	4.4±3.2	2.70E-10
Heart Burn	Severity	3.4±3.7	3.4±3.7	3.4±3.7	3.4±3.7	0.24E-08
Chest Pain	Frequency	5.5±3.8	5.5±3.8	5.5±3.8	5.5±3.8	2.72E-08
Chest Pain	Severity	5.5±3.8	5.5±3.8	5.5±3.8	5.5±3.8	0.63E-08

Conclusions: Before myotomy, patient symptom scores reflected the deleterious impact of achalasia. After myotomy, patient symptom scores dramatically improved, reflecting the favorable impact of laparoscopic Heller myotomy. Even years after myotomy, patient recollection of premyotomy symptom severity and frequency are very accurate and support longitudinal studies of symptom improvement after myotomy.

S059

BILATERAL LAPAROSCOPIC INGUINAL HERNIA REPAIR IN PATIENTS WITH OCCULT CONTRALATERAL INGUINAL DEFECTS,

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INTRODUCTION: A prospective clinical study was undertaken to reveal the occurrence rate of an occult contralateral inguinal defects in patients diagnosed with unilateral groin hernia prior to undergoing a laparoscopic totally extraperitoneal (TEP) repair and to compare clinical outcomes of bilateral versus unilateral TEP in this group of patients.

METHODS: One hundred consecutive patients with uncomplicated primary or recurrent unilateral hernias were enrolled in the study. Exclusion criteria included: bilateral inguinal hernias found on the preoperative physical exam, femoral hernias and prior lower abdominal celiotomy. TEP repair was performed by the same laparoscopic surgeon in all 100 subjects over a 48 month period. All patients underwent laparoscopic exploration of the contralateral groin and unilateral or bilateral TEP repair based on intraoperative findings.

RESULTS: Median follow-up was 24 (2 ? 46) months. Median age was 48 (18 ? 73). There were 89 men and 11 women. All the subjects were stratified into 2 groups, first of which consisted of 78 patients (78%) with intraoperative confirmation of unilateral hernias. Forty five (58%) of the unilateral hernias occurred on the right, while 33 (42%) were on the left. The second group of patients consisted of 22 (22%) subjects who had bilateral inguinal defects discovered only intraoperatively. Of those 22 patients 19 (86%) patients were diagnosed with left and 3 (14%) patients with right inguinal hernias preoperatively. Average operative time was 38.7 min in the first group and 53.9 in the second group. Minor complication occurred in 3 (3.8%) patients in the first group and in 2 (9%) in the second group. There were no major complications. Median period of hospitalization was 1.1 days in both groups. Median period of returning to normal activity was 6.2 days after unilateral repair and 8.4 days after bilateral TEP. There were no recurrences for the follow up period in either group.

CONCLUSION: This study revealed an occurrence rate of 22% for occult contralateral inguinal defects. Routine contralateral groin exploration with proper evaluation during TEP is valuable. Clinical outcomes of bilateral TEP repairs for these patients are as good as those of unilateral TEP for patients with single inguinal hernias.

S060

OPEN VS LAPAROSCOPIC VENTRAL HERNIA REPAIR: A PROSPECTIVE COMPARATIVE STUDY,

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Since its introduction in 1992, laparoscopic incisional hernia repair has revolutionized the management of ventral hernia. To date, preliminary studies show that laparoscopic approach seems to have a better outcome than the historical conventional approach. In fact, open ventral hernia repair either after primary suture or after mesh repair is known to be associated with significant morbidity and high recurrence rates.

Laparoscopic approach is increasingly becoming an attractive option and may possibly replace open repairs. Our objective was to compare open versus laparoscopic repair for ventral hernia. 100 patients underwent 50 laparoscopic and 50 open ventral hernia mesh repairs from 2001 to October 2004. There were 86 female and 14 male patients (mean age 55.66 yrs; range 30-83 yrs) in the study. No significant difference between the two groups was noted regarding patient demographics except that the mean hernia size for laparoscopic group was larger significantly larger (94 cm²) as compared to open (55 cm²) (p<0.002) In the laparoscopic group 23.5% of the patients had a previous open repair while only 16.2% in the open group. In both groups the hernia was reducible in 65% of cases. Open repair was done using standard Rives-Stoppa technique with mesh while laparoscopic repair was performed using three trocars placed laterally in the abdominal wall. IPOM was utilized with both transfascial suture and spiral staplers for fixation of double-layer polyester mesh coated with collagen membrane. The mean follow-up time was 18 months. We found no significant difference in the operative time between the two groups (laparoscopic 110 min vs open 95 min). Pain score and analgesic requirement was not significantly different between the two groups for the first 48hours but a significantly less pain was noticed at 72 hours (p<0.02). Hospital stay was significantly less in the laparoscopic group (2.2 vs 3.6days, P < 0.02). There was no difference in overall complication rates (p= 0.072). Two patients in the open group vs one in the laparoscopic required the removal of the mesh for infection. There was two recurrence (4%) in laparoscopic group and 6 (12%) in open group. In conclusion, laparoscopic ventral hernia repair offers significant advantages and should be considered for repair of primary and incisional ventral hernias larger than 3 cm. In our series significantly larger ventral hernias were repaired with better short and medium term outcomes.

S061



OVER FIVE HUNDRED CONSECUTIVE LAPAROSCOPIC TOTALY EXTRAPERITONEAL HERNIA REPAIRS USING MESH WITHOUT FIXATION. Scott J Ellner DO, Ibrahim M Daoud MD, Yusuf Gulleth MD, Saint Francis Hospital, Hartford Connecticut, Fellowship in Minimally Invasive Surgery

Background: Five hundred and eleven consecutive laparoscopic totally extraperitoneal (TEP) inguinal hernia repairs without mesh fixation were performed by a single surgeon between October 2001 and August 2005. This paper will review the patient outcomes of this ambulatory surgical procedure over a 5 year period.

Methods: Three hundred and sixty-two patients with primary or recurrent inguinal hernias underwent laparoscopic TEP repair without staple or suture fixation of mesh. Patients with contraindications to general anesthesia, scrotal or strangulated hernias, and prior prostatectomy were excluded. Once preperitoneal laparoscopic dissection and reduction of the hernia sac from the myopectineal orifice was sufficiently completed, a preformed polypropylene mesh (3D Max® Bard) was placed without fixation. All patients were, subsequently, discharged within 3 hours after surgery.

Results: Three hundred and twenty-one patients (89%) had primary hernias (217 were unilateral and 106 were bilateral). Forty-one (11%) patients had recurrent hernias (26 were unilateral and 15 were bilateral). The mean age was 46 years with a male to female ratio of 3:1. Average operative time was 31 minutes (range of 12 to 55 minutes). Intraoperative complications were minimal. Pneumoperitoneum occurred in 14% of the patients resulting in a 3.5% transabdominal preperitoneal repair (TAPP). There was one case of prolonged bleeding. Post-operative complications included urinary retention (0.6%), superficial wound infection (0.6%), significant bruising (1.2%), and port site abscess (0.6%). No re-operations or hospitalizations were needed. Of 93% of patients seen for post-operative follow-up 96.5% reported return to full activity with marked improvement. Eighty percent of patients did not require narcotic analgesia after post-operative day 3. One recurrence (0.2%) was reported.

Conclusion: Laparoscopic TEP hernia repair without mesh fixation is a safe procedure with low recurrence and the potential for eliminating nerve injury. Return to full activity occurred in the early post-operative period with minimal use of narcotic pain medication.

S062

LAPAROSCOPIC PARASTOMAL HERNIA REPAIR USING A NON-SLIT MESH TECHNIQUE. G J Mancini MD, B J Ramshaw MD, B T Heniford MD, Y M Novitsky MD, K A LeBlanc MD, M J Elieson MD, A E Park MD, S M Kavic MD, G R Voeller MD, E A Goldenberg BA, Departments of Surgery at University of Missouri, Emory University, Carolinas Medical Center, University of Maryland, Louisiana State University, and University of Tennessee

INTRODUCTION: The management of parastomal hernia (PH) is associated with high morbidity and recurrence rates between 20 to 70%. This study describes a novel laparoscopic approach and evaluates outcomes.

METHODS: A consecutive multi-institutional series of patients undergoing PH repair between 2001 and 2005 were analyzed retrospectively. Laparoscopy was utilized by modifying the open Sugarbaker technique. A non-slit ePTFE mesh was placed to provide 5cm overlay coverage of stoma and defect. Transfascial sutures secured the mesh, allowing stoma exit from the lateral edge. Five advanced laparoscopic surgeons performed all the procedures. Primary outcome measure was recurrence.

RESULTS: Twenty-five patients with a mean age of 60y and a BMI of 29 underwent surgery. Six had previous stoma revisions. Mean size of the hernia defect was 64cm², mean ePTFE size 365cm², respectively. There was no conversion with overall postoperative morbidity of 23% and mean LOS of 3.3days. One patient died from pulmonary complications, one patient had a trocar site infection, and one patient had a mesh infection requiring mesh removal. At a median follow-up of 19mos (2-38) 4% (total = 1) of the patients recurred.

CONCLUSION: Laparoscopic non-slit mesh technique for the

repair of parastomal hernias appears to be a promising management approach. In the experienced hands it may provide for a safe repair with low rates of hernia recurrence.

S063

POOLED DATA ANALYSIS OF LAPAROSCOPIC VS OPEN VENTRAL HERNIA REPAIR: 13 YEARS OF PATIENT DATA ACCRUAL. Richard A Pierce MD, Margaret M Frisella RN, Brent D Matthews MD, L. Michael Brunt MD, Department of Surgery and Institute for Minimally Invasive Surgery, Washington University School of Medicine, St. Louis, Missouri

Introduction: The purpose of this study is to analyze the published perioperative results and outcomes of Laparoscopic (LVHR) and Open (OVHR) ventral hernia repair with a focus on complications and hernia recurrences.

Methods: Perioperative outcomes, complications and follow-up data were compiled from all English-language reports of LVHR published from 1996 through August 2005 that accrued patients over a 13 year period (from 1991 through October 2003). Series with fewer than 20 cases of LVHR, those that did not report details of complications, and those in which the patients were included in a later or larger series were excluded. Data were extracted from 28 reports that dealt with LVHR alone (Unpaired Studies) and 12 that directly compared LVHR to OVHR (Paired Studies). Statistical methods used were Chi square analysis and Fisher's exact test.

Results: A total of 5196 patients who underwent repair of 5223 hernias reported in 40 published series were included (LVHR, 4342 patients; OVHR, 854 patients). In the overall analysis (combined Paired and Unpaired Studies), LVHR was associated with significantly fewer wound complications (3.7% vs. 15.8%, $p < .0001$), total complications (22.1% vs. 33.0%, $p < .0001$), and hernia recurrences (5.0% vs. 13.4%, $p < .0001$). Each of these outcomes maintained statistical significance when only the Paired Studies were analyzed. LVHR was also associated with fewer neurologic complications (0% vs. 0.2%, $p = 0.027$) but a higher incidence of prolonged suture site pain (1.8% vs. 0.4%, $p = .0015$); neither of these outcomes reached statistical significance in the Paired Study analysis. No differences in GI, cardiac, pulmonary, urinary, or thromboembolic complications were found. The overall mortality rate was 0.09% with LVHR and 0.12% with OVHR ($p = NS$). An overall trend toward shorter hospital length of stay was also observed for LVHR.

Conclusions: The early published literature on LVHR indicates fewer wound-related and overall complications, and a lower rate of hernia recurrence compared to OVHR. Further controlled trials are necessary to substantiate these findings and to assess the health care economic impact of this approach.

S064

CONCURRENT VALIDITY OF AUGMENTED REALITY METRICS APPLIED TO THE FUNDAMENTALS OF LAPAROSCOPIC SURGERY (FLS). E. Matt Ritter MD, Tamara W Kindelan MD, Curtis Michael, Elisabeth A Pimentel BA, Mark W Bowyer MD, 1NCA Medical Simulation Center, Department of Surgery, Uniformed Services University, 2Division of General Surgery, National Naval Medical Center, Bethesda Maryland

Objective: Current skills assessment in the Fundamentals of Laparoscopic Surgery (FLS) program is labor intensive requiring one proctor for every 1-2 subjects. The ProMIS Augmented Reality (AR) simulator (Haptica, Dublin IRE) allows for objective assessment of physical tasks through instrument tracking technology. We hypothesized that the ProMIS metrics could differentiate between ability groups as well as standard FLS scoring with fewer personnel requirements

Methods: We recruited 60 volunteer subjects. Subjects were stratified based on their laparoscopic surgical experience. Those who had performed more than 100 laparoscopic procedures were considered experienced ($n=8$). Those with less than 10 laparoscopic procedure were considered novices ($n=44$). The rest were intermediates ($n=8$). All subjects performed up to 5 trials of the peg transfer task from FLS in the ProMIS simulator. FLS score, instrument path length, and instrument smoothness assessment were generated for each trial.

Results: For each of the 5 trials, experienced surgeons outperformed intermediates who in turn outperformed novices.



Statistically significant differences were seen between the groups across all trials for FLS score ($p < 0.001$), ProMIS path length ($p < 0.001$) and ProMIS smoothness ($p < 0.001$). When the FLS score was compared to the path length and smoothness metrics, a strong relationship between the scores was apparent for novices ($r = 0.78$, $r = 0.94$, $p < 0.001$) respectively, intermediates ($r = 0.5$, $p = 0.2$, $r = 0.98$, $p < 0.001$), and experienced surgeons ($r = 0.86$, $p = 0.006$, $r = 0.99$, $p < 0.001$)

Conclusions: The construct that the standard scoring of the FLS peg transfer task can discriminate between experienced, intermediate, and novice surgeons is validated. The same construct is valid when the task is assessed using the metrics of the ProMIS. The high correlation between these scores establishes the concurrent validity of the ProMIS metrics. The use of AR for objective assessment of FLS tasks could reduce the personnel requirements of assessing these skills while maintaining the objectivity.

S065

WHAT CAN MOTION DERIVATIVES TELL US ABOUT SKILL PERFORMANCE? Laurel N Vuong BS, Steven D Schwaitzberg MD, Caroline G Cao PhD, Tufts University School of Medicine, Cambridge Health Alliance, Tufts University School of Engineering

Surgical simulators is a popular topic of discussion on training in laparoscopic surgery. They reduce the need to use human cadavers or animal models for skills development. A subset of the MISTELS methodology has been employed in the manual skills assessment for the Fundamentals Laparoscopic Skills (FLS) program because it was shown to be a valid discriminator of surgical experience. Pure performance outcome, such as time to task completion and number of errors, is used for scoring, which is dependent on the consistency of the scorer. A new simulator environment has been created which uses motion tracking for measurement of performance outcome measures and motion derivatives such as smoothness and efficiency. The purpose of the study was to determine if the motion derivatives can be used to automatically and objectively discriminate experience levels. Twenty-one subjects (6 medical students, 14 surgical residents, and 1 expert surgeon) were recruited to perform the following tasks: peg transfer, pattern cutting, pre-tied loop placement, extracorporeal and intracorporeal knot-tying in the new simulator environment. Subjects were evaluated on time to completion, errors, smoothness and total path length (used to calculate efficiency). Results show that experience level is still distinguishable when using task-dependent parameters to evaluate performances during peg transfer ($p = 0.035$), pre-tied loop placement ($p = 0.022$), extracorporeal ($p = 0.0006$) and intracorporeal ($p = 0.025$) knot tying in this new simulator environment. Evaluation of performance using task-independent parameters significantly distinguished training level in three tasks: (1) smoothness of the left instrument was significant as a function of experience level in extracorporeal knot-tying ($p = 0.016$), (2) efficiency (total path length divided by time to completion) was also significant in the movement of the right tool as a function of experience level in peg transfer ($p = 0.0011$) and (3) pre-tied loop placement ($p = 0.013979$). This preliminary analysis shows that automatic and objectively measured motion derivatives can be associated with the level of experience. These results indicate a potential for the application of an automatic and objective means of skills evaluation.

S066

REVERSE-ALIGNMENT SURGICAL SKILLS ASSESSMENT, James Frydman MD, Jon C Gould MD, University of Wisconsin Medical School

Introduction: At times during certain laparoscopic procedures, a surgeon must operate while the camera is oriented at an angle approximating 180-degrees to the axis of his/her instruments. The aim of this study is to measure the degree to which task performance is impaired under reverse-alignment (mirror image) conditions in operators with varying levels of skill.

Methods: Nineteen general surgery residents (PGY# 2-5, laparoscopic case experience 1-144 cases) and 3 attending sur-

geons (>1,000 laparoscopic cases) were tested in a video trainer. A task designed to simulate tack placement during laparoscopic ventral hernia repair was created. Our template consists of a 3.75? diameter circle with 8 smaller 0.38? diameter circles spaced evenly within the perimeter of the larger circle. Time required to accurately target (not drag) the tip of a laparoscopic dissector in each hand to the 8 small circles was measured in both forward and reverse-alignment conditions. Data regarding prior laparoscopic case volume and MISTELS scores were available for each resident. Spearman correlation coefficient calculation was used to determine if any measure of laparoscopic skill correlated with reverse-image skills.

RESULTS	r2	p-value
Forward:reverse	0.31	0.02
Rev:PGY#	0.08	0.24
Rev:L/S#	0.06	0.29
Rev:MISTELS	0.13	0.12
MISTELS:L/S#	0.45	0.004

r2 of 1.0=perfect correlation between variables. Rev=reverse-alignment time (seconds). L/S#=laparoscopic case volume experience.

Mean resident reverse-alignment times were significantly greater than attending times (149 +/- 99 seconds resident vs. 32 +/-8 attending; $p = 0.006$).

Conclusion: This data suggests that reverse-alignment surgical skills can be acquired with experience, but may require a volume of cases exceeding that encountered in residency training. Reverse image skills are not derivative from surgical skills developed in a video trainer with forward orientation.

S067

A MULTI-INSTITUTIONAL STUDY OF THE IMPACT OF A VIRTUAL REALITY SIMULATOR TRAINING CURRICULUM ON MASTERY OF COLONOSCOPY DURING FELLOWSHIP, Brian J Dunkin MD, Jeffrey Marks MD, Timothy McCashland MD, Sumeet Bushan MD, Darius Sorbi MD, Jeffrey Raskin MD, Ramon Mourelo MD, Jeffrey Ponsky MD, University of Miami, Miami, FL, Cleveland Clinic Foundation, Cleveland, OH, University of Nebraska, Omaha, NE, Wake Forest University, Salem, NC, Mayo Clinic, Scottsdale, AZ

Objective: To determine the impact of virtual reality simulation training on the performance of colonoscopy by first-year endoscopy fellows.

Methods: From 7/1/2002 to 6/30/2003 26 first year endoscopy fellows from 9 institutions were randomized into two groups (14 fellows from 5 institutions completed study). Group A (8) received a 16-week training curriculum on a virtual reality colonoscopy simulator (Simbionix GI Mentor, Simbionix USA, OH). Group B (6) had no simulator training. The clinical performance of all fellows during colonoscopy cases was recorded throughout the first year of fellowship. Study endpoints included: 1) procedure time 2) ability to reach cecum 3) time to cecum 4) necessity for attending to take over exam 5) medications used 6) recovery time, and 7) complications. Results expressed in mean values.

Results: 1091 colonoscopy cases were analyzed (570 Group A, 521 Group B). Each fellow averaged 78 cases (4-330). There were no significant differences in patient demographics, indication, number of therapies, or urgency of procedure between the groups. Procedure time (A 29 min, B 24 min $p < 0.001$) and time to cecum (A 16 min, B 12 min $p < 0.001$) was somewhat longer in Group A. Recovery time (A 64 min, B 64 min NS), and complications (A 15, B 18 NS), were not statistically different between groups. Group A reached the cecum slightly less often (A 85.3%, B 94.2%) with more attending take-over (A 33.7%, B 19.8%). Medication use was equivalent. No significant differences were found comparing the groups earlier in the training year versus later.

Conclusions: This study failed to show an overall benefit to virtual reality simulator training on teaching first year endoscopy fellows colonoscopy. The total procedure time and time to intubate the cecum was somewhat shorter in the non-simulator training group, although not by a clinically significant



amount. This lack of demonstrated benefit may be from an inappropriate curriculum. Repetition was the only requirement for advancing through the simulator training. Achieving benchmarks on the simulator established by experts may be more appropriate. Studies are underway to establish these benchmarks and repeat this type of investigation with a revised training curriculum.

S068

COMPARISON OF PROCEDURE SPECIFIC VIRTUAL REALITY SIMULATORS: CONSTRUCT AND FACE VALIDITY

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Background: Basic-task virtual reality (VR) simulators have been extensively studied however little is known regarding procedure-specific VR simulators. The purpose of this study was to compare the construct and face validity of the three commercially available VR laparoscopic cholecystectomy (LC) simulators: Lap Mentor, Lap Sim, SEP.

Methods: Participants visiting the 2005 SAGES Learning Center were voluntarily enrolled. Subjects completed a demographic survey and were randomly assigned to one of the three simulators. Each completed one repetition of the LC task on the assigned simulator and proceeded to other simulators as their time allowed. Simulator specific preset performance metrics were automatically generated and recorded. To determine construct validity, metric results for each simulator were divided according to subjects' training status, number of LCs performed and number of advanced laparoscopic case performed, then compared using ANOVA on ranks and rank sum. To determine face validity, subjects that completed all 3 simulators used a visual analog scale to rate each simulator regarding six parameters.

Results: Eighty participants completed one trial on the assigned simulator and 32 completed one trial on all 3 simulators. Construct validity was demonstrated for: 1) Lap Mentor in 2 of 19 metrics using training status (cautery time, safe cautery); and 1 of 19 metrics using number of LCs or number of advanced cases (cautery time); 2) Lap Sim in 1 of 16 metrics using number of LCs (ripped ducts or vessels) and 2 of 16 using number of advanced cases (ducts or vessels ripped, blood loss); and 3) SEP showed no construct validity for any of the 5 metrics. Face validity results (mean ± s.d.) are shown below. (20 = best rating)

	Lap Mentor	Lap Sim	SEP
Relevance to LC*	13.8 ± 3.5	9.3 ± 4.9	10.3 ± 4.3
Simulates Movements of LC*	12.3 ± 4.2	8.9 ± 4.6	9.3 ± 4.0
Useful Performance Measures*	13.2 ± 4.2	8.5 ± 4.7	9.9 ± 4.7
Precision*	12.6 ± 4.2	8.6 ± 4.7	9.5 ± 5.2
Image Quality†	14.4 ± 3.3	10.6 ± 4.9	11.8 ± 4.9
Appropriate Force Feedback‡	9.8 ± 5.9	7.7 ± 4.6	5.6 ± 4.6

* Lap mentor rated significantly better than Lap Sim and SEP

† Lap Mentor rated significantly better than Lap Sim only

‡ Lap Mentor rated significantly better than SEP only

Conclusions: Few simulator metrics demonstrated significant construct validity and while the Lap Mentor was rated to have better face validity, no simulator achieved excellent face validity. Improvements in metrics and interfaces are needed before

procedure-specific VR simulators can be used for assessment of surgical skill. Further study is needed to evaluate the educational value of these simulators.

S069

DO POSTGRADUATE COURSES REALLY ALTER PHYSICIAN DECISION MAKING?

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Objective: Postgraduate courses are frequently offered at national meetings to teach participants about the latest developments in medicine. The common format is a number of brief lectures by experts in the field. This study was conducted to determine if this format is effective in altering audience opinion about the clinical management of hypothetical surgical problems.

Methods: In April of 2005 156 physicians registered to attend a postgraduate course on endoluminal therapy conducted at a national surgery meeting (Society of American Gastrointestinal and Endoscopic Surgeons, SAGES). Ten experts gave 15 to 30 minute lectures on different methods of endoluminal therapies. Eight of these talks addressed the management of a clinically relevant medical problem. Prior to each lecture, a moderator presented a hypothetical patient problem to the audience. Each problem had two options for management, one of which was an endoluminal therapy. An audience response system was used to have the audience vote on a preferred option. The expert then gave the lecture followed by a re-vote from the audience. Results were immediately displayed.

Results: Eight hypothetical patient management questions were posed to the audience. An average of 67 (47-77) participants responded to each question. 84% of the audience stated they performed flexible endoscopy as part of their surgical practice. In 7 of 8 cases a larger number of audience members chose endoluminal therapies post-lecture than pre. Following three presentations, the majority of the audience reversed their opinion and chose an endoluminal therapy to manage the hypothetical patient problem after initially choosing a non-endoscopic option. In 4 of 8 cases, a larger percentage of the audience chose an endoluminal therapy after the lecture. After only one presentation did more of the audience choose a non-endoluminal therapy. The largest percent change in opinion pre and post lecture was from 42% choosing endoluminal therapy pre lecture to 93% post.

Conclusions: This study shows that a brief presentation given by an expert in a post-graduate course setting is effective in significantly changing the opinion of the audience (either reversing their pre-lecture decision or increasing the post-lecture decision). This finding supports the post-graduate course lecture format and demonstrates how audience participation can be used to judge the effectiveness of individual speakers as well as the program as a whole.

S070

FIRST INTRAOPERATIVE TELEMENORING SESSIONS USING THE RP-6 TM REMOTE PRESENCE ROBOTIC SYSTEM,

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Introduction: The RP-6? (InTouch Health, Santa Barbara) remote presence ?robot? has been used as a teleconsultation/telerounding device worldwide. The authors describe the first use of the system for intraoperative telemenoring, and provide a live demonstration of the system.

Methods: The RP6? is a 5?4? tall, 215 pound robot that can be remotely controlled from an appropriately configured computer located anywhere on the Internet (i.e. this planet). The system is composed of a control station (a computer), a mechanical robot, a wireless network (at the home facility—the hospital), and a high-speed Internet connection at both the home (hospital) and remote locations. The RP6? system allows the remote party (physician, etc.) to control the movements of the robot itself, see and hear at the home location (hospital), and be seen and heard at the home location (hospital) while not physically being there.

Results: Deployment of the system at the hospital was accomplished in January 2005. Multispecialty use of the system



included intensivists, orthopedists, ER physicians, cardiologists, and general surgeons. Initial use was limited to tele-rounding and nurse-physician consultation. Recently on September 4, 2005 we used it for intraoperative telementoring/consultation in 2 cases while the MIS fellow operated and the mentor was not on site. The robot was tele-driven by the mentor into the OR, and around the OR table. Real-time video capture by the RP-6TM allowed remote telestration by the mentor to the fellow. In both cases, operative time was reduced by an estimated 30%. Both the fellow and the mentor felt that the interaction was very beneficial to the conduct of the case. The nurses present also expressed significant satisfaction that the mentor could be 'telepresent' for the case. **Conclusions:** Our early experience suggests a significant benefit to patients, hospitals, nurses, and physicians. The implications for future development are enormous.

S071

ROBOT ASSISTED LAPAROSCOPIC SURGERY OF THE INFRARENAL AORTA; THE EARLY LEARNING CURVE, Jeroen Diks MSc, Denise Nio MD, H.J. Bonjer MD, Jan A. Rauwerda PhD, Willem Wisselink PhD, VU University Medical Center, Amsterdam, The Netherlands

Introduction: Laparoscopic aortic surgery to date has not been widely embraced among vascular surgeons. This lack of faith is probably due to the technical difficulties, especially concerning the aortic anastomosis. Recently, robot assisted laparoscopic surgery (RALS) has been introduced to facilitate endoscopic surgical manipulation. Increasing the degrees of freedom, introducing 3-D visualization and facilitating hand-eye coordination, it potentially reduces the learning curve, thereby stimulating recognition of laparoscopic aortic surgery among vascular surgeons.

Materials / Methods: Between February 2002 and May 2005, 17 men, median age 55 (range: 36-72), were treated in our institution with robot-assisted laparoscopic aorto-bifemoral bypasses (ePTFE) for aortoiliac occlusive disease. Five patients were operated with the Zeus® system between February 2002 and February 2003. In January 2004 our institution acquired a da Vinci® surgical system and between February 2004 and May 2005 an additional 12 patients were operated. Dissection was performed laparoscopically and the robot was used to make the aortic anastomosis.

Results: Median operative time was 365 minutes (range: 225 - 589), with a median clamp-time of 86 minutes (range: 25 - 205). Median blood loss was 1000 ml (range: 100 - 5800). A robot-assisted anastomosis was successfully performed in fifteen patients. Three patients were converted to a laparotomy, one due to bleeding of an earlier clipped lumbar artery after completion of the robotic anastomosis, the others due to difficulties with laparoscopic exposure of the aorta and technical failure of the robotic system. One patient died unexpectedly on post-operative day 3 as a result of a massive myocardial infarction. Median hospital stay was 4 days (range: 3 - 57).

Conclusions: Our experience with RALS shows it is a feasible technique for aortoiliac bypass surgery. After an initial learning curve, operation time, aortic clamp-time and hospital stay have been decreased to a fairly acceptable range. Reduction of the learning curve for laparoscopic aortic surgery with the use of a robotic surgical system might stimulate wide implementation of laparoscopic treatment for aortoiliac disease.

S072

TELE-SURGERY IN AN EXTREME ENVIRONMENT IN THE ABSENCE OF A LOCAL PHYSICIAN - THE NEEMO 7&9 MISSIONS, Mehran Anvari PhD, David Williams MD, Robert Thirsk MD, Lee Morin MD, Craig McKinley MD, Timothy Broderick MD, Anil Kapoor MD, Herawaty Sebjang MD, Geoffrey Hall PhD, Anthony Adili MD, Julian Dobranowski MD, Centre for Minimal Access Surgery, McMaster University, Hamilton, ON, Canadian Space Agency, National Aeronautics and Space Administration (NASA), Telemedicine and Advanced Technology Research Centre (TATRC), Ft. Detrick, MD

Introduction: Telementoring, both with and without robotic assistance, can effectively facilitate transfer of knowledge from one surgeon to another during live surgery. Recent experience with robotic-assisted remote telepresence surgery (RARTS)

has demonstrated that a surgeon can safely perform advanced procedures from a distance. The scientific goal of the NEEMO missions is to evaluate the potential for these technologies to enable provision of emergency surgical care in an extreme environment in the absence of a physician.

Methods: Coordinated by NASA, the NEEMO missions utilize the Aquarius undersea habitat as a training analogue for space missions. During NEEMO 7 (Oct. 11-21, 2004), experts at the Centre for Minimal Access Surgery (CMAS) in Hamilton, ON, used telementoring with robotic assistance to guide Aquarius crewmembers through several simulated surgical procedures including lap cholecystectomy, arterial anastomosis, cystoscopy and removal of a renal stone. NEEMO 9 (Oct. 3-20, 2005) will investigate the use of tele-presence surgery using a portable two-arm robot to allow a remote surgeon to carry out emergency surgery with latencies ranging from 150 ms to 2 seconds. For both missions, the Aquarius crew includes 3 astronauts, 2 habitat technicians and one surgeon as a control. **Results:** NEEMO 7 demonstrated that with proper telementoring technique, non-physicians could successfully be guided through all of the simulated surgical procedures, although not as quickly or as efficiently as the surgeon control. The mentoring skills of the remote surgeon and the image quality provided by the telecommunications network were found to be critical to successful telementoring. Telerobotic assistance could not be properly evaluated during NEEMO 7 because the robotic platform was too bulky for the confines of Aquarius. A newly developed and more compact system will be evaluated during NEEMO 9 in October 2005.

Conclusions: The technologies evaluated during the NEEMO missions may play a significant role in providing emergency medical and surgical care in extreme environments in the absence of a local physician, such as field of battle or human space exploration, and also in remote regions around the globe.

S073

EASY LAPAROSCOPIC VIEWING WITH A NEWLY DEVELOPED ROTATING LAPAROSCOPIC VIDEO MONITOR, Jae-Hwang Kim MD, Seok-Won Jang MD, Je-Hyung Lee MD, Min-Chul Shim MD, College of Medicine, Yeungnam University

(Background) Surgeons generally use more than 2 video monitors during major laparoscopic surgery, and this is different from the minor laparoscopic surgery such as cholecystectomy. The image of the monitor must be adjusted for the operator's eye and this is good to the operator; however, for the assistant who stands on the other side, it is a problem because of the image is rotated up to 180 degrees. This is one of major reasons why surgeons need more training and experience to overcome this difficult view. **(Purpose)** We wanted to evaluate the improvement of the laparoscopic performance with using the normalized video image as compared with the previous upside down image.

(Methods) Ten surgery residents who had no experience with major laparoscopic surgery were recruited. They performed a simple laparoscopic procedure using the laparoscopic training kit with a newly developed rotating laparoscopic video monitor (patent pending) that could be controlled by pushing button on the floor. The monitor rotates 180 degrees both right and left side on a central axis of the image. We named the 'i@Normalized' view as the best image for performing the procedure and it can be made by rotating the image with the former's foot control. The study procedure was placing red and blue rubber rings onto 2 red and blue standing bars in 5 minutes. The performers were divided in 2 groups (n=5 each) and each group performed one practice test and one final test with the 'i@180 degree rotated' and 'i@normalized' view in a cross-over designed order. We compared the number of successfully placed rubber rings in both situations.

(Results) The number of inserted rings in practice with the 'i@180 degree rotated' and 'i@Normalized' images were 1.6±1.83 and 8.9±2.64, respectively (p<0.01) and in final test, they were 3.3±2.40 and 11.9±4.01 respectively (p<0.01).

(Conclusions) We confirmed that changing the 'i@rotated' laparoscopic video image to the easy 'i@normalized' image (the normal eye view) allows a dramatic improvement for



laparoscopic performance. Using a rotating laparoscopic video monitor could maximize the capability of the assistants for performing major laparoscopic surgery at any location of the body.

S074

A PILOT STUDY OF BOTULINUM TOXIN INJECTION FOR THE TREATMENT OF DELAYED GASTRIC EMPTYING FOLLOWING ESOPHAGECTOMY AND VAGOTOMY, MICHAEL S KENT MD, ARJUN PENNATHUR MD, MATTHEW J SCHUCHERT MD, THOMAS FABIAN MD, JAMES D LUKETICH MD, RODNEY J LANDRENEAU MD, UNIVERSITY OF PITTSBURGH MEDICAL CENTER

Objective: Esophagectomy and vagotomy lead to significant impairment in gastric emptying, unless a pyloroplasty or pyloromyotomy is performed. These procedures may be technically challenging during minimally invasive esophagectomy, and are associated with a small but definable morbidity, such as leak and dumping syndrome. We sought to determine our early experience with a technique of minimally invasive ablation of pyloric function, in which the pylorus is injected with botulinum toxin.

Methods: Seven patients who had undergone esophagectomy and injection of the pylorus with botulinum toxin were identified. Four patients underwent botulinum toxin injection at the time of minimally invasive Ivor-Lewis esophagectomy, and the remaining three were treated endoscopically following surgery. The three latter patients had undergone esophagectomy with either no ablative pyloric procedure (n =2), or inadequate pyloromyotomy (n = 1), and had presented in the post-operative period with delayed gastric emptying. In all patients, 200 Units of botulinum toxin was injected in a systematic fashion, equally divided in all four quadrants into the pyloric musculature. A laparoscopic needle aspirating device or an endoscopic needle catheter was utilized for performing this injection. We evaluated the complications, postoperative clinical symptoms and assessed gastric emptying with a barium contrast study.

Results: There were no complications associated with botulinum toxin injection. All four patients who underwent primary laparoscopic botulinum toxin injection at the time of esophagectomy were discharged home tolerating a soft diet and demonstrated normal gastric emptying on the contrast study performed in the post-operative period. The three patients who underwent post-operative endoscopic injection experienced immediate improvement in symptoms of gastric outlet obstruction, tolerated a soft diet and demonstrated a moderate improvement in gastric emptying assessed by barium contrast study.

Conclusions: Injection of the pylorus with botulinum toxin shows promise to simplify the preservation of gastric emptying in patients undergoing esophagectomy. Longer-term studies are needed to clarify the durability of this technique and to compare its efficacy with the accepted procedures of pyloromyotomy or pyloroplasty.

S075

ENDOSCOPIC MUCOSECTOMY USING A MULTIPURPOSE THERAPEUTIC HOOD (TXHOOD), Tatsuyuki Kawano MD, Department of Surgery, 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 with endoscopic mucosectomy, esophagi are preserved and precise diagnoses of esophageal tumors are confirmed with histological examination for resected specimens. Nowadays although techniques of EMR in one piece resection (OPR) are established for relatively small lesions 2cm in diameter or less with some equipments and techniques, wider lesions should be resected with piecemeal resection (PMR) techniques. The ESD is an appropriate technique for mucosal lesions of any size, however, the techniques of ESD are relatively difficult and serious complications, e.g. perforation, massive bleeding, are reported more frequently than EMR.

We devised a noble technique of ESD and performed basic experiments for ensuring safety under the permission of IRB. The new techniques of ESD were undergone easily using newly designed equipments named multipurpose therapeutic hood (TxHood). A TxHood had some lines of therapeutic tools, e.g. electric needle knife, snare wire, injection needle, and the lines were selected freely before insertion of an endoscope covered with a TxHood. The main techniques of resection of the target mucosal and submucosal tissue were endoscopic submucosal saline injections on demand through a working channel of endoscope or TxHood, cut or swing cut with a needle knife attached on TxHood and grasping of target area with a grasping forceps through a working channel of endoscope. In the experiments, an electric needle knife was set parallel with a shaft of endoscope and offered the safety and the ease of handling for dissecting procedures. We performed 15 resections of mucosae and submucosae in average size of 3.5 x 2.5cm (from 2 x 2 cm to 7 x 4 cm). The average time of endoscopic resection for each target areas was about 15 minutes with no perforation or uncontrollable bleeding. We conclude from the basic study on the ESD using a newly devised TxHood and former experiences of endoscopic mucosectomy for EECs that the new techniques of ESD with a Txhood are useful in the treatment for EEC and may be applicable for all mucosal or submucosal tumors in the gastrointestinal tract.

S076

ESOPHAGEAL DYSMOTILITY IN MORBIDLY OBESE PATIENTS, John Koppman MD, Andrew Ukleja MD, Samuel Szomstein MD, Raul J Rosenthal MD, Bariatric Institute, Cleveland Clinic Florida

Objective: The majority of esophageal motility studies in the morbidly obese have focused on the relationship between lower esophageal sphincter (LES) pressure and its relation to gastroesophageal reflux disease (GERD) in this population. There are very few studies in the literature that have examined motility disorders in the morbidly obese population in general, outside of the context of GERD. The aim of this study was to determine the prevalence of esophageal motility disorders in obese patients selected for laparoscopic gastric banding.

Methods: 112 obese patients (78 women and 34 men) selected for laparoscopic gastric banding underwent manometric evaluation of their esophagus during the period from January 2003 to March 2003. Tracings were retrospectively reviewed for endpoints of LES resting pressure, LES relaxation, and esophageal peristalsis.

Results: The mean body mass index (BMI) was 42.9 kg/m² and the mean age was 40 years. 41% of patients demonstrated abnormal manometric findings as follows: 22% had nonspecific esophageal motility disorders (NSMD), 11% had nutcracker esophagus (peristaltic amplitude > 180 mm Hg), 3% had isolated hypertensive LES pressure (> 35 mm Hg), 3% had isolated hypotensive LES pressure (< 12 mm Hg), 1% had diffuse esophageal spasm (DES), and 1% had achalasia. No patients with abnormal esophageal motility related complaints of dysphagia or chest pain. There was no statistically significant relationship between BMI and abnormal esophageal motility.

Conclusions: Although several studies have investigated esophageal motility in obese patients with GERD, the selection bias of such studies precludes an accurate conclusion about the prevalence of esophageal dysmotility in the obese population as a whole. This study demonstrates that esophageal motility disorders occur frequently in the obese population and calls for more investigation into the etiology and potential significance of such disorders in the context of obesity.

S077

SELF EXPANDING ENDOLUMINAL STENTS ARE EFFECTIVE IN THE TREATMENT OF COMPLICATIONS AFTER UPPER GI SURGERY, Michael R St Jean MD, Stephanie Dunkle-Blatter MD, Fahad Ali Syed MD, Anthony T Petrick MD, Section of Minimally Invasive and Bariatric Surgery, Geisinger Medical Center, Danville, PA

Background: Self expanding endoluminal stents (SEES) have expanded options for management of surgical complications



after upper gastrointestinal (UGI) surgery. The objective of this study was to review our initial experience with SEES & to define the risks & benefits associated with SEES placement after UGI surgery.

Methods: All patients undergoing SEES after esophageal or gastric surgery from Sept. 2001 to Sept.2005 were retrospectively reviewed. Data was stored in a password protected database for patient information was collected by review of an electronic medical record (EPIC Systems).

Statistical method: Fisher's Exact Test. Results:20 pts(15M & 5F) with a mean age of 62 yrs [range, 43-85] underwent a total of 40 procedures [range, 1-6/pt]. A total of 37 stents were deployed (ave1.85/pt, range 0-10) with a stent migration rate of 50% including two complete migration of a stent through the GI tract s/p RYGBP. Stent migration led to restenting in 4 pts(20%) while the total # of restenting procedures required was 12(30%) in 9 pts(45%). Reasons for initial stenting procedures included benign stricture n-4(20%),malignant strictures n-8(40%), anastomotic leak n-7(35%) & fistula n-1(5%). UGI tract procedures prior to stenting:Esophageal resection n-7(35%); Esophageal Ca nonoperative n-3(15%); PEH repair n=2(10%); Lap Nissen n=1(5%); RYGBP n-3(15%); MI esophagectomy n-4(20%). 7 pts with leaks & 1 fistula were treated w/stenting(40%). Median durations to radiographic or endoscopic evidence of resolution of leak or fistula was 9.5 days (range2-33) with return to po diet median 8.5 days(range1-40).Patients managed conventionally had median resolution in 12.5 days(range3-60) and resumed po intake in median 11days(range3-60). SEPS were more prone to migration than SEMS 62.5% vs 17.2%(p=.02). No pts experienced procedure related morbidity or mortality.

Conclusions: SEES seem to be an effective means of treating postoperative complications in the upper GI tract & may avert reoperation in selected pts. Pts with stents resolved leaks & fistulas more quickly than similar pts managed with observation & drainage. The time to oral feeding was also improved in the stented pts. There was no mortality & morbidity related to repeat procedures due to stent migration. The rate of migration of the SEPS in our series was much higher than previously reported in the literature.

S078

PREVALENCE OF GASTROESOPHAGEAL REFLUX DISEASE (GERD) AND MANOMETRIC OESOPHAGEAL FINDINGS IN PATIENTS WITH MORBID OBESITY SELECTED FOR BARIATRIC SURGERY. A PROSPECTIVE STUDY IN 100 PATIENTS., Simon MSIKA MD, Eric Poupardin MD, Mohamed Merrouche MD, Florence Harnois MD, Jean Marc Sabaté MD, Benoit Coffin MD, Department of Digestive Surgery, Department of Gastroenterology, University Hospital Paris VII Louis Mourier Colombes FRANCE

Obesity is considered as a predisposing factor of GERD, but the characteristics of GERD and manometric oesophageal findings in patients with morbid obesity remains poorly studied. In patients selected for bariatric surgery, symptomatic GERD or/and abnormal manometric findings could influence the surgical technique (gastric banding or gastric by-pass).

Aims.To determine prospectively in patients with morbid obesity the prevalence of GERD, abnormal manometric findings and to study the relationship between BMI, GERD and manometric findings.

Every obese patients (BMI > 40 kg/m² or > 35 in association with comorbidity) selected for bariatric surgery were prospectively included with an evaluation of GERD symptoms, upper GI endoscopy, 24 hours pH-metry and esophageal manometry. Results : (mean +/- SD) 100 patients (83 F, mean age : 38,4 +/- 10,9 yrs) have been included. BMI was 44,9 +/- 5,9 kg/m² (range 35,4-63,7). Heartburn, regurgitations and epigastric pain were present in 61,44 and 29 patients respectively. 23 had chronic pharyngitis and 20 were asthmatic. Endoscopy evidenced a hiatal hernia in 37 patients, a cardiac failure in 14 and oesophagitis (grade 1 to 3) in 6. The pH-metry (De Meester score) was pathologic in 46 patients (mean % of time with pH < 4 : 7.7+/-2.9) ; longer reflux : 27.2+/-14.9 min). 69 patients had a failure of lower esophageal sphincter (LOS) with a tone < 15 mmHg and 7 had esophageal dyskinesia. There was no hyperpression of LOS. No significant relationship could be evi-

denced between BMI and De Meester score, LOS tone and esophageal dyskinesia. But BMI was significantly related to the number of reflux > 5 min (P = 0.008) and LOS tone was significantly related to the number of reflux (P = 0.027).

GERD and LOS failure are highly prevalent in patients with morbid obesity, but BMI is not the only explanatory factor. In morbidly obese patients with reflux, the main mechanism could be abnormal esophageal clearance. Testing for GERD and oesophageal manometric could be helpful before bariatric surgery in order to select the type of surgery (gastric banding or gastric by-pass) . However, because of frequent esophageal symptoms after gastric banding, a preoperative manometry should be useful as a reference before surgery. Analysis of postoperative long-term results are in progress.

S079

IMPAIRED ESOPHAGEAL CLEARANCE AFTER NISSEN FUNDOPPLICATION CAN BE OBJECTIVELY MEASURED WITH ESOPHAGEAL IMPEDANCE, Eliana Quiroga MD, Muna Dahir, Brant K Oelschlager MD, The Swallowing Center University of Washington

Nissen fundoplication is assumed to impair esophageal clearance, though the extent to which this happens is difficult to measure with traditional methods. To determine the true physiologic impact of a Nissen fundoplication we used multichannel intraluminal impedance (MII), a new method that allows precise measurement of esophageal clearance.

Methods: We performed simultaneous manometry/MII and 24 hr pH monitoring in 28 consecutive patients before and at least 6 months after (range 6-13 mo) laparoscopic Nissen fundoplication. We did not include any patient with potential obstruction of the cardia (i.e. stricture, paraesophageal hernia, or prior antireflux procedure).

Results: Transit time increased significantly after Nissen fundoplication and the number of swallows that achieved complete bolus clearance was significantly reduced. Peristaltic activity, as measured by manometry was unaffected.

	Feintains (Manometry)	Complete Bolus Clearance (MII)*	Bolus Transit Time (MII)	Esophageal Acid Exposure
Preoperative	93%	78%	7.8 sec	14.1%
Postoperative	90%	63%	8.5 sec	3.4%
p-Value	0.51	0.01	0.02	0.001

* % of swallows that achieved complete bolus clearance

The operation was effective in the control of reflux. No patient developed new dysphagia after fundoplication. Three of Twelve patients who had dysphagia preoperatively, had persistent dysphagia post-operatively. All three had normal peristaltic activity by manometry, but 2 had abnormal esophageal clearance.

Conclusion: Nissen fundoplication causes impairment of esophageal clearance. This impairment is usually subclinical, but can be measured objectively with MII. This information may prove important in developing strategies to minimize dysphagia.

S080

LONG-TERM OUTCOMES CONFIRM THE SUPERIOR EFFICACY OF EXTENDED HELLER MYOTOMY FOR ACHALASIA, Andrew S.Wright MD, Chase W Williams BS, Carlos A Pellegrini MD, Brant K Oelschlager MD, University of Washington Department of Surgery

Standard Heller myotomy (SM) for achalasia extends 1-2 cm onto the stomach. We proposed the use of an extended (>3cm) myotomy (EM) and in 2003 reported better relief of dysphagia than with SM at 16 months. This study is designed to examine the long-term efficacy and durability of EM.

Methods: Patients with achalasia who had a laparoscopic Heller myotomy between 1994 and 2003 were identified from a prospective database that includes symptom questionnaires and esophageal physiology studies. From 9/94 to 8/98 we performed a SM with Dor fundoplication (n=55), and from 9/98 through 2003 we performed an EM with Toupet (n=102). In 2001 we performed a telephone survey of all available patients. This was repeated in 2005 for those with EM. The survey included scales of symptom frequency (0=never, 1=1x/month, 2=1x/week, 3=1x/day, 4=>1x/day) and severity (0-



10, 0=no symptoms, 10=symptoms equivalent to before surgery) as well as need for post-operative intervention for dysphagia.

Results: We were able to contact 35 patients following SM (46mo median F/U) and 67 patients following EM (46mo median F/U). Patient demographics were similar between groups. Post-op results are shown in the Table.

	Dysphagia Severity	LESP	# Interventions	Heartburn Frequency	%H+4	
SM	4.6±2.3	17±5.6	18	1.5±1.8	4.9±7.5	*p=0.005
EM	3.1±2.6*	10.9±5.7†	47	1.2±0.9	7.2±6.3	†p=0.05

Of the SM group 9 patients (26%) required a total of 14 endoscopic interventions and 4 re-operations while 4 EM patients (6%) required one endoscopic intervention each. Of the EM group, 31 were contacted in both 2001 (16mo median F/U) and 2005 (64mo median F/U). There was no significant change over time in dysphagia severity (2.5↑1.8 vs.

2.9↑2.3, p=0.4).Conclusions: Extended gastric myotomy provides excellent durable relief of dysphagia, and is superior to a standard myotomy for the treatment of achalasia.

S081

LONG TERM RISK OF MORTALITY AFTER ANTIREFLUX SURGERY,

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Introduction: The objective of this study was to examine long-term mortality of patients with complicated gastroesophageal reflux disease (GERD) undergoing anti-reflux surgery. A randomized controlled trial conducted in Veterans Affairs hospitals suggested that patients having antireflux surgery are at greater risk of death as compared with patients treated medically.

Methods: We developed a population-based inception cohort of 43,992 adult patients newly diagnosed with complicated GERD between the years 1991 and 1994, using administrative data. In Ontario, Canada, administrative health databases contain information on all residents receiving health services. Cox-proportional hazard models were created to compare mortality rates between patients undergoing surgery and those that did not. Antireflux surgery was modeled as a time-dependent variable. Patients were followed until death or December 31, 2002. Hazard ratios (HR) and 95% confidence intervals (CI) are reported.

Results: Of the 43,992 patients with complicated GERD newly diagnosed between 1991 and 1994, 1,827 patients went on to have an anti-reflux procedure. At the time of index GERD diagnosis, patients who eventually had surgery tended to be younger (46.6 vs. 55.1 years; p < 0.0001), female (53.48% vs. 50.83%; p = 0.0267), and had fewer comorbid conditions (Charlson comorbidity score, 0.086 vs. 0.21; p < 0.0001). Overall, 11,377 patients died during the study period. The unadjusted HR of death associated with surgery was 0.42 (95% CI, 0.36 to 0.49). After adjustment for confounding variables, the HR was 0.83 (95% CI, 0.71 to 0.97). Age, gender, Charlson score, and GERD severity were independent predictors of mortality.

Conclusion: In a population-based cohort study, we found no evidence that anti-reflux surgery is associated with higher rates of mortality as compared with medical therapy.

S082

LAPAROSCOPIC LAVAGE AND DRAINAGE OF COMPLICATED DIVERTICULITIS LONG TERM RESULTS,

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BACKGROUND: The accepted standard of treatment for non-elective management of perforated diverticulitis has been an open laparotomy with staged resection of the colon advocated to avoid resection and primary anastomosis in the setting of a contaminated field. For a select group of patients that warrant operation for diffuse peritoneal signs but those who are not found to have gross fecal contamination, it has been proposed that they undergo peritoneal lavage, inspection of their colon,

and intraoperative drain placement of the peritoneal cavity. When the patient recovers from their acute disease they may then undergo definitive colonic resection with primary anastomosis, thus avoiding a colostomy. We report our experience using this laparoscopic peritoneal lavage technique with delayed definitive resection.

METHODS: Patient records were retrospectively reviewed who underwent intraoperative peritoneal lavage and drainage placement for complicated diverticulitis at the Texas Endosurgery Institute from August 1993 to August 2005. The technique include insufflation of the abdominal cavity, thoroughly examination and adhesiolysis when needed, localization of the inflamed or perforated place, drainage of the purulent material and irrigation of the cavity with copious amounts of sterile normal saline and after this a combination of beta-dine, heparin and saline solution, suction of all the remain solution and placement of two 10mm flat Jackson Pratts drains in the pelvis.

RESULTS: We enroll a total of 29 patients, 9 female and 20 male, the mean age was 60 years (28-99y), None of our patients was converted to open surgery, EBL 30.3cc (10-55cc), Mean operative time 62min (40-150min), Mean beginning of PO was 2 days (1-3 d). Eight complications were reported: 6 patients with paralytic ileus and 2 atelectasis. No mortality was reported. The mean follow up was 96 months (1-168 months). To date 16 patients were operated for definitive sigmoidectomy with no complications during the laparoscopic resection.

CONCLUSIONS: Intraoperative peritoneal lavage for purulent diverticulitis, has proven to be a safe alternative to the current standard of treatment for the management of perforated diverticulitis. We found that a single stage laparoscopic approach decreases length of hospital stay, immediately improves patient symptomatology, and avoiding colostomy placement decreases the cost for overall treatment of the disease and maintains the quality of life of the patients

S083

OPERATIVE TIME IS A POOR SURROGATE FOR THE LEARNING CURVE IN LAPAROSCOPIC COLORECTAL SURGERY,

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Background: Previous studies have relied on operative time and conversion rate to construct learning curves in laparoscopic colorectal surgery. We hypothesized that operative time and conversion rate were less important than complication rate and re-admission rate in defining good outcomes and hence the learning curve.

Methods: A database of 287 consecutive laparoscopic colorectal resections from a single tertiary referral center was analyzed. Outcome measures included operative time, conversion rate, major and minor complications, length of stay, as well as 15 and 30-day hospital readmission rate. Data were analyzed both by surgeon and by quartile case numbers.

Results: There were 151 right colectomies and 136 left colectomies. For both right and left colectomies, the conversion rate decreased in each of the first three quartiles reaching a nadir of 0% for right colectomies and 3% for left colectomies in the third quartiles. The conversion rates increased slightly in the 4th quartile. Operative time remained stable for three quartiles and increased slightly in the 4th quartile. Two surgeons performed 199/287 cases. Analysis of the two high volume surgeons demonstrated that the surgeon with the shorter operative times had the higher major complication rate (8% vs 2%), overall complication rate (18% vs 6%) and 30 day readmission rate (10% vs 3%) and length of stay (4.0 vs 3.3 days) (all comparisons p<0.05).

Conclusions: In this series, operative time failed to decrease with experience and shorter operative times did not correlate with better clinical outcomes. The failure of operative time to decline with experience often reflects surgeons' willingness to attempt more difficult cases rather than accurately representing a ?learning curve?. Therefore complication and readmission rates are more important than operative time and conversion rates in evaluating the learning curve and quality of laparoscopic colorectal surgery.



S084

IMPACT OF AN EXPERT LAPAROSCOPIC SURGEON ON THE INSTITUTIONAL OUTCOMES OF LAPAROSCOPIC COLECTOMY FOR CANCER, Alessio Pigazzi MD, I B Paz MD, J D Ellenhorn MD, City of Hope National Cancer Center

Introduction: Laparoscopic colectomy is a difficult operation with long learning curves and conversion rates inversely proportional to the surgeon's experience. Methods to help train surgeons outside of fellowship programs have been poorly analyzed. This study was undertaken to assess the impact of an experienced laparoscopic surgeon on the outcome of laparoscopic assisted colectomy for cancer in a single institution

Methods: In August 2004 a fellowship-trained laparoscopic surgeon with extensive experience in laparoscopic colectomy joined the surgical staff of an NCI-designated Cancer Center. This surgeon served as a laparoscopic colectomy preceptor for 6 surgical oncologists with no formal training in laparoscopic surgery. Clinical and pathologic data from all attempted laparoscopic colectomies for primary colon cancer after the recruitment of the preceptor was compared with the outcome of laparoscopic colectomies prior to the preceptor's arrival.

Results: In twelve months following the arrival of the preceptor, 28/28 (100 percent) of eligible colectomies were approached laparoscopically, compared with 28/47 (59 percent) in the 20 months before ($P < 0.001$), while the rate of conversion decreased from 42 to 15 percent ($P = 0.04$). The preceptor was present in over 70 percent of all laparoscopic colectomies attempted and the absence of the preceptor in the operating room increased significantly the chances of conversion ($P = 0.003$). The overall complication rate and number of lymph node harvested were not affected by the presence of the preceptor in the department. Converted cases had greater blood loss ($P < 0.001$) and longer hospital stay ($P < 0.05$) than non-converted ones.

Conclusions: Recruitment of appropriate utilization of a properly trained laparoscopic surgeon can help institutions introduce laparoscopic-assisted colectomy for cancer.

S085

LAPAROSCOPIC LYMPHATIC MAPPING AND SENTINEL LYMPHNODE DETECTION IN COLON CANCER. TECHNICAL ASPECTS AND PRELIMINARY RESULTS, Paolo P Bianchi MD, Chiara Ceriani MD, Valerio Panizzo MD, Matteo Rottoli MD, Marco Montorsi MD, Cattedra e Unità Operativa Chirurgia Generale, Università di Milano, Istituto Clinico Humanitas IRCCS, Milano

Introduction: The application of sentinel lymphnode (SL) technique to colon cancer is a method to improve staging still under evaluation. Aim of this study is to evaluate the feasibility and accuracy of lymphnode mapping in laparoscopic resections of the colon.

Material and Methods. Twenty patients were enrolled from March 2004 to July 2005 in the study. The first five cases were excluded because the learning curve. Polyps endoscopically removed were tattooed or clipped before surgery to permit laparoscopic localization of the tumor site. Before surgical dissection 2 ml of Patent Blu V dye were injected subserosally in four sites around the tumor with a 22 gauge spinal needle percutaneously. The needle was extracted with mild aspiration and the site of injection was carefully protected to avoid dye diffusion. The lymphnodes coloured in 2 to 5 minutes were tagged as sentinel with metallic clips and the operation was completed with standardized resection. All sentinel lymphnodes were examined by hematoxylin and eosin (H&E) staining with multiple sectioning of 3-5 micron slices and 200 microns interval. Immunohistochemical (IHC) evaluation with CK-antibodies was applied only to doubtful cases.

Results. Of the fifteen patients studied ten neoplasms were located in the left and five in the right colon. Lymphatic mapping caused no complications and added 10 to 15 minutes to the overall operative time. Detection rate of SL was 100%, in an obese patient was performed an *ex vivo* technique, with subserosal injection of dye on the specimen after removal. The total number of lymphnode examined was 322 (range: 8-36, average 21). SL were 34 (average 2.3). Of the 15 patients four

(26.6%) had lymphnode metastasis. In 3 of these 4 patients both SL and non-SL detected metastasis, the one false negative case (25%) was registered in a large cecal tumor staged as IIIc (T3N2). In one patient SL was the only positive lymphnode. One doubtful case, evaluated with IHC, revealed isolated tumor cells (ITC) and was classified pT3N0(i+). Accuracy, Sensitivity and Negative Predictive Value (NPV) were respectively 93.3%, 75% and 91.6%

Conclusions. Laparoscopic lymphatic mapping in colon surgery with blue dye is a feasible and relative simple technique. The detection rate of SL reaches 100%, performing a salvage *ex vivo* technique. The high false negative rate (25%), in this preliminary cases, may be reduced with selection of patients and exclusion of III stages.

S086

SURVEILLANCE COLONOSCOPY IN POST-POLYPECTOMY PATIENTS - WHY WE DO IT, Ruth O'Mahony MD, Mark A Liberman MD, Cleveland Clinic Florida - Naples

OBJECTIVE: To determine polyp recurrence rates among different pathologic subtypes in patients who have previously undergone colonoscopic polypectomy.

METHODS: Retrospective review of an existing database with additional data obtained from patients' medical records and pathology reports.

RESULTS: A total of 4779 patients underwent screening colonoscopy at Cleveland Clinic Florida-Naples from 1999-2001. 785 patients had polyps. Of these, 342 presented for follow-up within 48 months (mean time to follow-up 42 months). 227 patients had further pathology found on follow-up. Eight had malignancies detected on their first colonoscopy. Of these, three were confined to a polyp and completely resected endoscopically without recurrence during the follow-up period. The remaining five patients required surgical resection. Six new cancers were detected in the follow-up group. One of these patients previously had a hyperplastic polyp, the other five previously had adenomatous polyps. Three of these cancers were managed endoscopically while three required surgical resection. Overall rates of polyp recurrence were similar regardless of initial pathologic type. 67% of patients with hyperplastic or adenomatous polyps had recurrence. Patients with initially hyperplastic polyps were most likely to have further hyperplastic polyps (75% of recurrences). Patients with adenomatous or dysplastic polyps were most likely to recur with adenomas (52% and 67% of recurrences respectively). **CONCLUSIONS:** The high likelihood of polyp recurrence emphasizes the importance of compliance with post-polypectomy surveillance. Our lower than expected incidence of colorectal cancer is likely due to aggressive follow-up and early intervention, further underscoring the need for surveillance. Patients with hyperplastic polyps are most likely to have recurrent hyperplasia and hence do not require surveillance as frequently. Patients with adenomatous or dysplastic polyps are more likely to have recurrent adenomas or dysplasia and therefore require more careful surveillance.

S087

A PROVINCE-WIDE POPULATION SURVEY OF APPENDICITIS IN CANADA. NEW TWISTS TO AN OLD DISEASE., Jean-Pierre Gagné MD, Marc Billard MD, Robert Gagnon MSc, Marcel Laurion MD, André Jacques MD, Le Collège des Médecins du Québec, Montréal, Québec, Canada

Objectives: This study, sponsored and conducted by Le Collège des Médecins du Québec, audited the management of acute appendicitis in the Province of Québec (7,25 million population), Canada, during one year (April 2002-March 2003).

Methods: A questionnaire was sent to the Health Records Department of all hospitals treating appendicitis in the province. Data from 85 (100%) hospitals was received and reviewed.

Results: During the study period, 7599 appendectomies were performed and 5707 (75%) were selected for study (55% men). The rate of normal and perforated appendix was 6.0% and 17.1% respectively. Median hospital stay for simple and perforated appendicitis was 2.5 and 5.7 days respectively. At least one imaging procedure was done in 86% of cases (23% CT



scans, 55% ultrasounds).

Antibiotics were not given at all in 7% of cases and inadequately given in 8% of patients with a perforation. Sixteen percent of patients did not receive preoperative or intraoperative doses and 69% of patients received unnecessary doses. Laparoscopy was used in 35% of cases and was associated with a reduction in postoperative stay for simple (2.2 vs 2.6 days, $p < 0.001$) and perforated appendicitis (4.6 vs 5.8 days, $p < 0.001$). A low rate of laparoscopy (<25%) was found in 53% of teaching and 45% of non-teaching institutions. Conversion rates were 10.3% for simple appendicitis and 28.5% for perforated ones ($p < 0.001$).

Conclusion: Although results of this survey compare to similar published series, a few concerns emerge. Many have to do with non compliance with recommended antibiotic usage for acute appendicitis. Although laparoscopy seems to be slowly making its way into the surgical armamentarium, the low rate of laparoscopic appendectomies in teaching hospitals raises the issue of appropriate resident training.

S088

THE USE OF URINARY TRYPSINOGEN-2 DIP STICK TEST IN EARLY DIAGNOSIS OF POST-ERCP PANCREATITIS, Senthil Sankaralingam MD, Cheryl Wesen MD, Mohammad Barawi MD, Rigel Galera MD, Larry Lloyd MD, St. John Hospital and Medical center, Detroit, MI

Introduction: The reported incidence of post Endoscopic Retrograde Cholangio Pancreaticography (ERCP) pancreatitis varies between 1.3 ? 24.4%. Trypsinogen-1 and trypsinogen-2 (tryp ?2) have been studied in Europe as markers for acute pancreatitis. The kidneys appear to excrete tryp ?2 as evidenced by steep rise in urinary tryp ?2 in acute pancreatitis. We hypothesized that tryp ?2 should be able to detect acute pancreatitis in post ERCP patients.

Methods & Materials: This is a prospective, blinded study of patients who had ERCP performed at our institution. IRB approval was obtained prior to this study. Urine samples were collected pre ERCP, 1 hour post ERCP and 4 hr post ERCP, and evaluated using the urine dipstick (Actim Pancreatitis Medix Biomedica OY AB, Finland TM) to detect tryp ?2. After the patient had been evaluated and treated in the standard fashion, the dipstick results were compared with the results of serum pancreatic enzymes, and clinical findings by reviewing the chart. We used Fisher's exact test to evaluate success of urine dipstick results in predicting pancreatitis. The sensitivity, specificity, positive and negative predictive values were calculated. All values are reported as mean \pm SEM.

Results: Urinary tryp ?2 was evaluated in 30 patients. Fifteen men and 15 women participated in our study with age ranging from 18 ? 86 yrs (mean = 55). Five out of 29 (17%) patients were diagnosed with post-ERCP pancreatitis. The amylase and lipase level for post ERCP patients with and without pancreatitis were 650 ± 145 vs 134 ± 26 ($P = 0.023$) and 1658 ± 594 vs 84 ± 17 ($P = 0.057$) respectively. Six out of 28 patients tested positive in 1 hour and 5/29 patients tested positive in 4 hours. The one hour test post ERCP in one patient, who later developed pancreatitis, could not be done because he had difficulty urinating. The sensitivity of 1 hour test was 91% and specificity was 100%. The positive predictive value was 100% and negative predictive value was 66.6%. The sensitivity of 4 hour test was 95% and specificity was 100%. The positive predictive value was 100% and negative predictive value was 83.3%.

Conclusion: The urinary tryp ?2 Dip Stick Test is useful in early diagnosis of post ERCP pancreatitis. It allows physicians to begin management early in the course and has several potential benefits including avoidance of blood draws, reduced cost and early discharge of patients with negative test.

S089

ENDOSCOPIC TRANSAXILLARY APPROACH TO THE THYROID GLAND: OUR EARLY EXPERIENCE, Titus D Duncan MD, Ijeoma Ejeh MD, Qammar Rashid MD, Atlanta Medical Center; Morehouse School of Medicine

Introduction: The surgical treatment of thyroid disease typically involves a transverse incision made through the skin of the neck. Although this technique has proven to be safe and effi-

cient in the hands of most surgeons, the end result of this approach is a noticeable scar within a highly visible area of the neck.

Endoscopic transaxillary approach to the thyroid, eliminates scarring on the neck and anterior chest wall completely hiding all incisions when the arm is in a normal postural position. This endoscopic approach allows for improved illumination and magnification of the operative field improving visualization thereby enhancing safe dissection. We describe our initial technique and results of transaxillary endoscopic approach to the thyroid.

Materials and Methods: After performing a feasibility study espousing the efficacy and safety of this approach, we set out to perform endoscopic transaxillary thyroid lobectomy for unilateral thyroid disease. There were 35 patients involved in this study. There were 23 females and 2 male patients. Average age of all patients was 33 (range 19 to 71).

Results: All patients had successful completion of lobectomy and isthmusectomy using the transaxillary approach.

Temporary hoarseness occurred in two patients with subsequent complete resolution within three weeks of the surgery. One patient had to be returned to the operating room for post-operative bleeding from a superficial vessel on top of the pectoralis muscle, that was controlled endoscopically. There were no long term complications and overall patient satisfaction was excellent. All patients were satisfied with the cosmetic result.

Discussion: Most minimal access techniques to the thyroid involve an anterior approach with multiple small incisions in the neck or chest region. Although these techniques are less invasive than the open cervical approach with improved cosmetic results, scars are still highly visible. We report our series of thyroidectomy using a transaxillary approach to the thyroid region. We show that endoscopic transaxillary thyroidectomy is a safe and viable alternative to the open technique in select patients.

S090

LAPAROSCOPIC MANAGEMENT OF NON OBSTRETIC EMERGENCY IN THE THIRD TRIMESTER OF PREGNANCY, Ajay Upadhyay MD, Steven Stanten MD, George Kazantsev MD, Rupert Horoupan MD, Arthur Stanten MD, Alta Bates Summit Medical Center

[AIMS] Laparoscopic management of non obstetric acute abdominal pain during pregnancy remains controversial and represents a unique challenge. A gestational age of 28 weeks has been considered an upper limit for laparoscopy by some authors. Most reported cases are in the first and second trimester. We report a case series of Laparoscopic surgery in the third trimester of pregnancy.

[Methods] Medical records of third trimester patients who underwent open or Laparoscopic surgery between 1997 and 2005 were reviewed.

[Results] There were total twelve patients in this study. Eight patients underwent laparoscopic surgery while four had open surgery. In the Laparoscopic group, there were three appendectomies, three cholecystectomies and two adenexal surgeries. In the LS group the procedures were successfully completed using laparoscopic approach in seven patients, these had no complications and subsequently had normal full term deliveries. One patient in the LS group had to be converted to an open approach; she subsequently developed post operative hemorrhage and pre-term labor, requiring a cesarean section on the 3rd post operative day. The OS group included two appendectomies and two patients at 37 and 38 weeks who underwent a planned cesarean section followed by a total colectomy and Right hemicolectomy. In summary, we show that the even in the third trimester of pregnancy, access is easily obtained, space is generally not a problem, trocar placement can be optimized and there is minimal uterine manipulation.

[Conclusions] Our study shows that laparoscopic surgery is feasible and can be safely performed in the third trimester



with an acceptable risk to both the fetus and the mother.

S091

THORACOSCOPIC SYMPATHETIC CHAIN CLIPPING IS EQUIVALENT TO TRANSECTION IN SYMPTOMATIC HYPERHIDROSIS, Bryan A Whitson MD, Rafael S Andrade MD, Peter S Dahlberg MD, Michael A Maddaus MD, University of Minnesota Department of Surgery

INTRODUCTION: Symptomatic hyperhidrosis is treated by thoracic sympathetic chain interruption via traditional transection or a newer clipping approach. In the setting of severe compensatory hyperhidrosis, clipping has the advantage of potential reversibility. Our aim was to evaluate the efficacy and equivalence of the two methods.

METHODS: Retrospectively, all patients undergoing thoracoscopic sympathectomy for primary hyperhidrosis from January 1, 1999 through June 30, 2005 were reviewed. Demographic, operative, and postoperative data were collected and analyzed.

RESULTS: 55 operations were performed for refractory sweating in the following locations: palmar (71%), axillary (65%), plantar (52%), head/neck (19%), and Raynaud's (2%). 69% (38/55) of patients were clipped and 31% (17/55) were transected. There was no difference in age, sex, or blood loss. Three ganglionic levels were interrupted in 58%; two levels were interrupted 33%; and a single level in 21%. The incidence of both some compensatory hyperhidrosis was 10.4% (3 clipped, 2 ablated; all truncal), of which 1 patient (clipped) underwent clip removal for debilitating symptoms. There were three small pneumothoraces; all were in the transected group and treated expectantly.

[Mean ± SD]	Overall (n=55)	Clip (n=38)	Transect (n=17)
EBL (cc)	7.9 ± 9.9	6.3 ± 5.4	11.9 ± 15.9
OR Length (Min)	42.8 ± 22.7	35.9 ± 14	58.9 ± 30.6
LOS (Days)	0.22 ± 0.5	0.08 ± 0.27	0.53 ± 0.72

CONCLUSION: Thoracoscopic sympathectomy for primary hyperhidrosis, either via clipping or transection, can be performed safely and routinely as an outpatient. Both clipping and transection yield excellent results. Compensatory hyperhidrosis is minimal. In the event of debilitating compensatory hyperhidrosis, thoracoscopic clipping has the added benefit of potential reversibility. Both approaches have minimal operative length, blood loss and length of stay. Thoracoscopic sympathetic chain clipping is equivalent to chain transection.

S092

LAPAROSCOPIC INTRALUMINAL SURGERY A SAFE APPROACH FOR GASTROINTESTINAL DISEASE, Jorge M Trevino MD, Morris E Franklin MD, John J Gonzalez MD, Gregory Kim MD, Texas Endosurgery Institute

Overview: Advances in laparoscopic surgery have allowed its application in endoluminal surgery. Laparoscopic-assisted endoluminal surgery has been used for a variety of indications. We review our experience with this technique to determine its safety, feasibility and efficacy in the hands of an experienced laparoscopic surgeon.

Methods: Between 1996 and 2005, data was collected retrospectively of all patients having undergone laparoscopic endoluminal surgery at the Texas Endosurgery Institute. All patients underwent endoluminal port placement using a 5mm balloon trocar for the camera and 2mm for working ports, under direct visualization after a pneumoperitoneum was established. All the operations were performed in conjunction with upper endoscopy for assistance in port placement under intraluminal visualization, insufflation, and specimen retrieval. The endoluminal port sites were then closed with laparoscopic intracorporeal suturing after the intraluminal portion of the operation was completed.

Results: Thirty five patients from 1996 to 2005 underwent laparoscopic endoluminal surgery. Indications for the procedure were varied and included: diagnostic procedure, carcinoma tumors, pancreatic pseudocysts, gastric and esophageal polyps, duodenal webs, gastric adenocarcinoma, and benign

obstructing ulcer disease. All cases were completed successfully with no recurrence of the original pathology and minimal complications.

Conclusions: We were able to successfully complete procedures and establish diagnoses in all 35 patients using this technique and found it to be a safe, feasible, and effective alternative to more conventional therapies. It is a technique that will likely have more applications in the future as our experience and instrumentation improves and should be performed by anyone with previous experience in advanced laparoscopic surgery

S093

ROBOTIC VS LAPAROSCOPIC COLECTOMY, Arthur L Rawlings MD, Jay H Woodland MD, Prakash Gatta MD, Ravindra Vegunta MD, David L Crawford MD, University of Illinois College of Medicine at Peoria

This study compares thirty robotic colectomies with twenty-seven laparoscopic colectomies done by one MIS fellowship trained surgeon at a tertiary institution. Since the introduction of the DaVinci Robotic System, minimally invasive surgeons have explored its use for a variety of procedures. This study is based on information that was prospectively collected from 9/2002 to the present. Data analyzed (SPSS 12.0 for Windows) included indications for surgery, gender, age, BMI, EBL, length of operation, length of stay (LOS), complications, and average OR cost of operation. Male to female ratios, patient age, BMI and EBL were similar between the groups (p>0.05). Operations included 13 robotic and 12 lap sigmoid colectomies and 17 robotic and 15 lap right colectomies. Preop diagnosis for robot: Cancer (5); Diverticulitis (8); Polyp (16); Carcinoid (1). Preop diagnosis for lap: Cancer (9); Diverticulitis (12); Polyp (5); Crohns (1). Total right colectomy case time (minutes): Robot 218.9 vs Lap 169.2 (p=0.002). Total sigmoid colectomy case time (minutes): Robot 225.2 vs Lap 199.4 (p=0.128). LOS right colectomy (days): Robot 5.2 vs Lap 5.5 (p=0.8). LOS sigmoid colectomy (days): Robot 6.0 vs Lap 6.6 (p=0.9). Robotic complications: 1) Patient slid off OR table to floor after the robotic portion of the procedure; 2) Persistent left hip paresthesia; 3) Transverse colon injury from ultrasound shears; 4) Cecal injury from cautery; 5) Anastomotic leak; 6) Urinary retention beginning POD 5. Laparoscopic complications: 1) Anastomotic leak; 2) Partial small bowel obstruction. Two robotic and two lap cases were converted to open. Average OR cost for lap was \$6,464 (OR time \$1,131, personnel \$249, supplies \$5,084). The average OR cost for robotic was \$8,117 (OR time \$1,378, personnel \$485, supplies \$6,254), a difference of \$1,653 per case.

Conclusions: Indications for surgery, gender, age, BMI, EBL, length of hospital stay, and number of conversions to open were statistically similar between the groups. The difference in the length of operation was statistically significant only in the right colectomy group. The reason for this is the completely intracorporeal anastomosis performed in a robotic right colectomy. Complications in the robot group were more numerous but not attributable to equipment. The average OR cost of robotic colectomy at our institution is \$1,653 (25.5%) higher than when done laparoscopically.

S094

EFFECT OF THE "LEARNING CURVE" ON OUTCOMES AFTER ROBOTIC ASSISTED DONOR NEPHRECTOMY (RALN), Maria V Gorodner MD, Santiago A Horgan MD, Carlos Galvani MD, Giuliano Testa MD, Howard Sankary MD, Enrico Benedetti MD, University of Illinois at Chicago

Background: Robotic technology has emerged as a promising adjunct to advanced minimally invasive surgery (MIS). Herein we present our experience and the evolution of the technique with RALN over a 5 year period. We hypothesize that changes in surgical technique improve outcomes following RALN.

Patients and Methods: 213 patients underwent RALN between 10/2000 and 8/2005. Patients were divided into 2 groups based upon surgical technique: Group A (initial technique, n = 74), and Group B (current technique, n = 139). Retrospective review from prospective collected data was performed.

Results: Overall, 68% of patients were overweight or obese (BMI >= 25). Mean age was 35 years. Surgery time, complica-



	Group A	Group B	p value
Multiple renal arteries	19 (26%)	42 (30%)	NS
Surgery time (min)	201±42	117±36	< 0.001
WIT (sec)	97±19	95±27	NS
Hospital stay (days)	2±1	2±1	NS
Complications	18 (24%)	10 (7%)	<0.001
Graft loss	2 (3%)	1 (0.7%)	NS
Conversion	4 (5%)	0	<0.03

WIT: warm ischemia time. In the recipients, 1 year patient survival was 100% and graft survival was 98%. Conclusion: Specific changes in our operative technique over time improved patient safety and diminished complications with RALN. RALN can be performed expeditiously with minimal complications and risk for conversion to open nephrectomy with appropriate training and experience.

S095

ROBOTIC ASSISTED BILIARY PANCREATIC DIVERSION WITH DUODENAL SWITCH: PRELIMINARY EXPERIENCE. R. Sudan MD, V. Puri MD, D Sudan MD, Department of Surgery, Creighton University Medical Center, Omaha, NE.

Introduction: Minimally invasive (MI) surgical techniques decrease length of hospitalization and morbidity for general surgery procedures. Application of MI techniques to obesity surgery had previously been limited to stapled techniques and primarily for the roux-en-y gastric bypass. We present the initial series of totally intracorporeal robotic assisted biliary pancreatic diversion with duodenal switch (BPD/DS) using 5 ports.

Methods: Forty-seven patients underwent robotic assisted BPD/DS between October 2000 and July 2004. Their demographic, anthropometric, operative and follow-up data were maintained in a prospective fashion and reviewed retrospectively. The mean age of patients was 38 ± 10 years. The mean preoperative body weight was 126.1 ± 14.7 kg with a mean BMI of 45 ± 3.6 kg/m². Surgical patients had a minimum of 4 co-morbid conditions.

Results: Forty-four of the 47 procedures were completed intracorporeally with a mean operative time of 542 ± 135 minutes (range 378-800 min). Mean loss of excess body weight at 1 year is 74% with a mean follow-up of 19 months. Seventy-five percent of co-morbidities have resolved. The incidence of gastrointestinal leaks was 12% and postoperative small bowel obstruction 8%. The metabolic and liver function tests at one year were satisfactory.

Conclusions: Minimally invasive robotic surgery can be applied to complex abdominal operations like BPD/DS. The da Vinci™ (Intuitive Surgical, Inc., Sunnyville, CA) surgical robot allows for hand-sewn bowel anastomosis similar to the open technique. The short-term weight loss and metabolic results are comparable to the open operation.

S096

A COMPUTERIZED ANALYSIS OF ROBOTIC VERSUS LAPAROSCOPIC TASK PERFORMANCE V.K Narula MD, W C Watson MD, S S Davis MD, K Hinshaw BS, B J Needleman MD, D J Mikami MD, J W Hazey MD, J H Winston MD, P Muscarella MD, M Rubin, V Patel MD, W S Melvin MD, The Ohio State University. CMIS, Columbus, OH

Introduction: Robotic technology has been postulated to improve performance in advanced surgical skills. We utilized a novel computerized assessment system to objectively describe the technical enhancement in task performance comparing robotic and laparoscopic instrumentation.

Methods and Procedures: Advanced laparoscopic surgeons (2-10 yrs experience) performed 3 unique task modules using laparoscopic and Telerobotic Surgical Instrumentation (Intuitive Surgical, Sunnyvale, CA). Performance was evaluated using a computerized assessment system (ProMIS, Dublin, Ireland) and results were recorded as time (sec), total 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: 10 surgeons completed the study. Objective assessment of the data is presented in the table below. 8/10 surgeons had significant technical enhancement utilizing robotic technology

Laparoscopic vs Robotic	Time (sec)	Total Path(mm)	Precision
Module 1210 vs 161 #		11649 vs 5571 *	1434 vs 933 *
Module 2119 vs 68 *		5573 vs 1949 *	853 vs 406 *
Module 377 vs 55 *		4488 vs 2390 *	552 vs 358 *

= p < 0.009 * = p<0.001

Conclusions: The ProMIS computerized assessment system can be modified to objectively obtain task performance data with robotic instrumentation. All the tasks were performed faster and with more precision using the robotic technology than standard laparoscopy.



V001

NATURAL ORIFICE TRANSVISCERAL ENDOSCOPIC SURGERY, Jeffrey Marks MD, Michael McGee MD, Michael Rosen MD, Raymond Onders MD, Amitabh Chak MD, Ashley Faulx MD, Anthony Ignagni BA, Steve Schomisch BS, Jeffrey Ponsky MD, Case Western Reserve University

Natural Orifice Transvisceral Endoscopic Surgery (NOTES) has been heralded as the future of minimally invasive surgery. Our group has evaluated the potential applications of NOTES for various abdominal surgical procedures. Access techniques were addressed initially, utilizing several different approaches. Following this, adhesiolysis, liver biopsy, cholecystectomy, small bowel evaluation, and diaphragm pacing were performed. This video documents our early experience with this novel technique to perform minimally invasive abdominal procedures without abdominal incisions.

V002

LAPAROSCOPIC ASSISTED COLONOSCOPIC POLYPECTOMY USING CO₂ COLONOSCOPY ? A TECHNICAL REVIEW., Nan-Yaw Wong MD, Jeffery W Milsom MD, Section of Colorectal Surgery, New York Presbyterian Hospital, Weill Medical College of Cornell University, 525 East 68th Street, New York, NY 10021, USA.

Polyps of the colon and rectum harbor malignant potential and should be removed in order to halt their progression into invasive cancer. Small polyps can frequently be successfully excised through a colonoscope. Larger polyps, however, are not safe to be excised in this manner and will require formal segmental resection under general anesthetics. We describe a technique whereby the combined use of laparoscopy and CO₂ colonoscopy was employed to successfully excise a large tubulovillous adenoma of the sigmoid colon without any complications. Although this technique is demanding and requires the presence of at least two experienced laparoscopic surgeons, it can help avoid a laparotomy in a poor risk patient.

V003

GASTRO CUTANEOUS FISTULA TREATED WITH A COVERED STENT, David Hazzan MD, Edward Chin MD, Peter Legnani MD, Daniel Herron MD, Mount Sinai Hospital-Division of Minimally Invasive Surgery

We are presenting a case of a successful treatment of a Gastrocutaneous Fistula using a Covered Stent. 32 year old female patient who underwent a failed vertical banded gastroplasty in 1999. In 2000 she underwent a conversion to a Roux end Y gastric Bypass. Subsequently the patient required multiple laparotomies, lysis of adhesions and small bowel resections due to recurrent small bowel obstructions. In 2003 she presented complaining of poor oral intake, weight loss and total body pain, which required a reversal of the gastric bypass. 6 months later the patient presented with post-prandial diarrhea and feculent eructation. Upper gastrointestinal series revealed a gastrocolic fistula. She was taken to the operating room for a take down of gastrocolic fistula and a jejunostomy tube placement. On postoperative day 3, the patient developed a gastrocutaneous fistula. Despite 5 weeks of conservative treatment, she persisted with 250-300 cc output a day. We decided to treat her with a covered stent. The stent was inserted. The fistula output decreased dramatically. The stent was removed 14 days after the initial placement. A final upper gastrointestinal series demonstrated no evidence of fistula. The patient was discharged home tolerating diet. During a followup of one month she is doing well.

V004

COMBINED ENDOLUMINAL - LAPAROSCOPIC RESECTION FOR MULTIPLE GASTRIC STROMAL TUMOR., Antonello Forgiione MD, Dimitri Coumaros MD, Stefano Sereno MD, Joel Leroy MD, Francesco Rubino MD, Jacques Marescaux MD, IRCAD-EITS. European Institute of Telesurgery. Louis Pasteur University. Strasbourg, France

Background: Gastrointestinal stromal tumors (GIST) are rare and generally benign lesions of the stomach. If local excision is technically feasible radical gastrectomy is not required. This

video shows the feasibility of combining endoluminal resection and laparoscopic gastric wedge resection in case of multiple GISTs of the stomach.

Materials and methods: This video shows the case of a 64 y.o. obese female patient with two asymptomatic benign (c-Kit positive) submucosal gastric lesions. One of them, 5 mm in size was located at the cardia and another of 3 cm at the greater curvature. An endoscopic ultrasonography (EUS) showed that both lesions were confined to the submucosal layer. Contrasted Gastro-MRI confirmed the extension of the two lesions. Results: Local excision of the submucosal tumor at the level of the cardia was achieved by endoscopic cap assisted snare resection under laparoscopic control. Laparoscopic view showed an unexpected extension of the lesion located at the greater curvature. Laparoscopic gastric wedge resection was performed using two Endo GIA 45 cartridges. Endoscopic control confirmed the complete removal of the lesion and absence of intraluminal bleeding. Intraoperative and definitive histological findings confirmed benign stromal lesions. Postoperative course was uneventful.

V005

TWO STAGE LAPAROSCOPIC MANAGEMENT OF SIGMOID DIVERTICULITIS, Andrew G Harrell MD, B L Paton MD, Michael J Rosen MD, Kent W Kercher MD, B T Heniford MD, Carolinas Medical Center

Diverticulitis is a common condition, accounting for more than 200 000 hospitalizations annually and health care costs of more than \$300 million. With the introduction of laparoscopic surgery, the number of elective colectomies for diverticulitis has increased over the last few years. Emergency operations for diverticulitis are also amenable to laparoscopic management and in this video we demonstrate a two-staged laparoscopic management of sigmoid diverticulitis.

V006

HAND ASSISTED LAPAROSCOPIC SPLENECTOMY FOR MEGASPLEEN, Julie A Stein MD, Andrea Pietrabissa MD, Carlo Moretto MD, Andrea Peri MD, Franco Mosca MD, University of Pisa, Italy

This video shows the operative technique that we suggest for hand assisted laparoscopic splenectomy. The technique is indicated for cases of massive splenomegaly (splenic weigh over 1K), when the dissection is particularly difficult as for splenic abscess and infiltrating lymphomas, or to further minimize the risk of bleeding (Geova's witnesses). The patient is placed in a semi-lateral decubitus position. The hand-access incision is done in the right subcostal space and the operating surgeon will use the intracorporeal left hand with a brown glove to reduce light reflection. Three additional trocars are needed for the optics, the dissecting instruments and a fan retractor to lift the spleen up. The first step is to open the lesser sac by dividing the short gastric vessels. This will give access to the splenic artery that lies along the superior border of the pancreatic tail. Early ligation of the splenic artery reduces the size of the spleen, gives the patient an auto-transfusion, and minimize the following risk of bleeding. A blunt finger dissection is used to create a passage posterior to the vascular pedicle of the spleen. This will allow the safe positioning of the articulated vascular stapler which is fired across the hilum. Only now, the dissection is extended to isolate the posterior attachment of the spleen to the diaphragm, with virtual no risk of bleeding from a devascularized spleen. Loading a large spleen inside an extraction bag can be very difficult in pure laparoscopy. The hand assisted approach makes this step much easier and quicker. The spleen is finally extracted in pieces from the hand access incision. In our experience the hand assisted approach for megaspleens was not detrimental to the benefit associated with the totally laparoscopic splenectomy.



V007

S.G.I.T.: LAPAROSCOPIC SLEEVE GASTRECTOMY WITH ILEAL TRANSPOSITION AS AN ALTERNATIVE TO REVERSAL OF BILIO-PANCREATIC DIVERSION WITH DUODENAL SWITCH., Michel Gagner MD, Camilo Boza, Luca Milone BA, Alexandra Broseus, Elliot Yung MD, Division of Baritric Surgery, Department of Surgery, Weill Medical College of Cornell University, New York Presbyterian Hospital, New York

Laparoscopic biliopancreatic diversion with duodenal switch (LBDP/DS) has proven to be a good alternative for the treatment of morbid obesity with low recurrence rate. However, a number of patients can develop nutritional complications (2-4%).

We present a case of a 36 year old male with a weight of 340 pounds and a BMI of 50, with type 2 diabetes and Sleep apnea. The patient underwent a LBDP/DS in 2003. However, 8 months after surgery he had a weight loss of 160 pounds, a BMI of 26 and a significant protein-calorie malnutrition associated with frequent bowel movements. Eleven months after surgery he underwent a common channel elongation by transecting the alimentary limb and creating an anastomosis with the biliopancreatic limb, leaving a 200 cm common channel. Seventeen months after the first procedure he continued to lose weight reaching the 145 pounds with a BMI of 21. With severe hypalbuminemia he required total parenteral nutrition.

Based on his condition, it was decided to reverse the BPD/DS. We performed an ileal transposition by transecting the alimentary limb at the common channel and performing an ileoduodenal anastomosis, leaving the sleeve gastrectomy intact.

The patient was placed in supine split leg position. We identified the duodenoileostomy and followed the bowel to reach the junction of the alimentary limb to the biliopancreatic limb and common channel. At this site we did a careful dissection of the anastomosis to transect the alimentary limb and leave the biliopancreatic limb and the common channel in continuity. The procedure continued with the dissection of the distal duodenal stump and the placement of a 21 mm circular stapler anvil. The ileum was opened and a circular ileo-duodenal anastomosis was performed. This anastomosis created a wide U-shaped segment of ileum (antecolic) between the sleeve gastrectomy and the duodenal stump with a new mesenteric defect from the ileum to the mesocolon which was closed with non-absorbable sutures. The patient had a good post operative course and was discharged after 7 days. At the moment he has a BMI of 27 with a normal albumin (4.2 g/dl). This simple reanastomosis permits complete bowel restoration for nutrients absorption, and provides an ileal brake with early release of PYY 3-36 and GLP1. In conclusion, we present the sleeve gastrectomy with ileal transposition as a feasible and novel technique to restore the continuity of the alimentary tract for reversal of the BPD/DS.

V008

LAPAROSCOPIC SUBTOTAL GASTRECTOMY FOR GASTRIC CANCER, Ninh Nguyen MD, Esteban Varela MD, Peter Lin MD, Allen Sabio BS, University of California Irvine Medical Center

The authors present a video of a laparoscopic subtotal gastrectomy for gastric cancer. The case is of a 75 y/o male who underwent anemia workup revealing a large antral gastric adenocarcinoma. The specific steps of the gastrectomy are shown in detail: Diagnostic laparoscopy shows a greater curvature mass with no invasion. The division of the gastroepiploic vessels and duodenum with GIA stapler and the use of glycolide-copolymer staple-line reinforcement is revealed. The steps for subtotal gastrectomy including division of the left gastric artery and creation of the retrogastric window are shown. The construction of the jejunostomy is demonstrated. The construction of the gastro-jejunostomy with an EEA stapler is shown. Finally, the patient's length of stay, complications and pathology are explained.

V009

LAPAROSCOPIC DIVERTICULECTOMY WITH MYOTOMY AND ROUX-EN-Y GASTRIC BYPASS FOR EPIPHRENIC DIVERTICULUM AND MORBID OBESITY, Taner Yigit MD, Andrew S Wright MD, Brant K Oelschlager MD, University of Washington Department of Surgery

Epiphrenic diverticuli are often secondary to esophageal dysmotility or distal obstruction. Increased intraluminal pressure causes herniation of the mucosa and submucosa through the muscular layer of the esophagus. Symptoms include dysphagia, chest pain, regurgitation, and/or aspiration. The usual treatment includes a diverticulectomy and myotomy, either through a laparoscopic or transthoracic approach, followed by partial fundoplication to prevent gastroesophageal reflux. The treatment may need to be amended for special patient circumstances, such as morbid obesity.

This video is a case presentation of a 54 year-old morbidly obese woman with dysphagia due to an epiphrenic diverticulum. Pre-operative esophageal manometry revealed severe dysmotility with 40% aperistaltic swallows and 60% triple-peaked waves, as well as prolonged durations in the distal esophagus. Her BMI was 43. Since there is substantial evidence of increased failure rates of fundoplication in patients with morbid obesity, we recommended an epiphrenic diverticulectomy and myotomy combined with a gastric bypass. We performed a laparoscopic stapled diverticulectomy (EndoGIA, Tyco?) with a lighted 50 Fr bougie within the esophagus to prevent narrowing. An esophagogastric myotomy was created from 3cm on the stomach, through the GEJ, to a point above the level of the diverticulum. A small proximal gastric pouch was created, leaving 1 cm between the myotomy and the gastric staple line. We then performed a Roux-en-Y gastric bypass with a stapled side-to-side jejeuno-jejunostomy, and a circular stapled retro-colic, retro-gastric end-to-side gastro-jejunostomy. On post-operative day#2 an Upper GI series showed no residual diverticulum with normal bypass anatomy. The patient started a post-bypass diet that evening and was discharged home in good condition of post-operative day #5. Laparoscopic epiphrenic diverticulectomy, esophagogastric myotomy, and roux-en-y gastric bypass is a feasible alternative to standard approaches to epiphrenic diverticulae in morbidly obese patients.

V010

MINIMALLY INVASIVE APPROACH TO A GIANT RETROPERITONEAL GANGLIONEUROMA, Giancarlo Basili MD, Giuseppe Celona MD, Luca Lorenzetti MD, Claudio Angrisano MD, Graziano Biondi MD, Enrico Preziuso MD, Orlando Goletti MD, Local Health Unit 5 Pisa - Pontedera Hospital - General Surgery Unit

Introduction: Ganglioneuroma is a rare, differentiated and usually benign tumor that commonly arises from sympathetic ganglion cells. It occurs in young patients, between age 10 and 40. Though some ganglioneuromas may secrete neurochemicals and hormones, most commonly they are asymptomatic masses: symptoms appear late when tumor grows and are related to compression of a huge mass in the mediastinum or in the retroperitoneal space. Prognosis is generally good if ganglioneuroma may be completely removed by surgery. Here, we report one case of a giant retroperitoneal successfully removed by laparoscopy.

Case: A 19-yo male patient was admitted in our department complaining from fever and diffuse abdominal pain. After a preliminary abdominal ultrasound, CT and MRI scans showed a huge retroperitoneal mass, spreading anteriorly from right paravertebral space with medial displacement of inferior vena cava and right iliac veins. Pathological diagnosis of ganglioneuroma was achieved by laparoscopic biopsy and then laparoscopic resection of the tumor was achieved. A four-trocar technique was used. A gentle and sharp dissection of the mass from ileocaval vessels and right ureter was required. Tumor was completely removed and extracted through a mini-laparotomy above the pubis. Definitive pathological examination confirmed the diagnosis. Operative time was 3 hours and blood loss negligible. Patient was discharged in 4th p.o. day; no morbidity was registered.

Discussion: Because of its rarity, only one case of complete removal of a large presacral ganglioneuroma is reported in literature. Good visualization of the tumor is the most important factor for successful completion of the procedure. In selected cases, minimally invasive excision of such benign retroperitoneal tumor could be safely performed by skilled endoscopic surgeons.



V011

LAPAROSCOPIC RESECTION OF EXTRA ADRENAL (PELVIC) PHEOCHROMOCYTOMA, Barry Salky MD, Mount Sinai School of Medicine

This is a 22 year-old female with an extra-adrenal pheochromocytoma located ventral to the sacrum in close proximity to the right common iliac artery and the right ureter. The total excision of the tumor was accomplished with three ports. The key to the performance of the procedure was proper positioning of the patient to allow excellent exposure of the tumor. The anatomical dissection, including division of some of the pelvic nerves, is depicted. All biochemical tests returned to normal, and the preoperative back pain disappeared following excision. The cosmetic result was superior.

V012

ROBOTIC ASSISTED RIGHT HEPATECTOMY, Maria V Gorodner MD, Santiago A Horgan MD, Carlos Galvani MD, Giuliano Testa MD, Enrico Benedetti MD, University of Illinois at Chicago

Background: the technical limitations of laparoscopic surgery have encouraged surgeons to investigate the potential benefits from robotic surgery to expand their application in the minimally invasive surgery field. The robotic assisted right hepatectomy is emerging as a new alternative to laparoscopic techniques. Our goal is to present our experience with robotic assisted right hepatectomy.

Methods: 77 year old female, referred for evaluation for possible liver metastasis.

Her past medical history is significant for congestive heart failure with an ejection fraction of 30%. Her past surgical history includes right hemicolectomy for colon cancer (Dukes B II) in 2002.

Labs: CEA 14.1. The abdominal CT scan showed hepatic lesion in segment 6 compatible with metastasis.

Results: Surgical approach was decided performing robotic assisted liver resection of segments 6 and 7. The operative time was 5 hours with an estimated blood loss of 350 cc. Hospital stay was 3 days.

Conclusion: robotic assisted right hepatectomy can be safely and effectively performed, diminishing postoperative discomfort and shortening the hospital stay.

V013

NISSEN FUNDOPLICATION: THREE CAUSES OF FAILURE, Craig B Morgenthal MD, C. Daniel Smith MD, Emory Endosurgery Unit, Atlanta, Georgia

This video depicts some of the causes of failure of Nissen fundoplication. It is divided into three redo Nissen cases, each with a different mechanism of failure.

The first case shows an example of a misplaced wrap and also shows the proper construction of a Nissen fundoplication.

The second case shows failure secondary to a retained foreign body. The foreign body from the patient's initial procedure was left in situ and created a fibrotic reaction leading to esophageal stricture. The foreign body is removed and a Nissen fundoplication is created in this segment as well, although different parts of the procedure are emphasized.

The final case shows how chronic failure can sometimes have an acute presentation. We see the patient's gastric fundus has herniated through the retroesophageal space and it has become incarcerated and volvulized, creating a closed loop obstruction and acute distention. The herniated fundus is reduced and the hernia orifice is repaired.

V014

DUAL ENDOLUMINAL REVERSAL OF A MODIFIED HARTMANN PROCEDURE; A NEW MINIMALLY INVASIVE APPROACH, Jan Lukas Robertus MD, Esther C Consten MD, Sergio J Bardaro MD, Michel Gagner MD, Department of Surgery, New York Presbyterian Hospital, Weil College of Medicine of Cornell University, New York, USA. Department of Surgery, Meander Medical Center, Amersfoort, The Netherlands

Objective: The purpose of this study is to establish feasibility of an minimally invasive endoluminal colostomy reversal.

Summary Background Data: Reversal of emergent left colon end colostomies are associated with a high morbidity risk. Often the general health of the patient is poor so that the increased operative stress and high morbidity can lead to delay of colostomy reversal or even non reversal. To limit operative stress and reduce morbidity, an endoluminal approach was developed which permits colostomy reversal without entering the peritoneal cavity.

Methods: To evaluate the feasibility of an endoluminal approach we performed a three step procedure. Based on a early canine model which was developed to test a modified Hartmann procedure and endoluminal reversal cadaver studies were performed to evaluate endoluminal techniques. Finally a clinical patient pilot trial was performed to assess feasibility of a modified Hartmann procedure.

Results: In the canine model 6 mongrel dogs underwent laparoscopic modified Hartmann's procedures and endoluminal reversal. This showed that using fluoroscopy and dual endoscopy, an endoluminal approach could create an patent and functioning true end to side colostomy. The cadaver studies existing of 2 female and 2 male cadavers with no previous history of abdominal surgery showed that a modified Hartmann procedure and endoluminal reversal were possible in a human model. The clinical pilot trial consisted of 3 patients, 1 male and 2 female, all patients were diagnosed with recurring diverticulitis. All three patients successfully underwent a modified Hartmann procedure and laparoscopic guided endoluminal reversal. This demonstrated the applicability of an endoluminal procedure after a modified Hartmann procedure.

Conclusion: Although more research is needed in the form of clinical trials and the further development of direct visual access, we believe that endoluminal reversal of a modified Hartmann procedure is feasible and would greatly reduce operative stress, morbidity and the time interval between the initial operation and the reversal of the colostomy. This could potentially lead to an increase in the number of candidates for a second stage-colostomy reversal.

V015

A NOVEL APPROACH FOR ROUX LIMB CONSTRUCTION VIA THE LESSER SAC: AN ALTERNATIVE TECHNIQUE FOR THE DIFFICULT LAPAROSCOPIC GASTRIC BYPASS, Mark D Kligman MD, University of Maryland

The lesser sac approach is an alternative method for Roux limb construction during laparoscopic gastric bypass when access to the inframesocolic abdomen is difficult. Access to the inframesocolic abdomen requires either cephalad reflection or division of the omentum. Factors compromising reflection of the omentum include: (1) a large omentum, (2) hepatomegaly, and (3) adhesions between the omentum and lower abdominal wall or pelvic contents. Division of the omentum requires identification of the transverse colon and is occasionally compromised by extreme fat deposition.

In this technique, the lesser sac is entered by dividing the gastrocolic omentum. The ligament of Treitz is next identified by opening the transverse mesocolon from within the lesser sac. The jejunum is brought into the lesser sac for Roux limb construction. The jejunojejunostomy and biliopancreatic limb are then returned to the inframesocolic compartment and following creation of a gastrojejunal anastomosis the mesenteric defects are closed. This video focuses on the process of inframesocolic abdominal access and on the appropriate closure of the resulting mesenteric defects to minimize the risk of internal hernia.

V016

LAPAROSCOPIC RECTOPEXY, Joseph W Nunoo-Mensah MD, Jonathan Efron MD, Tonia Young-Fadok MD, Mayo Clinic, Scottsdale, Arizona

Abdominal rectopexy (with or without concomitant resection) has been advocated as the treatment of choice for complete rectal prolapse. Recurrence rates are low ranging from 0-8% and fecal continence has been documented to improve in 50-88% of patients. As most patients are elderly and not always fit enough to undergo open abdominal procedure, various perineal approaches have been advocated. Depending on the type

and extent of the operation, these procedures tend towards having a higher recurrence of up to 21%.

Laparoscopic rectopexy represents the latest development in the evolution of surgical treatment of rectal prolapse. This technique aims to combine the good functional outcome of the open abdominal procedure with the low postoperative morbidity of minimal invasive surgery.

We present a video of laparoscopic rectopexy on a 72-year-old lady with a 10-year history of fecal incontinence and recent development of a full thickness rectal prolapse.

V017

LAPAROSCOPIC TME WITH INTERSPHINCTERIC DISSECTION AND COLOANAL ANASTOMOSIS IN ULTRA-LOW RECTAL CANCER, J Leroy MD, L Mendoza Burgos, M Simone MD, A Alzahrani MD, J Marescaux MD, IRCAD-EITS European Institute of Tele Surgery, Louis Pasteur University, Strasbourg, France.

Abdominoperineal resection is the standard procedure in the treatment of rectal cancer located within 5 cm of the anal verge in selected patients. Sphincter-Sparing Laparoscopic Total Mesorectal Excision (SSLTME) with coloanal anastomosis may represent an alternative treatment option without compromising the possibility of cure. We present a case so treated.

Methods: A case of residual ultra-low rectal cancer after preoperative radiation therapy in a female patient is presented. We show the different steps of laparoscopic SSLTME using intersphincteric dissection transanally. Low rectum dissection with medial mobilization, vascular access and nerve plexus preservation are shown. A coloanal hand-sewn anastomosis is performed onto a colonic J-pouch.

Results: SSLTME with intersphincteric resection and coloanal anastomosis is achieved in compliance with oncological principles. Dissection and identification of the pelvic anatomy are facilitated by laparoscopic magnification.

Conclusion: SSLTME with intersphincteric resection and coloanal anastomosis in the treatment of very low rectal cancer is feasible and reproducible. Its standardization facilitates reproducibility.

V018

THORACOLAPAROSCOPIC ESOPHAGECTOMY FOR CARINOMA ESOPHAGUS MIDDLE THIRD, Chinnuswamy Palanivelu, R Parthasarathy, P Anandprakash, Dept of Minimal Access surgery & Surgical Gastroenterology

Minimally invasive esophagectomy had the potential to lower the morbidity of open operation and allow quicker return to normal function. The video describes the thoracoscopic esophagectomy in prone position approach. Thoracoscopic mobilization of the esophagus and mediastinal lymphadenectomy is done with the patient in prone position. The initial assessment is done and the azygos vein is dissected, ligated and divided. The esophagus is encircled with umbilical tape for retraction and esophagus is dissected from the chest wall. The lymph nodal clearance is completed along with the mobilization, which extends from the thoracic inlet to the esophageal hiatus. An ICD is inserted and ports are closed after removing trocars. The patient is turned to supine position and the mobilization of the stomach is done in the routine method using 5 ports. The esophagus is exposed by left cervical skin crease incision and transected 2-3 cm distal to UES. A nasogastric tube is sutured to cut end of the esophagus and whole specimen is advanced into the peritoneal cavity. The stomach and esophagus-NG tube assembly is exteriorized via a minilaparotomy made over the antrum, incorporating camera port and the esophagus is divided with adequate clearance with endostapler. A wide gastric-conduit (5-6 cm diameter) is fashioned and NG tube is sutured with gastric conduit and it is returned to abdomen. Pneumoperitoneum is recreated and gastric conduit is positioned into the mediastinum under laparoscopic guidance. Gastric tube is brought to neck wound and esophago-gastric anastomosis is fashioned in side-to-side or end-to-end manner. The complete video is presented followed by the discussion of the results. We feel that thoracoscopic mobilization of the esophagus in prone position is ergonomically better technique compared with that of in left lateral position. TLE has the potential to change the practice of transthoracic esophagectomy, though this procedure is technically demanding.

V019

LAPAROSCOPIC REPAIR OF RETROHEPATIC VENA CAVA INJURY DURING A HAND-ASSISTED LAPAROSCOPIC RIGHT RADICAL NEPHRECTOMY, Yuri W Novitsky MD, Lauren B Paton MD, B. Todd Heniford MD, Chris M Teigland MD, Kent W Kercher MD, Carolinas Medical Center

Vascular injuries during laparoscopic solid organ surgery may have catastrophic consequences. The availability of manual control of the hemorrhage is one of the advantages of the hand-assisted approach. This video demonstrates important operative strategies of controlling caval injuries, including adequate exposure of the bleeding source, hemorrhage control with sponges, SURGICEL, and direct manual compression, as well as intracorporeal suture repair of the venous injury.

V020

LAPAROSCOPIC RETRIEVAL OF FOREIGN BODIES: 3 CASES, Edward H Chin MD, Daniel M Herron MD, David Hazzan MD, Barry Salky MD, Mount Sinai Medical Center, NY

We recently had three cases of laparoscopic foreign body retrieval. The first case involved ingested latex gloves within the stomach that caused GI bleeding. Flexible endoscopy was unable to remove these gloves. Laparoscopically, we opened the stomach, extracted the gloves, and repaired the gastrotomy. The second case involved the removal of a penrose drain around the distal esophagus. The patient had initially underwent a laparoscopic Nissen wrap, vagotomy, and gastrojejunostomy to treat reflux and a duodenal stricture. He had persistent dysphagia after surgery. This was discovered to be secondary to a retained penrose drain, which was removed laparoscopically 18 months after the first surgery. The third case is a duodeno-jejunal fistula caused by multiple ingested magnets that eroded through the bowel wall. The fistula was divided laparoscopically, and the magnets removed. The duodenum and jejunum were repaired with laparoscopic suturing and stapling. All three patients did well after surgery.

V021

LAPAROSCOPIC REPAIR OF A DISTAL ESOPHAGEAL PERFORATION FOLLOWING PNEUMATIC DILATATION FOR ACHALASIA, Kurt E Roberts MD, Joyce I Kaufman, Andrew J Duffy, Robert L Bell, Yale School of Medicine, Department of Surgery, Section of Gastrointestinal Surgery

Esophageal perforation following pneumatic dilatation for achalasia occurs approximately in 2-5% of patients. Open left thoracotomy or thoracoscopic treatment has usually been performed in the emergent setting and open transabdominal repair has been used with distal esophageal perforations. Although laparoscopic repair has emerged as the standard of care for the elective treatment of achalasia recent literature reports only a few cases of a laparoscopic approach in the emergent treatment. We now present a video of a successful laparoscopic repair of an esophageal perforation following pneumatic dilation. This laparoscopic technique shows in detail the primary closure of the perforation as well as a longitudinal myotomy and a partial fundoplication.

The patient is a 77yo M who underwent his first pneumatic dilatation for progressive achalasia. Post procedural severe back pain associated with subcutaneous crepitus was noted. An upper gastrointestinal series showed a perforation of the distal esophagus with extravasation into the mediastinum. Within 3 hours of the perforating event the patient was brought to the operating room. Positioned in lithotomy position and after adequate pneumoperitoneum was established, a right sided approach thru the lesser omentum was chosen. The right crus was easily identified and great care was taken not to injure the anterior or the posterior vagus during dissection of the esophagus. After complete mobilization of the distal esophagus an approximately 12mm perforation was encountered on the lateral aspect of the esophagus about 6cm proximal to the GE-junction. Primary repair with 2-0 polysorb sutures in an interrupted fashion using an intracorporeal suturing technique was undertaken. Then, on the contralateral site just below the perforation, a longitudinal myotomy was performed and extended distally to 1.5cm onto the stomach.



Endoscopic inspection and air-insufflation proved our repair and myotomy to be intact. Subsequently a Dor-fundoplication was performed.

A postoperative upper gastrointestinal series showed no signs of a leak. The patient was discharged tolerating a regular diet with no signs of dysphagia or reflux.

Our video presentation shows clearly that the transabdominal laparoscopic repair of a distal esophageal perforation is a safe procedure in the hands of an experienced laparoscopic surgeon and therefore should be recommended as the preferable treatment for emergent distal esophageal repair.

V022

SURGICAL MANAGEMENT OF GASTRIC POUCH NECROSIS DUE TO LATE PROLAPSE FOLLOWING LAP-BAND PLACEMENT, Jeraldine S Orlina MD, Julio Teixeira MD, St. Luke's-Roosevelt Hospital Center

Following its introduction in 1993, the LAP-BAND (INAMED Health, Santa Barbara, CA) has been used extensively across the world for the treatment of obesity. Complications associated with the LAP-BAND include gastric prolapse, stoma obstruction, esophageal and gastric pouch dilatation, erosion, and access port problems. Over the years, improvements in operative technique have caused a significant decline in the post-operative complication rate. This video demonstrates the rare complication of gastric pouch necrosis due to late prolapse in a patient with a LAP-BAND placed by the perigastric technique. We demonstrate successful management of this serious complication by the laparoscopic removal of the LAP-BAND and resection of the necrotic segment of the stomach.

V023

LAPAROSCOPIC REPAIR OF A PERICARDIOPHRENIC HERNIA, Vera Freeman MD, Richard Perugini MD, Patrick McEnaney MD, Andras Sandor MD, Ciran McNamee MD, Department of Minimally Invasive Surgery, UMASS Medical School

The occurrence rate of pericardiophrenic hernias is rare. Fewer than 80 cases have been reported in the literature, even fewer following the formation of a pericardioperitoneal window. To date the use of laparoscopy in the repair of these hernias has not been reported. In this video we will demonstrate the use of laparoscopy in the repair of such a hernia. The patient in a 57 year old steroid dependent lady with a past medical history significant for Rheumatoid Arthritis and Pulmonary Fibrosis who had been found on work up of progressive dyspnea and intermittent substernal discomfort to have developed a pericardiophrenic hernia. Of note, the patient had undergone a subxiphoid pericardioperitoneal drainage of a pleural effusion 13 months prior. Pre-operative evaluation was completed and the patient was brought to the operating room. After using the Hassan technique to enter the abdomen a total of four trocars were placed in the abdominal wall. The hernia contents were retracted laparoscopically into the abdomen. The hernia defect was closed using AlloDerm. The patient had resolution of her symptoms post-operatively. This case, along with another similar case we performed at our institution, demonstrates laparoscopy as an effective way to approach the repair of pericardiophrenic hernias.

V024

BLEEDING CONTROL DURING LAPAROSCOPIC PELVIC SURGERY, Luis E Mendoza Burgos MD, J Leroy MD, F Rubino MD, S Sereno MD, M Vix MD, J Marescaux MPA, IRCAD-EITS European Institute of Tele Surgery, Louis Pasteur University, Strasbourg, France.

Background and Objectives: Bleeding is an event that may occur during any kind of surgery. In some advanced laparoscopic procedures, some authors consider that the difficulty to control bleeding may even contraindicate laparoscopy. The authors present two cases of high flow bleeding events during pelvic dissection, and the ways to control them.

Methods: Two cases of bleeding events during Laparoscopic pelvic surgery were analyzed. The first hemorrhagic event occurred during Total Mesorectal Excision for rectal cancer. The second event took place during rectal resection for rectovaginal endometriosis. In the first case, coagulation, clip appli-

cation and stitch suturing were tried but did not work. Compression allowed the intervention to continue, and made the final hemorrhage easier to control with application of Cellulose absorbable hemostat and fibrin glue. In the second case, the same attempts were made for a rather high-flow bleeding episode. After at least twenty minutes of compression, the bleeding continued. Further vascular dissection allowed for better understanding of the bleeding source and final bleeding control by clip application and compression.

Results: The basic principles of bleeding control are presented. Advise about what to do and not to do is given for definitive control, with a view to avoid worsening of bleeding. Hemorrhage was stopped by a combination of pressure and hemostatic material like cellulose absorbable hemostat or collagen glue in the first case. Further dissection for better understanding of the anatomy helped to control the bleeding in the second case.

Conclusion: The principles of bleeding control in laparoscopic pelvic surgery are similar to those of open surgery.

V025

LAPAROSCOPIC LEFT ADRENALECTOMY FOR 6 CM VIRILIZING TUMOR., Gavin D French MD, Colin Weber MD, C. Dan Smith MD, Emory University

This abstract accompanies a video submission.

The patient is a thirty-five year old woman with signs and symptoms of virilization. Preliminary testing revealed elevated DHEA levels and excluded the possibility of a pheochromocytoma. A CT scan confirmed a 6 cm left adrenal mass. With a thus confirmed diagnosis of a left, virilizing adrenal tumour, the patient was prepared for a laparoscopic resection. The video begins with a description of the patient and her pre-operative workup, including presentation, bloodwork, and CT scanning. Following this introduction, the patient position in the OR, equipment setup, staff arrangement, and port selection is outlined. Next there is a narrated video of the steps in performing a laparoscopic left adrenalectomy. The video concludes with a still shot of the tumor, followed by closing comments about the patients post-operative clinical course.

V026

LAPAROSCOPIC, SPLEEN PRESERVING, DISTAL PANCREATECTOMY, Patrick R Reardon MD, Wiljon Beltre MD, Mary Schwartz MD, Alberto Barroso MD, Karen Woods MD, Department of Surgery, The Methodist Hospital, Houston, Texas

We present a case of a 55 year old woman with a cystic neoplasm of the mid-body of the pancreas. Successful laparoscopic, spleen preserving, distal pancreatectomy was carried out. Mucinous cystadenoma was the final diagnosis.

V027

ENDOLUMINAL SURGERY : TRANSANAL ENDOSCOPIC MICROSURGERY RESECTION OF A SESSILE RECTAL POLYP, John H Marks MD, Lauren A Kosinski MD, David J Heinsch BS, Gerald Marks MD, Lankenau Hospital and Institute for Medical Research

Sessile polyps of the mid to upper rectum present a difficult problem for the endoscopist and surgeon. Lesions too large to be removed endoscopically and not accessible transanally routinely require a low anterior resection. Transanal Endoscopic Microsurgery (TEM) allows the surgeon to maximize the minimally invasive approach by curvatively resecting rectal tumors without any external incisions.

Presented is a 65 year old woman, on Coumadin for repeated DVTs, with a 3.5 cm sessile polyp 10 cm above the anorectal ring. The gastroenterologist felt this unresectable colonoscopically and the patient was referred to a colorectal surgeon who recommended a LAR. The patient sought an additional opinion. A repeat colonoscopy was performed to confirm the polyp was not colonoscopically resectable, its position, and the absence of malignancy.

Demonstrated is an application of endoluminal surgery utilizing the technique of TEM emphasizing the equipment, room set-up, and surgical approach. Key steps are highlighted including the proximal reach of TEM, polypectomy in a non-peritoneal fashion and anastomosis.



V028

LAPAROSCOPIC REPAIR OF A FORAMEN OF MORGAGNI HERNIA, Beth A Ryder MD, Thomas Ng MD, Department of Surgery, Brown Medical School, Providence, RI, USA

Congenital diaphragmatic hernia is an uncommon surgical problem. A Foramen of Morgagni hernia is diagnosed in only three to four percent of all cases of diaphragmatic hernia. If abdominal viscera are found within the hernia sac, incarceration or strangulation can occur. For this reason, these hernias warrant repair. We present a case of a symptomatic Foramen of Morgagni hernia in a 35 year old woman. A primary repair via laparoscopy was performed. Controversies regarding hernia sac resection and primary versus secondary repair are addressed. Repair via laparoscopy is safe and effective for such hernias of the diaphragm.

V029

POSTOPERATIVE PERITONITIS CAUSED BY A THERMAL INJURY DURING LAPAROSCOPIC COLECTOMY: LESSON LEARNED, Francesco Rubino MD, Joel Leroy MD, Antonello

Forgione MD, Stefano Sereno MD, Michele Simone MD, Jacques Marescaux, EITS-IRCAD, Louis Pasteur University, Strasbourg, France.

Postoperative peritonitis due to leak or bowel perforation after laparoscopic colectomy often requires reoperation by conventional open surgery. We show two cases of laparoscopic re-intervention for the treatment of postoperative peritonitis due to bowel perforation in previous colectomy.

The first of the two cases is a postoperative peritonitis after laparoscopic left colectomy. Early re-intervention by laparoscopy showed a diffuse peritonitis. Inspection of bowel loops allowed to identify a 1 cm hole in the descending colon. The injury was fixed by direct suture and the abdomen washed and drained. Postoperative course was excellent. Review of the initial operation allowed to identify the mechanism of perforation in an inappropriate use of the Atlas Ligasure sealing device, which was activated while the lateral edges of its blade were at direct contact with the wall of the colon.

The second case is a postoperative peritonitis after laparoscopic right colectomy. The patient was re-operated on post-operative day 2; under laparoscopic approach, an injury of the small bowel was easily recognized and fixed by stapled entero-entero anastomosis and resection of the injury site. Lavage and drainage was also performed. The post-operative course was favorable. By reviewing video-taped records of the initial operation, which are also shown here, we identified the mechanism of perforation in an inappropriate use of the Atlas Ligasure sealing device directly on the small bowel during dissection.

These two cases demonstrate the feasibility of laparoscopic treatment of postoperative peritonitis when re-intervention is readily performed. Careful review of the initial operation allowed us to recognize the mechanism of perforation, which in both cases depended on inappropriate use of dissecting/coagulating instruments. This video emphasizes the risk of using energy-driven instruments as dissecting tools.

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Posters Of Distinction–P001

SECURING THE APPENDICEAL STUMP WITH THE GEa EXTRACORPOREAL SLIDING KNOT DURING LAPAROSCOPIC APPENDECTOMY IS SAFE AND ECONOMICAL. Rodolfo Arcovedo MD, Sharp Medical Center, South Bay California

INTRODUCTION: Laparoscopic appendectomy has become very popular. One of the criticisms is its cost. An alternative to the expensive linear stapler most commonly used, would be a suture ligature of the base of the appendix. To prove that the gea extracorporeal sliding knot is a safe method of closing the stump after laparoscopic appendectomy, I carried the following retrospective study.

METHODS: During the past 4 years, all the 83 laparoscopic appendectomies performed by myself in which I utilized the Gea knot were reviewed. The Gea knot is created with a 0 prolene in the manner already described. During the same four years, another 83 appendectomies performed by other surgeons utilizing the stapler were reviewed. The main end point was the presence or absence of stump blowout, leak or fistula from the appendiceal stump. Secondary end points were abdominal sepsis, wound infection, need for readmission or reoperation. The results were analyzed and the difference in groups were compared with the Mann Whitney test.

RESULTS: Out of the 83 laparoscopic appendectomies in which the Gea knot was utilized was considered group A. Group B represented the 83 laparoscopic appendectomies performed with the stapler. Both groups were similar in terms of their characteristic i.e. age, gender, perforated versus suppurative. Within group A, none developed a stump blowout. There was one patient who developed interloop abscesses, which required percutaneous drainage. The abscesses were in remote areas to the cecum. This patient had a ruptured appendix at the time of surgery. Also, within this group there were two wound infections, directly related to contamination at the time of extraction of the specimen. In group B, none developed problems with the stump. There were 2 patients who developed prolonged ileus and one who developed a wound infection. There were no statistical differences noted between groups.

CONCLUSIONS: There are surgeons who routinely use sutures to secure the stump of the appendectomy. We try to demonstrate that the Gea extracorporeal knot is as secure as the stapler to close the appendiceal stump. Moreover, as previously published, the Gea knot takes 19 seconds to be tied and secured, the 0 prolene suture can be passed through a 5 mm trocar. The Gea knot seems like a good alternative to the stapler.

Posters Of Distinction–P002

DECREASED IMMUNE RESPONSE AFTER OPEN CHOLECYSTECTOMY VS LAPAROSCOPIC CHOLECYSTECTOMY IN ACUTE CHOLECYSTITIS. Yoon Jung Boo MD, Jin Kim MD, Sung Ock Suh MD, Chong Han Kim MD, Min Young Cho MD, Department of Surgery, Korea University College of Medicine

Objective: Early laparoscopic cholecystectomy in acute cholecystitis has subsequently been shown to improve outcome. This may partly be related to less immunosuppression and preservation immunity to infection in laparoscopic surgery. The aim of this study is to evaluate the influence of surgical trauma on the local and systemic inflammation and immune response in acute cholecystitis.

Methods: 33 patients with acute calculous cholecystitis were assigned to laparoscopic cholecystectomy (LC, n=18) and open cholecystectomy (OC, n=15). Blood samples were obtained preoperatively and postoperative day 1 (24 hours after operation) and day 3. Systemic concentration of C-reactive protein (CRP), white blood cell count and their subpopulations and tumor necrosis factor-alpha (TNF- α) ex vivo secretion of peripheral blood mononuclear cells (PBMCs) were measured in both groups.

Results : The operation time (90.2 vs 73.2 minutes, $p=0.054$) and postoperative hospital stays (5.76 vs 9.21, $p=0.001$) were significantly shorter in LC group than in OC group. Two patients showed postoperative morbidity in the OC group, but not in the LC group. The TNF- α ex vivo secretion of PBMCs and PBMC counts on postoperative day 1 of the OC

group was significantly lower than that of the LC group ($p=0.002$). The CRP level decline on postoperative day 3 was more marked in the LC group than in the OC group ($p<0.001$). Postoperative monocyte counts were more profoundly decreased in the OC group than in the LC group ($p=0.001$). **Conclusion:** The Laparoscopic approach appears to induce less surgical trauma and immunosuppression in patients with acute cholecystitis, indicated by monocyte deactivation, and reflected by the lack of monocyte TNF- α production and decreased monocyte counts. LC could be a beneficial option in the management of acute cholecystitis with immunologic advantage.

Posters Of Distinction–P003

A REVIEW OF LAPAROSCOPIC DONOR NEPHRECTOMY: 498 CASES. Edward H Chin MD, Michael Edye MD, Daniel M Herron MD, David Hazzan MD, Scott A Ames MD, Jonathan S Bromberg MD, Mount Sinai Medical Center, NY

Introduction: Several large series have been published on the feasibility of laparoscopic donor nephrectomy, focusing on short-term success and immediate complications. Objective: to examine the results of laparoscopic donor nephrectomy, with medium-term and long-term donor followup. Methods: We examined the results of two surgeons performing almost 500 lap donor nephrectomies (LDN) from 1996-present. Prospectively collected databases were reviewed for 498 patients that underwent LDN. Demographics, medical history, intraoperative events, and complications were noted. Patients were followed between 6 months and 9 years after surgery to assess for delayed complications, especially hypertension, renal insufficiency, incisional hernia, small bowel obstruction, and chronic pain. Results: 55% were female, and 45% male. Mean age was 40. Left kidneys were procured in 85% of cases, and right kidneys in 15%. Intraoperative complication rate was 2.8%, most commonly bleeding. Mean blood loss was 198 mL. Graft survival was 98.2%, and acute tubular necrosis was seen in 2%. Warm ischemia time averaged 3.4 minutes, and operative time 3 hours. Conversion rate was 1.6%. Immediate post-operative complications were seen in 3.8%. Average length of stay was 2.5 days. Mean donor creatinine at two weeks was 1.56. Long-term complications were rare, and included three cases of small bowel obstruction, two cases of incisional or leg pain, one case of hypertension requiring medication, and one case of renal insufficiency. Conclusions: LDN can be performed safely with acceptable immediate morbidity. Better data is necessary to assess long-term risks faced by LDN.

Posters Of Distinction–P004

CAN INNATE VISUOSPATIAL ABILITIES PREDICT THE LEARNING CURVE FOR ACQUISITION OF TECHNICAL SKILLS IN LAPAROSCOPY? Amin Andalib, Liane S Feldman MD, Jiguo Cao MSc, Anthony L McCluney MD, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University

Background: Acquisition of skills follows a learning curve, which can be characterized mathematically according to the rate of learning and the performance that can be theoretically achieved with extensive practice. We assessed whether innate abilities (visuospatial perception) impact the rate and/or the performance potential for learning a fundamental laparoscopic transferring skill.

Methods: 32 naïve first year med and dental students were tested for innate visuospatial abilities using 3 tests. Card Rotation (CR) and Cube Comparison (CC) test spatial orientation; Map Planning (MP) tests spatial scanning abilities. Each student performed the FLS peg transferring task 15 times and a learning curve was generated. Learning potential and learning rate were calculated from these curves. A linear regression model was used to test for correlation between task performance and each visuospatial test. Observed differences were tested for significance using Student's t test.

Results: There was significant correlation of learning potential with both CR ($r = 0.36$, $P < 0.05$) and CC ($r = 0.46$, $P < 0.05$). Learning rate correlated with scores for CR ($r = 0.37$, $P < 0.05$), but not CC ($r = 0.26$; $P = 0.15$). MP did not correlate with either learning rate or potential. Students scoring > 120 on CR had



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significantly greater learning potential (100 vs. 95; $P < 0.05$) and rate (6.6 vs. 4.0; $P < 0.05$), than those scoring < 120 . Similarly, those scoring > 22 on CC also had greater learning potential (101 vs. 95) and rate (6.4 vs. 4.0) than those < 22 ($P < 0.05$). Those with higher learning potential (> 94) fared significantly better in CR (122 vs. 105; $P < 0.05$) and CC (23 vs. 14; $P < 0.05$). Students with interest in surgical specialties had significantly higher learning potential than students with no interest in surgery.

Conclusion: Innate spatial orientation abilities, but not spatial scanning abilities, correlate with the rate of learning and the learning potential during the learning curve for the fundamental laparoscopic skill of bimanual transferring using a monocular optical system.

Posters Of Distinction—P005

CARBON DIOXIDE PNEUMOPERITONEUM-MEDIATED ATTENUATION OF THE INFLAMMATORY RESPONSE AND THE SYMPATHETIC NERVOUS SYSTEM, Joseph M Fuentes MD, Eric J Hanly MD, Alexander R Aurora MD, Samuel P Shih MD, Antonio De Maio PhD, Mark A Talamini MD, The Department of Surgery, The Johns Hopkins University School of Medicine, Baltimore.

INTRODUCTION: CO₂ pneumoperitoneum is known to have beneficial immune effects in laparoscopic surgery. We have recently shown that CO₂ suppresses pro-inflammatory cytokine production and increases survival. However, the mechanism behind this phenomenon is not fully elucidated. There is recent evidence that implicates the sympathetic nervous system as a key player in regulating the inflammatory response to injury. The purpose of this study was to determine if the sympathetic nervous system is behind CO₂ pneumoperitoneum immunomodulation.

METHODS: Forty rats were randomized into two groups: sympathetic block with 6-hydroxydopamine hydrobromide (6-OHDA, 100mg/kg, IV) or saline injection. Forty-eight hours later, animals were further randomized into 4 subgroups: LPS control, anesthesia control, CO₂ pneumoperitoneum, and helium pneumoperitoneum. The last three groups received their respective treatment for 30 minutes. Following their treatment, LPS was injected (1 mg/kg). Blood samples for serum cytokine assays were collected via cardiac puncture from all animals 1.5 hours following LPS injection.

RESULTS: Sympathetic-blocked LPS control animals had significantly suppressed TNF- α levels when compared to their saline-treated counterparts ($p=0.006$ by t-test), sympathetic-blocked CO₂ pneumoperitoneum animals also significantly suppressed TNF- α levels when compared to their saline-treated counterparts ($p=0.015$ by t-test). Furthermore, both sympathetic-blocked and saline-treated CO₂ groups had significantly suppressed TNF- α levels when compared to their LPS control counterparts. There were no differences between groups or among counterparts with respect to IL-10 levels.

CONCLUSIONS: CO₂ pneumoperitoneum downregulates TNF- α production in LPS challenged rodents. Our study shows that the immunomodulatory properties of CO₂ are independent of the sympathetic nervous system. However, sympathetic blockade appears to independently modify the early cytokine production seen with LPS-challenge.

Posters Of Distinction—P006

THE EFFECTS OF SURGICAL TRAUMA ON COLORECTAL LIVER METASTASIS, Clifford E Georges BS, Thomas Lo BS, Richard Whelan MD, John Allendorf MD, Columbia University School of Physicians and Surgeons

Introduction: The benefits of laparoscopic colectomy may go beyond a reduction in hospital length of stay, better pain control and cosmesis. Multiple animal models have demonstrated a decrease in tumor establishment and growth after minimally invasive procedures. We have investigated the effects of the extent of operative trauma on tumor cell metastasis in a murine colon cancer model.

Hypothesis: The increased abdominal wall trauma from a long incision increases the rate of colorectal liver metastases.

Methods: Murine colorectal adenocarcinoma cells (MC38)

were grown in cell culture in DMEM with 10%FBS. Cells were harvested when they reached 80% confluency. Cell pellets were resuspended in PBS to create a single cell suspension. Six week old C57/BL6J mice were anesthetized with xylazine and ketamine. Under aseptic conditions, 2×10^4 cells were injected in total volume of 0.1 mL into the portal vein. Abdominal exposure was through either a minilaparotomy (1cm) or a xiphoid to pubis laparotomy (2.5cm). The mice were sacrificed on postoperative day 21. Livers were excised and weighed. The expected liver weight based on mouse weight was subtracted to yield a measure of tumor burden.

Results: There was an 8 fold increase in tumor burden in the mice that had a long incision (1.32 +/- 1.43 g, n=5) compared to mice that had a minilaparotomy (0.134 +/- 0.07 g, n=7), $p < 0.05$.

Conclusions: The amount of abdominal wall trauma during surgery can profoundly affect metastatic spread of tumors. The stress effect of increased trauma during surgery may decrease the body's ability to defend metastatic spread of tumor. These data suggests that tumor resection using minimally invasive techniques may provide a survival benefit to patients with resectable cancers.

Posters Of Distinction—P007

LAPAROSCOPY IN THE MANAGEMENT OF SUBMUCOSAL TUMORS IN GI TRACT, Junichi Hasegawa MD, Tsuyoshi Takahashi MD, Junichi Nishimura MD, Akiko Nishitani MD, Takeshi Omori MD, Kiyokazu Nakajima MD, Masaya Nomura MD, Toshirou Nishida MD, Department of Surgery, Osaka University Graduate School of Medicine

Background: Laparoscopic surgery is one of treatments to choose for submucosal tumor (SMT) in the GI tract including asymptomatic incidentally-found small SMT. However, guideline from NCCN and ESMO do not recommend laparoscopic surgery for SMT with a strong suspicion of gastrointestinal stromal tumor (GIST). Here, we have retrospectively analyzed our laparoscopic experiences to investigate the feasibility and clinical outcome of laparoscopic surgery for SMT.

Method: From August 1996 to June 2005, laparoscopic surgery was performed for 71 patients with SMT. There were 27 men and 44 women, and median age was 59 years old. Location includes 5 tumors in the esophagus, 61 in the stomach, 4 in the small intestine, and 1 in the rectum. The tumors ranged in size from 1.5 to 7.6 cm (median, 3.5). Enucleation was performed for 9 patients, intragastric stapled resection 13, and partial or wedge resection 49.

Results: A histopathological examination revealed 11 leiomyoma (15.5%), 8 schwannoma (11.3%), and 52 GIST (73.2%). All esophageal SMT were leiomyoma. The mean operating time was 171 minutes, and the mean intraoperative blood loss was 102 ml. One case (1.4%) was converted to a laparotomy due to technical difficulty. The postoperative morbidity was 5.6 percent (4/71) and consisted of 3 wound infection and one anastomotic leakage which was conservatively treated. There were no other major complications and in-hospital deaths. After a median follow up of 30 months (range: 3-98) 2 patients who underwent enucleation in gastric GIST have relapsed, although enucleation surgery for leiomyoma have had no relapse. One patient had local recurrence 23 months after operation and the other met peritoneal metastasis after 74 months. No tumor recurrence was observed for patient with complete partial or wedge resection.

Conclusion: The laparoscopic surgery for SMT in the GI tract is technically feasible and safe. The enucleation is acceptable for benign tumor including leiomyoma, although this procedure is prohibited for GIST. Partial or wedge resection with a substantial margin (1 to 2 cm) should be done for GIST even if small one, but this is equally true for not only laparoscopic but also conventional open surgery.

Posters Of Distinction—P008

PREVIOUSLY UNREPORTED HIGH GRADE COMPLICATIONS OF ADRENALECTOMY, Rafael A Iglesias-Marquez MD, Will C Chapman MD, Kent Kercher MD, Brent D Matthews MD, Lee Gorden MD, L. Michael Brunt MD, Departments of Surgery, Carolinas Medical Center, Charlotte, NC, Vanderbilt University



Medical Center, Nashville, TN, and Washington University School of Medicine, St. Louis, MO

Background: Serious complications of adrenalectomy are rare but the incidence may be underestimated if they occur outside of major referral centers. We report 5 previously undescribed cases of high grade complications of adrenalectomy referred to 3 different academic centers.

Methods: Records of 5 cases of adrenalectomy performed at outside hospitals were reviewed. Four cases were referred for complication management and one for medical-legal review. The nature of the adrenal lesion, operative approach, complication(s), and subsequent clinical course and complication management were assessed. Both open adrenalectomy (OA) and laparoscopic adrenalectomy (LA) cases were included.

Results: Operative indications were pheochromocytoma (pheo) (N=3), aldosteronoma (N=1), and a left nonfunctioning 6cm hypervascular mass. Complications of adrenalectomy were: Case 1 - complete transection of the porta hepatis during attempted right LA for pheo converted to OA resulting in acute hepatic failure requiring emergent liver transplantation; Case 2 ? ligation of the hepatic artery during open removal of a right extra-adrenal pheo resulting in recurrent cholangitis and requiring liver transplantation; Case 3 -ligation of the left ureter during left LA for hyperaldosteronism resulting in hydronephrosis and subsequent loss of ipsilateral kidney function; Case 4 ?loss of function of the left kidney due to probable renal artery injury during OA for pheo requiring subsequent laparoscopic nephrectomy; and Case 5 ? laparoscopic removal of a normal left adrenal in a patient with a 6cm hypervascular left ?adrenal? mass. Imaging after adrenalectomy showed persistence of the mass which was then treated by hand-assisted laparoscopic left nephrectomy 3 months later. Pathology showed a renal cell carcinoma that was missed at LA.

Conclusions: Despite the generally low morbidity of adrenalectomy, serious and potentially life-threatening complications can occur. Surgeon inexperience may be a factor in the occurrence of some these complications which had not been described in the era of open adrenalectomy.

Posters Of Distinction-P009

GASTRIC BYPASS VERSUS GASTRIC BANDING IN THE SUPEROBESE, Neel R Joshi MD, Sergey Lyass MD, Mark Gaon MD, Masanobu Hagiike MD, Scott Cunneen MD, Gregg K Nishi MD, Edward Phillips MD, Theodore M Khalili MD, Department of Surgery, Cedars Sinai Medical Center, Los Angeles, California

Objective: To analyze our institution's experience with "super-obese" patients (preoperative BMI greater than or equal to 50) undergoing gastric bypass surgery (GBP) and gastric banding (GBD), and determine which option is superior in this demographic group.

Methods: We performed a retrospective study of all super-obese GBP and GBD patients at our institution from a prospectively maintained database of over 1000 patients from December 1999 to January 2005. Data collected included demographics, operative time, estimated blood loss, length of stay, morbidity, mortality, and percentage of excess body weight loss (EWL).

Results: 398 patients meeting criteria for superobesity (mean preoperative BMI 57 [range 50-83]) underwent GBP (386 laparoscopic, 12 open) at our institution during the study period. Over the same time period, GBD was performed on 76 (74 laparoscopic, 2 open) superobese patients (mean preoperative BMI 57 [range 50-72]). Preoperative comorbidity profiles in the GBP and GBD groups were similar. 53 GBP patients (13.3%) experienced medical or surgical complications compared to 17 GBD patients (22.4%). Complications in the GBP group included anastomotic leak (1.0%), intraperitoneal hemorrhage (1.0%), small bowel obstruction (0.5%), and acute gastric dilatation (0.3%). Complications in the GBD group included band obstruction (1.3%), esophageal dilatation (1.3%), and band slippage (5.3%). There were no deaths in either study group. 12 months after surgery, mean EWL was 56.2% (range 27.5-92.5%) in the GBP group and 30.4% (range -0.6%-78.4%) in the GBD group (p<0.0001). The average BMI of the GBP group 12 months after surgery was 38.1 (range 24.3-58.5) compared to

46.2 (range 31.2-67.9) in the GBD group (p<0.0001).

Conclusion: In superobese patients, gastric bypass surgery is superior to gastric banding in terms of weight loss achieved, with only minor differences in perioperative morbidity and mortality.

Posters Of Distinction-P010

STENTIMPLANTATION AS A TREATMENT OPTION IN PATIENTS WITH THORACIC ANASTOMOTIC LEAKS AFTER ESOPHAGECTOMY, Werner K Kauer PhD, Hubert J Stein PhD, Hans J Dittler MD, Rüdiger J Siewert PhD, Chirurgische Klinik und Poliklinik der Technischen Universität München, Klinikum rechts der Isar

Background: In patients with esophagectomy and gastric pull up for esophageal carcinoma anastomotic leaks are a well known complication and a major cause for morbidity and mortality.

Objective: Is stentimplantation a treatment option in patients with thoracic anastomotic leaks after esophagectomy?
Methods: Between 1/2002 and 12/2004 a thoracic anastomotic leak was clinically and endoscopically proven in 15 patients (m : w = 12 : 3, median age 62 years, range 42 ? 74 years) who had undergone esophagectomy and gastric pull up with an intrathoracic anastomosis for esophageal cancer. Insertion of a self expanding covered metal stent at the site of the anastomotic leak was performed in all patients.

Results: Stents were successfully placed in all patients without complications. In all but one patients radiologic examination showed a complete closure of the leakage. In one patient the stent was endoscopically corrected and a complete closure could be achieved as well. During the hospital course a distal dislocation of the stent was observed in 2 patients. In one patient endoscopic correction was successful, in one patient a proximal stent extension was successfully placed. Two patients died during the in-hospital time due to reasons not related to the stent placement.

Conclusion: Stentimplantation in patients with thoracic anastomotic leaks after esophagectomy is an easily available and effective treatment option with a low morbidity.

Posters Of Distinction-P011

APPLICATION OF BIOGLUE SURGICAL ADHESIVE TO AN EXPERIMENTAL SMALL INTESTINAL ANASTOMOTIC DEFECT SIGNIFICANTLY INCREASES LEAKAGE PRESSURE., Sang W Lee MD, Nadav Dujovny MD, James Yoo MD, Koiana Trencheva RN, Toyooki Sonoda MD, Jeffrey W Milsom MD, Dept. of Surgery, New York Presbyterian Hospital, Weill-Cornell Medical College, NY, NY

Introduction: Anastomotic (anast) leakage is among the most feared surgical complications after GI resection. Currently there is no absolute means to prevent intestinal anastomotic leak. The main objective of this study was to investigate the efficacy of Bioglue tissue adhesive (Cryolife, Kennesaw, GA) as a sealant when an anastomotic defect is artificially created in an ex vivo porcine small intestinal model.

Methods: In 2 studies, 5 cm segments of fresh porcine intestines were excised and anastomosed using a 21 mm circular stapler. Study 1 (Sealant effect on anast defect): In the control (N=7), two staples were removed from the anast on its antimesenteric side, using a wire cutter, creating a 5 mm defect. In the study group (N=7), Bioglue was applied over the defect. Bursting pressures (BP) were compared. Study 2 (Reinforcement of intact anast): In the study group (N=7), a 1.5 cm wide thin layer of Bioglue was applied to the either side of the anast and compared to the (N=7). BP of the anast and compliances were compared.

Results: Application of Bioglue to an anast defect significantly increased BP compared to control (103 +/- 34 vs. 5.4 +/- 2.1)(p < 0.0001). Similarly Bioglue significantly increased BP of intact anast (120 +/- 46 vs. 43 +/- 23)(p < 0.002) (Fisher's exact). Bioglue significantly decreased compliance at the anast (0.34 vs. 0.48 ml/mmHg)(ANOVA). Additionally, study 1 anast BP with defect was similar to anast BP with no defect.

Conclusion: Application of Bioglue is effective in acutely sealing an intestinal anast defect and raising BP of an intact anast in a porcine ex vivo model. An anast with defect, when



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repaired with Bioglue, is acutely as strong as one with no defect.

Posters Of Distinction—P012

LAPAROSCOPIC ANTERIOR ADRENALECTOMY: TECHNIQUE AND RESULTS OF A MODIFIED SURGICAL APPROACH IN A SERIES OF 124 CONSECUTIVE PATIENTS, Andreas Kiriakopoulos MD, Dimitrios Tsakayannis MD, Dimitrios Linos PhD, Department of Surgery, "Hygeia" Hospital, Athens, Greece

Objective: Laparoscopic right or left adrenalectomy includes complex operative steps imposing some serious operative difficulties and potential hazards. This study presents the surgical results of a modified operative technique for both glands during laparoscopic transabdominal adrenalectomy
Patients and Methods: From January 1993 to August 2005, one hundred twenty four patients (41 males and 83 females, mean age 47.4 years (range 6-74)) underwent laparoscopic adrenalectomy by a single surgeon. The modified operative technique involves no mobilization of the liver (right adrenalectomy) or of the spleen (left adrenalectomy) and direct entry to the retroperitoneal space. The main outcome measures included adrenal pathology, BMI, operative time, conversions, intra-operative and postoperative complications. Univariate and multivariate analysis was performed to assess the variables that affected the operative time

Results: Mean tumor size was 6.28 cm (range 1.2-13). The adrenal lesions included incidentalomas (34.17%), Cushing adenomas (21.97%), pheochromocytomas (12.28%), diffuse hyperplasia (6.14%), primary and metastatic carcinoma, cysts (5.26%), myelolipoma, gagleioneuroma, aldosteronoma, tuberculosis (4.38%), and unspecified pathology (4.38%). Mean operative time was 67 min (range: 52-113) for the right adrenalectomy and 82 min (range 55-134) for the left adrenalectomy. By multiple regression analysis, size of the adrenal specimen and patient body mass index were independent predictors of the operative time. One conversion was needed due to avulsion of the left adrenal vein. Postoperatively, there was one case of a large left pleural effusion. No infectious complications from the wound were encountered. Institution of oral intake was accomplished after 12 hours. Mean hospital stay was 2.1 days (range 1-3).

Conclusions: The modified operative technique simplifies and perhaps makes safer this technically demanding operation avoiding the potentially hazardous steps of mobilizing the liver or the spleen. Although tumor size does not constitute an absolute contraindication to the laparoscopic technique, it does affect the operative time. Patient BMI appears as another independent variable.

Posters Of Distinction—P013

A NOVEL TECHNIQUE FOR MANAGEMENT OF ENDOSCOPIC GASTROTOMY FOLLOWING NATURAL ORIFICE TRANSVISCERAL ENDOSCOPIC SURGERY, Jeffrey Marks MD, Michael McGee MD, Michael Rosen MD, Raymond Onders MD, Amitabh Chak MD, Ashley Faulx MD, Anthony Ignani, Steve Schomisch BS, Jeffrey Ponsky MD, case western reserve university

Background: Natural Orifice Transvisceral Endoscopic Surgery (NOTES) is the most novel minimally invasive approach to the abdominal cavity. There are numerous limitations to this conceptual technique, foremost being safe management of the endoscopically created gastrotomy. Endoscopic suturing tools are still cumbersome and other presently available tissue approximating devices provide only superficial mucosal closure. Creation of a temporary gastrocutaneous fistula with a Percutaneous Endoscopic Gastrostomy (PEG) is a safe and reliable alternative until a reproducible and dependable full thickness endoscopic closure technique is available.

Methods: Pigs were anesthetized and following endotracheal intubation, standard endoscopy with a diagnostic gastroscope was performed. Using a seldinger technique a guidewire was placed into the gastric lumen at a standard site on the abdominal wall for a PEG. The endoscope and guidewire were then

brought out through the mouth, and the endoscope was reinserted along side the guidewire. A gastrotomy was performed with a combination of needle knife cautery followed by endoscopic balloon dilation. The endoscope was advanced into the peritoneal cavity and all four quadrants of the peritoneum were inspected and the scope was then removed. A standard Pull PEG tube was attached to the wire exiting the mouth and the PEG was withdrawn back through the gastrotomy, leaving the internal mushroom bumper in the gastric lumen. The lumen of the stomach was then filled with 500 cc diluted India ink solution and the animals were sacrificed and analyzed. Results: Four pigs were studied and all showed complete sealing of the gastrotomy site with the PEG bumper in appropriate position. There was no evidence of extravasation of the diluted India ink solution in any of the animals.

Conclusion: This study supports the use of this novel technique for gastrotomy management following NOTES until a safe and reliable closure technique has been developed. Corollary studies with longer term evaluation in animals are necessary prior to proceeding to clinical trials.

Posters Of Distinction—P014

INTEGRATED ENDOSCOPY TRAINING DURING A SURGICAL RESIDENCY, M P Morales MD, G J Mancini MD, B W Miedema MD, N J Rangnakar MD, W S Eubanks MD, University of Missouri, Department of Surgery

INTRODUCTION: New advances in endoluminal surgery make it imperative that future gastrointestinal surgeons obtain adequate endoscopic skills. An evaluation of the 2001-02 general surgery residency program at the University of Missouri revealed an inadequate endoscopy experience for graduating residents. Our aim was to determine if endoscopic training could be improved by dedicating specific staff surgeon time to a gastrointestinal diagnostic center at an affiliated Veterans Administration Hospital.

METHODS: During the academic years 2002-05, two general surgeons who routinely perform endoscopy staffed the gastrointestinal endoscopy center at the Harry S. Truman Hospital two days per week. A minimum of one surgical categorical resident participated during these endoscopy training days. A retrospective observational review of ACGME surgery resident case logs from 2001 to 2005 was conducted to document the changes in resident endoscopy experience.

RESULTS: Resident endoscopy case volume increased by 850% from 2001 to 2005. Case volume was evenly distributed among all training levels.



CONCLUSION: Having specific endoscopy training days at a VA Hospital under the guidance of a dedicated staff surgeon is one method to improve resident endoscopic case volume. Integrating this experience in a general surgery service does not compromise other aspects of general surgery training. An integrated endoscopy training curriculum provides (1) opportunity for early skills attainment (2) continued proficiency throughout residency, and (3) an efficient way to obtain endoscopic skills.

Posters Of Distinction—P015

POSTOPERATIVE PAIN AFTER LAPAROSCOPIC VENTRAL HERNIA REPAIR: A COMPARISON OF FIXATION METHODS, SUTURES VS. TACKS, Scott Q Nguyen MD, Kerri E Buch RN, Celia M Divino MD, Mount Sinai School of Medicine

Introduction: Mesh fixation in laparoscopic ventral hernia repair requires the use of tacks and/or transabdominal permanent sutures. We compare postoperative pain after repair with these two methods. Methods: A prospective nonrandomized study was performed on patients undergoing laparoscopic ventral hernia repair at the Mount Sinai Medical Center. They were divided into two groups 1) Hernia repairs consisting of



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primarily transabdominal sutures (Sutures group) and 2) Hernia repairs consisting of primarily tacks (Tacks group). Follow up was by telephone survey to determine verbal pain scores at 1 week, 1 month, and 2 months postoperatively. Also, patients time to return to work and use of narcotic pain medications was assessed. Results: 44 patients have been enrolled in the study. 29 in the Sutures group and 14 in the Tacks group.

	Sutures (n = 29)	Tacks (n = 14)	
Multiple Defects	8/29 (28%)	5/14 (36%)	
Total Defect Size (cm ²)	109	97	P = NS
Length of Stay (days)	1.7	2.8	P = NS
Complications	1 (3%)	2 (14%)	
Pain Score 1 wk (range 0-10)	5.1	5	P = NS
Pain Score 1 month (range 0-10)	2	1.7	P = NS
Pain Score 2 months (range 0-10)	0.8	1.1	P = NS
Narcotic pain needs > 1 wk	12/29 (41%)	2/14 (14%)	
Return to work by 1 wk	12/29 (41%)	3/14 (21%)	

Both groups had similar total hernia defect size, operative time, and postoperative length of stay. There were no early postoperative recurrences in either group. The complication rate in the Tacks Group was higher and consisted of urinary retention, pulmonary embolism, and pneumonia. A postoperative pneumonia was the only complication in the Sutures Group. Pain scores at 1 week, 1 month, and 2 months were similar. Both groups also had similar times to return to work and narcotic pain medication requirement. Conclusion: Patients undergoing laparoscopic ventral hernia repair with primarily transabdominal sutures or tacks experience similar postoperative pain. The determination of fixation methods during surgery should not be based on risk of postoperative pain.

Posters Of Distinction-P016

THE EFFECT OF FRICTION AND VISION ON TACTILE PERCEPTION IN MINIMALLY INVASIVE SURGERY, Tuan D Nguyen BS, Caroline G Cao PhD, Steven D Schwaitzberg MD, Tufts University School of Medicine, Cambridge Health Alliance, Tufts University School of Engineering

Injury to abdominal viscera can occur when instruments are in motion outside of the field of view of the camera during laparoscopic surgery. Current endoscopic instrumentation is incapable of reproducing the haptic and tactile feedback available to surgeons during open surgery. A tight seal is required at the port where instruments are inserted into the abdominal cavity in order to maintain pneumoperitoneum. As a result, friction is introduced between the cannula and the instrument. This reduces the surgeon's haptic feedback from the abdominal viscera potentially leading to injury. Two experiments (N=11 surgical residents) were conducted to examine the effect of friction and vision upon the accuracy of determining contact with simulated human tissues and differentiating tissue softness in a simulated laparoscopic surgical environment. In the first task, surgical residents were asked to insert the instrument until they perceived to have made contact with the tissue under four conditions: vision with friction (VF), vision without friction (VNF), blind with friction (BF) and blind without friction (BNF). Mean force for this study was BF=6.8 Newtons (N), BNF=5.2N, VF=5.1N, VNF=3.7N. In the second task, residents were asked to determine the relative softness of two tissue samples under the same four conditions and to rate their confidence at the discrimination. Accuracy of determination for this study was BF=52.1%, BNF=68.8%, VF=60.4%, VNF=85.4%. Performance measures include applied force to tissues, difference between perceived contact time and actual contact time, accuracy in determining relative tissue softness and perceived confidence level in making those determinations. When friction at the cannula seal was eliminated, subjects applied less force, had greater accuracy in determining tissue softness and greater confidence level. Both cannula friction and instrument motion not visualized by the operator seemed to hinder the operator's awareness when contacting simulated tissue. These deleterious effects appear additive. Laparoscopic surgery could be made incrementally safer through the development of frictionless cannulas and the recognition that off-camera motion can be inherently dangerous.

Posters Of Distinction-P017

COST COMPARISON OF LAPAROSCOPIC VS. OPEN ADRENALECTOMY: DOES DIAGNOSIS MATTER?, C J Northup MD, S A Abdollahzadeh, R L Carty, J A Humsi, A L Wind, V B Simpson RN, B D Schirmer MD, J B Hanks MD, University of Virginia Health System

INTRODUCTION- One of the assumptions of laparoscopic adrenalectomy is the increased cost, typically offset by a decrease in length of stay(LOS). Our goal was to review the actual hospital cost and LOS with regards to the surgical approach and pathologic diagnosis.

METHODS- Seventy-five unilateral adrenalectomies for benign disease were reviewed retrospectively from 1992-2004. Procedures were performed either with a transperitoneal laparoscopic (n=30) or an open flank approach (n=45). Total adjusted hospital costs and LOS were compared using standard t-tests.

RESULTS- The average cost for open adrenalectomy(OA) was \$11,036 ±6,805 and \$8,491 ±2,311 for laparoscopic adrenalectomy(LA). The LOS for the OA and LA groups were 4.7±2.2 and 1.9±1.0* respectively. The results were then grouped by diagnosis.

	Cost(OA)	LOS(OA)	Cost(LA)	LOS(LA)
Adenoma	\$8,772 ±2,773	4.2±0.6	\$7,032 ±1,508	1.9±1.0*
Adipocarcinoma	\$9,044 ±1,496	4.0±1.0	\$7,860 ±1,431	1.6±0.8*
Cortisol Secreting	\$11,214 ±7,194	5.4±3.2	\$10,395 ±2,964	3.0±1.4
Phaeochromocytoma	\$13,246 ±8,609	4.9±2.4	\$9,868 ±2,623	2.3±0.5*

*=statistically significant CONCLUSION- There is no increase in overall hospital cost of laparoscopic adrenalectomy stratified by diagnosis. The increased OR costs of LA are counterbalanced by a decrease in LOS. Cortisol Secreting Tumors are the only pathology type that has no significant difference in LOS by surgical approach.

Posters Of Distinction-P018

ENDOSCOPE ASSISTED PERCUTANEOUS TRANS-ESOPHAGEAL GASTRO-TUBING (EA-PTEG), Hideto Oishi MD, Noriyasu Shirota MD, Shingo Kameoka MD, Department of Surgery, Aoyama Hospital, Tokyo Women's Medical University

In 1994, we developed a new technique of non-surgical esophagostomy called percutaneous trans-esophageal gastro-tubing (PTEG) for the patients who percutaneous endoscopic gastrostomy (PEG) could not be performed and more than 7000 patients were already treated by PTEG in Japan. However, PTEG is done under ultrasonographic and fluoroscopic control and not always easy for the endoscopists who perform PEG. Therefore, we developed a new product called double balloon over tube equips rupture-free balloon (DBOT-RFB) for safer and easier PTEG.

Endoscope assisted PTEG (EA-PTEG) using DBOT-RFB allows direct endoscopic observation during the puncture and reduces x-ray exposure. Moreover, clearer ultrasonographic view is obtained with DBOT-RFB's internal and external balloons for safer puncture.

We performed 10 EA-PTEG since 2003, and all cases were successful without any complications.

In this presentation, the details of DBOT-RFB and EA-PTEG will be introduced to generalize this innovative technique for not only interventional radiologists but also surgical endoscopists.

Posters Of Distinction-P019

LAPAROSCOPIC MAPPING OF THE MOTOR POINTS IN PARTIALLY DENERVATED DIAPHRAGMS: KEY FINDING FOR SUCCESSFUL PLACEMENT OF THE DIAPHRAGM PACING SYSTEM, Raymond Onders MD, Anthony Ignagni MS, Mary Jo Elmo RN, Bashar Katirji MD, Robert Schilz DO, University Hospitals of Cleveland and CASE School of Medicine

Background: The laparoscopic diaphragm pacing stimulation (DPS) system (Synapse Biomedical) is successful in providing adequate ventilation in spinal cord injured patients who have intact phrenic nerves but its efficacy in patients with partial denervation is unknown. Progressive denervation is the hallmark of amyotrophic lateral sclerosis(ALS or Lou Gehrig's disease) which leads to progressive diaphragm weakness and



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subsequent respiratory failure. Patients with spinal cord injuries (SCI) from C3 to C5 can also have injuries to the motor neurons that comprise the phrenic nerve. We undertook a Phase I trial of DPS in patients with ALS to assess if diaphragm function can be maintained in the setting of progressive motor neuron degeneration and have successfully implanted DPS in a SCI patient with partial diaphragmatic denervation. This report outlines the ability to identify the motor point of the diaphragm in a partially denervated diaphragm either from ALS or SCI to facilitate successful diaphragm pacing.

Methods: Patients underwent outpatient laparoscopic mapping of their diaphragm to locate the phrenic nerve motor points and two electrodes were implanted into each hemidiaphragm. The technique of mapping and identifying the motor point were compared to patients that had normal phrenic nerve and non-denervated diaphragms with successful implantation of the DPS system.

Results: Four ALS patients and one C4 level SCI patient who had a partially denervated left diaphragm were implanted. The key finding of mapping a partially denervated diaphragm are: 1) The denervation is easily visualized laparoscopically, 2) Patients with ALS have multiple patterns of movement and atrophy. We have observed both diffuse atrophy and radial banding of the diaphragm with better diaphragmatic function. 3) Mapping using a ?burst? stimulation as opposed to ?twitch? stimulation provides better qualitative assessment to locate the phrenic nerve motor point.

Conclusions: The use of burst stimulation and qualitative assessment of diaphragmatic function allowed the successful implantation in these five patients with heterogeneous diaphragmatic atrophy. The long term success in ALS will be determined with further follow-up. The success of the SCI patient in this study suggests that SCI patients with inconclusive phrenic nerve studies may be successfully paced after laparoscopic assessment of the diaphragm.

Posters Of Distinction-P020

APPENDICITIS IN ELDERLY- A CHANGE IN THE LAPAROSCOPIC ERA, Charudutt Paranjape MD, Samir Dalia BA, James Pan BS, Ann Salvator MS, Mark Horattas MD, Akron General Med. Ctr., NE Ohio Universities College of Medicine (NEOUCOM)

Introduction— Appendicitis in elderly patients is associated with significant morbidity and mortality. Early and correct diagnosis along with minimal invasive surgery can lead to more favorable outcomes as compared with pre-laparoscopic era.

Methods— Retrospective review of 116 elderly patients (age > 60) from 1999-2004 is compared with our previously published studies from 1978- 1988 (N=96) and 1988-1998 (N=113) respectively.

Results— In our present series (1999-2004), more cases were done laparoscopically (n=68) than open (n=48). Perforated appendicitis had significantly more Length of Stay (LOS), more complications and longer Operating time as compared with non-perforated cases. The laparoscopic cases had significantly less LOS, fewer complications and comparable Operating time compared with open cases.

	Lap (n=68)	Open (n=48)	p-value
LOS (days)	5.3 +/- 4.3	9.8 +/- 9.7	.0001
CT scan done	75%	85%	0.17
Accuracy of CT	92%	97%	0.25
COMPLICATIONS	18%	37%	.02
OR Time (min)	82.5 +/- 39.4	80.4 +/- 48.1	0.40

Compared with our previous studies from (1978- 1988) and (1988-1998), the present series (1999-2004) has patients presenting with fewer classical symptoms. CT scanning was more accurate in the present study and was more routinely used. Patients in the present series had more correct pre-operative diagnosis. Perforated appendicitis was encountered less frequently and was associated with fewer complications. The 4% mortality rate in the previous two series decreased to less than 1% in this series.

Conclusion— Minimally invasive surgery combined with increased use and accuracy of pre-operative CT scans have changed the clinical management of acute appendicitis in elderly patients leading to decreased length of stay ,decreased mortality and more favorable outcomes.

Posters Of Distinction-P021

TISSUE FUSION DEVICE COMPLICATIONS REPORTED TO THE FDA, Robert J Rhodes MD, Thomas N Robinson MD, Ashok Babu MD, Sagar Damle MD, Jason H Clarke MD, University of Colorado Health Sciences Center, Denver, CO, USA.

Introduction: Complications caused by tissue fusion devices differ depending on the energy source used. Radiofrequency (RF) and ultrasonic (US) energy are the principle energy sources used in the modern operating room.

Methods: We retrieved consecutive medical device reports associated with the use of energy based tissue fusion devices from the Manufacturer User Facility Device Experience Database (MAUDE) received by the FDA. We analyzed 382 adverse event reports; including 145 (38%) RF device reports and 237 (62%) US device reports. Statistical analysis was performed using chi-squared analysis; * denotes significance set at p<0.05.

Results: Clinically significant complications were more frequently reported for RF devices 33% (48/145) than for US devices 1% (3/237) (*p<0.01). For US devices, 99% (234/237) of reported complications were mechanical failures of no clinical consequence. For RF devices, clinically significant complications included: bleeding 69% (33/48), burns 19% (9/48) and mechanical failures 12% (6/48). The bleeding complications reported for RF devices included: conversion to open procedures 36% (12/33), re-operation 33% (11/33), massive blood loss 15% (5/33) and other 15% (5/33). Bleeding complications were more frequently reported for RF devices than for US devices; 23% (33/145) vs. 1% (3/237) (*p<.01); burns were also more frequently reported for RF devices; 6% (9/145) vs. 0% (0/237) (*p<.01). Overall, there were 3 deaths from bleeding in the RF group compared to 0 in the US group. This did not reach statistical significance; 2% (3/145) vs. 0% (0/237) (p=.10).

Conclusions: RF tissue fusion devices have more clinically significant complications compared to US devices. Bleeding and burns accounted for the majority of RF reported complications.

Posters Of Distinction-P022

COMPARISON OF CONVENTIONAL LAPAROSCOPIC VERSES HAND ASSISTED ONCOLOGIC SEGMENTAL COLONIC RESECTION, Chad D Ringley MD, Victor P Bochkarev MD, Corrigan L McBride MD, Jon Thompson MD, Dmitry Oleynikov MD, University of Nebraska Medical Center

Laparoscopic assisted segmental colon resection has evolved to be a viable option in the treatment of colorectal cancer. This study evaluates the efficacy of the hand assisted technique (HALS) as compared to the totally laparoscopic technique (LAP) of segmental oncologic colon resection in regards to lymph node harvest, operative times, intra operative blood loss, incisional length and length of hospital stay in an attempt to help delineate the role of each in the treatment of colorectal cancer.

The prospective databases of three advanced laparoscopic surgeons were analyzed to acquire data for this evaluation. Forty patients underwent elective oncologic segmental colon resection between June 2001 and July 2005 (22 HALS, 18 LAP). Main outcome measures included lymph node harvest, operative times, intra operative blood loss, incisional length and length of hospital stay. Statistical analysis was performed via the SPSS statistical program to ascertain any differences between the two groups.

A total of forty patients were evaluated in the study, 22 in the HALS group and 18 in the LAP group. The two groups were comparable with regards to patient demographics. The tumor margins were clear in all patients. HALS resection resulted in a statistically significant higher lymph node yield than the LAP group (HALS = 16 +/- 6.5; LAP = 9.4 +/- 5.3; p = 0.009) and significantly shorter operative times (HALS = 125.5 min +/- 33.5; LAP = 169.1 min +/- 59.1; p = 0.009). Both groups were comparable in regards to length of hospital stay and intra operative

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blood loss. However, the LAP group yielded a statistically significant smaller incision for specimen extraction (LAP = 5.9 cm +/- 0.8; HALS = 6.8 cm +/- 0.7; p = 0.007).

This evaluation suggest that hand assisted laparoscopic oncologic segmental colonic resection is associated with shorter operative times, higher lymph node harvest and equivalent hospital stays and intra operative blood loss as compared to the totally laparoscopic approach. The totally laparoscopic technique was completed with a smaller incision; however, this less than a centimeter reduction in incisional length has doubtful clinical significance.

Posters Of Distinction-P023

EVOLUTION OF LAPAROSCOPIC SPLENECTOMY AT A SINGLE INSTITUTION OVER A 6-YEAR PERIOD, Erin E Rowell MD, Thadeus Trus MD, William S Laycock MD, Dartmouth-Hitchcock Medical Center

Objective: Laparoscopic splenectomy has emerged as the elective treatment of choice for a variety of disorders involving the spleen. This study examines the evolution of elective laparoscopic splenectomy at a single institution over a 6-year period.

Methods: Since 1998, 75 patients underwent elective splenectomy at Dartmouth-Hitchcock Medical Center. Data were collected prospectively for both open splenectomy [OS] and laparoscopic splenectomy [LS]. Comparison was made using Fisher's exact test and student's t-test.

Results: 24 patients underwent OS, and 51 patients underwent LS. The most common indications for surgery for the OS group were lymphoma 44%, myelodysplastic syndrome 28%, and idiopathic thrombocytopenic purpura [ITP] 16%. In comparison, indications for the LS group were ITP 44%, hereditary spherocytosis [HS] 26%, hemolytic anemia 13%, and lymphoma 12%. Median length of stay (LOS) for the OS group was 7 days, compared to 2.5 days for the LS group (p<0.0001). Mean hospital charges for the OS group were \$24,786 versus \$16,070 for the LS group (p<0.0001). Two patients in the OS group [8.3%] and four patients in the LS group [7.8%] developed complications. Of the OS patients, one developed wound infection and one suffered occlusive cerebrovascular accident. In comparison, one patient in the LS group [1.9%] developed pancreatitis, and two patients [3.9%] developed non-occlusive portal vein thrombosis. There were no statistically significant differences in complication rates between the two groups. Three patients in both the OS group and LS group required readmission within 30-days of surgery [12.5% versus 5.9% respectively] (p<0.01). The proportion of elective laparoscopic splenectomy cases increased from 44% for the years 1998-2000 to 74% for 2001-2004.

Conclusion: These data suggest that laparoscopic splenectomy is a safe approach for the elective treatment of splenic disorders requiring surgery, and results in shorter hospital LOS, reduced hospital charges, and lower readmission rate than open splenectomy. Despite the fact that certain splenic disorders require open surgery (massive splenomegaly), there is a growing trend to utilize elective laparoscopic splenectomy at our institution.

Posters Of Distinction-P024

3-DIMENSIONAL (3-D) MODELING OF CT SCAN DATA FOR PREOPERATIVE PLANNING IN LAPAROSCOPIC ADRENALECTOMY, Patricia L Turner MD, Ivan M George MS, Michael J Mastrangelo, Jr MD, Stephen Kavic MD, Adrian E Park MD, University of Maryland, Baltimore, MD, Advanced Surgical Care, Bend, OR

CVAS modeling techniques have been utilized in other solid organ procedures with excellent degree of correlation between model and operative findings. At the University of Maryland, we have developed a novel method of pre-operative surgical imaging in adrenal surgery.

During the preoperative evaluation of a 57-year-old patient for planned laparoscopic adrenalectomy for a functional tumor, a routine CT scan was reconstructed into polygonal mesh surface models. Computed Volumetric Analysis Systems (CVAS) techniques were employed to image this patient's left adrenal mass.

The traditional imaging process provided 2-dimensional data

which we reconstructed, using CVAS techniques, into 3-D models. CVAS-derived immersive virtual reality 3-D modeling provides surgeons with otherwise unavailable relevant spatial relationships of surrounding structures. In particular, our modeling demonstrated a mass that deflected the left renal artery caudally, a notable tissue plane between mass and kidney, and vasculature consistent with significant mass angiogenesis. 3-D models closely correlate to the operative videoscopic image and can be used in a surgeon-driven navigation mode or virtually dissected along any anatomic plane or axis.

This novel CVAS technique currently provides 3-D patient-specific anatomy and relevant spatial relationships to the surgeon as tools to facilitate operative planning and execution in the most efficacious manner possible. Additionally, this technology is available in an inexpensive, intuitive, and accessible way on standard computer hardware.



Posters Of Distinction-P025

ENDOSCOPIC PROCEDURE FOR BREAST CANCER, Motoo Yamagata BA, Minoru Matsuda BA, Kazuo Sato BA, Yukie Morishita, Tadatoshi Takayama PhD, Department of Surgery, Nihon University

Breast conserving surgery for Breast cancer is becoming to routine procedure. But most patients are thinking that the image of breast conserving is similar to keeping on originally shape of their breast after surgery.

There is a wide difference between patient's image and surgeon's image.

Minimally invasive technique improved cosmetic shape of breast conserving surgery by inconspicuous wounds.

Patient selection: patients with the tumor, which was within 2cm, N0 or N1 were selected.

Method: Our methods consist of Video-assisted partial mastectomy with Endoscopic sentinel node biopsy. If metastasis of Axillary lymph node is detected, Video-assisted lymph node dissections performed.

Video-assisted mastectomy consists of 3step. 1st step is Skin flap formation by using subcutaneous tunnel method. VISIPORT is inserted into subcutaneous layer for making @tunnels. The vessels are dissected and collected into septum between tunnels, septum were dissected by LCS. 2nd step is dissection of fascia of pectoralis major by using dissecting balloon. 3rd step is Mastectomy, Mammary gland was completely dissected from skin and fascia, mammary gland was dissected by LCS. After resection, defect of mammary gland is filled with some materials. Endoscopic sentinel node biopsy is consist of 2step, 1st step is the method @for making cavity in axilla. VISIPORT is inserted into axillary space for introduce dissecting balloon to the proper layer. And then dissecting balloon @was inserted into axillary space and inflated. Sentinel node is detected by observation through the balloon.

In Video-assisted Axillary lymph node dissection, Rtorocars are inserted and lymph node dissection is performed under pneumo-axilla(8mmHgCO2).

Results: Our method was able to perform in entire fields of breast. In 204 cases mean duration of operation was 127min., mean hemorrhage was 42g

.Cosmetic finding @after operation @was @better than nor-



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mal procedure. In long term result?A5 year survival was 97.2% and recurrence rate was 5.6% ?@These results were equal compared with normal procedure. Endoscopic breast surgery will give more benefits to the patients by improving cosmetic shape.

Interesting Case Report–P026

ASCARIDIASIS IN THE HEPATOBILIARY SYSTEM, Ruben Astudillo MD, J. Andres Astudillo MD, Hospital Latinoamericano, Cuenca-Ecuador

This is a retrospective study in Hospital Latinoamericano, Cuenca, Ecuador, between February 1992 and April 2005. 2047 Laparoscopic hepatic and biliary surgeries were performed, 12 of these cases (0.59%) where ascariasis causing hepatobiliary pathology: We found 9 (75%) ascaris in the C.B.D, 2 as hepatic abscess (16.6%), and 1 in C.B.D and gallbladder (8.3%): 11 patients were women, 1 man, with an age between 22 and 78, most coming from rural zones. The clinical presentation varied between colicky abdominal pain in RUC with no response to anticholinergic medication (100%), nausea and vomiting in 8 patients (66.6%), mild jaundice in 7 patients (58.3%), and mild fever 6 patients (50%). The diagnostic test performed was hepatic and biliary U/S, where parasites where found in 11 of the 12 patients (91%). 7 patients (58.3%). presented with acute cholecistitis and gallstones. We managed 4 of this 12 patients (33.3%) with endoscopic extraction in whom clinical management with albendazole and anticholinergic drugs was not effective, laparoscopic cholecistectomy + C.B.D exploration in 6 patients (50%), cholecstectomy + parasite extraction from a liver abscess in 1 case (8.3%), and cholecistostomy + parasite extraction followed by cholecistectomy in 1 patient (8.3%). We recommend considering ascariasis in the hepatobiliary system as a differential diagnosis in all patients with upper abdominal pain in patient populations at risk. Management options include medical therapy, endoscopic extraction and laparoscopic exploration with extraction combined with cholecystectomy.



Interesting Case Report–P027

FAMILIAL BARRETT'S ESOPHAGUS WITH DYSPLASIA AND IT'S SURGICAL TREATMENT, Keith B Boone MD, Charles M Farr MD, T.K. Chen MD, Michael M Farr, Kelvin D Higa MD, James Svoboda MD, Advanced Laparoscopic Surgical Associates, Fresno, California

Introduction: Barrett's esophagus is felt to be an acquired condition resulting from chronic acid reflux. This family case study provides significant new compelling evidence to support a genetic basis for this disease.

Methods and Procedures: There are four generations in one family with severe acid reflux disease. The index case and his son and daughter all had Barrett's with severe dysplasia treated surgically. A grandson and great-grandson have both been diagnosed with severe reflux and are being treated medically. Immunohistochemical staining for p53 and traditional hematoxylin and eosin staining were performed on all biopsy specimens.

Results: The immunohistochemical staining for p53 has been performed on three generations. The p53 immunoreactivity was observed in areas of low grade and high grade dysplasia, but not in nondysplastic Barrett's epithelium.

Conclusion: This family case study provides significant evidence that Barrett's esophagus may be an inherited condition in some families. This evidence may lead to earlier intervention when a strong family history is present.

Interesting Case Report–P028

LAPAROSCOPIC TREATMENT OF ACHALASIA BY THAL ESOPHAGOGASTROPLASTY WITH DOR ANTIREFLUX VALVE ? ANALYSIS OF 4 CASES, Gustavo L Carvalho PhD, Thiago G Vilaça, Mauro C Luna MD, Daniel G Araújo, Frederico W Silva MD, Carlos H Ramos MD, Gilvan Loureiro MD, Claudio M

Lacerda PhD, Pernambuco State University, School of Medicine, Recife, Brazil; Gustavo Carvalho Surgical Clinic

INTRODUCTION: Surgical therapy is the most effective treatment to relieve dysphagia associated with achalasia. Among the different surgical techniques, Thal esophagogastroplasty is one that can be performed, especially in advanced stage disease.

OBJECTIVE: To present 4 cases of achalasia that underwent surgical treatment, all laparoscopically, by Thal esophagogastroplasty with Dor antireflux valve (Thal-Dor). **PATIENTS:** Four patients (3 female; mean age, 36 years old) underwent laparoscopic Thal-Dor surgery. All patients had progressive dysphagia, besides significant weight loss. They underwent upper gastrointestinal endoscopy and had an esophagogram that detected the presence of megaesophagus (ME). Three patients had ME stage III, besides positive serology for Chagas' disease (CD), and underwent an elective procedure. The fourth patient had stage I ME and negative CD serology. For this patient, a pneumatic balloon dilation was the treatment of choice. However, the dilation caused a laceration in the juxtacardiac esophagus and, a few hours later, the patient had to undergo an emergency Thal-Dor procedure. **METHOD:** After sectioning the short gastric vessels, esophagogastric junction was sectioned including 6 cm of the esophagus and 4cm of the stomach. In the laceration case, the lesion was enlarged downwards to the appropriate size. The esophagogastroplasty was performed using a continuous transverse suture in a single layer. After methylene blue instillation, no leakage was found. Next, a Dor anterior antireflux valve was made, covering the entire gastroesophageal suture line. Postoperative follow-up with endoscopy and esophagogram were performed in all patients.

RESULTS: No conversion to open surgery and no mortality were observed. Follow-up was from 36 to 47 months. An esophagogram, taken on the first postoperative day in all patients, showed normal esophagogastric function and no leakage. The patients were then fed. Three weeks after surgery, endoscopy showed no esophagitis or stenosis and on the rear view, the endoscope was well adjusted to the cardia. Control of symptoms: 3 patients are still asymptomatic and in one patient symptoms of reflux appeared 12 months after the procedure, which are controlled with daily 20 mg of omeprazole.

CONCLUSION: The feasibility and reproducibility of the results of laparoscopic Thal esophagogastroplasty with Dor antireflux valve are demonstrated.

Interesting Case Report–P029

LAPAROSCOPIC ILEOCOLECTOMY FOR GIANT PSEUDOPOLYPOSIS OF CROHN'S COLITIS, Chou-Chen Chen MD, Hideo Yamada MD, Joe-Bin Chen MD, Jeu-Shan Wu MD, Taichung Veterans General Hospital, Taiwan, TOHO Sakura Hospital, Japan

This is a case report of giant pseudopolyposis of Crohn's colitis with clinical presentation of positive occult blood test on routine healthy examination. The 41 y/o male patient has no abdominal pain, no bowel habit change, no fever, no abdominal mass, no previous operation history, no colorectal cancer of family history. Colonoscopy showed multiple polypoid lesion over cecum to T-colon. CT scan revealed multiple elevated polypoid colon lesion with wall thickness comparable with wall deformity on barium enema film. Laparoscopic assisted extended right hemicolectomy was done and biopsy confirmed Crohn's disease. The patient discharged under stable condition on 15th postoperative day. Conclusion: laparoscopic colectomy is feasible for selected patient for this kind of autonomous recurrent Crohn's disease.

Interesting Case Report–P030

LAPAROSCOPIC ACCESSORY SPLENECTOMY FOR THE TREATMENT OF RECURRENT IDIOPATHIC THROMBOCYTOPENIC PURPURA: IS IT INDICATED?, Yong U Choi MD, Edward P Dominguez MD, Lawrence R Rice MD, F. Charles Brunicaudi MD, John F Sweeney MD, Department of Internal Medicine and The Michael E. DeBakey Department of Surgery, Baylor College of Medicine



Introduction: Laparoscopic splenectomy is an effective therapy for patients with immune thrombocytopenic purpura (ITP) who have failed medical management, with early response rates between 80-89% and long term remission rates of 50-70%.

Failure to respond to splenectomy may be due to the presence of an accessory spleen that was not detected at the time of surgery. We report the case of a patient with ITP who underwent a splenectomy 20 years ago but relapsed. The patient was found to have an accessory spleen on localization studies and underwent a laparoscopic accessory splenectomy.

Report of the Case: A 44 year old male with a history of ITP underwent an open splenectomy in 1985. The patient had a transient response for 2 years but then developed ITP recurrence with a platelet count maintained around 20,000 on immunosuppression therapy. The patient was seen at the Baylor College of Medicine with a one month history of easy bruising and gingival bleeding. At that time, his platelet count had dropped to 4,000. Localization studies were undertaken, with an accessory spleen being localized by CT scan and liver/spleen scan. The patient underwent a successful laparoscopic accessory splenectomy. His platelet count increased to 77,000 at the time of discharge and was 120,000 at the patient's 2 week postoperative follow-up.

Conclusion: Patients with ITP who relapse after splenectomy may have residual accessory splenic tissue. Localizing studies need to be performed prior to surgery. When present, an accessory spleen(s) can be removed using a laparoscopic approach. Laparoscopic accessory splenectomy is ideal because it is associated with less morbidity, a shorter hospital stay, and earlier return to normal activities. Although response rates for accessory splenectomy vary, medical management of ITP will be easier when all splenic tissue is removed.

Interesting Case Report-P031

LAPAROSCOPIC GASTROPEXY FOR REPAIR OF GASTRIC VOLVULUS IN INFANTS, Ravi J Chokshi MD, Radu Constantine MD, Charles Avergis, Nipun Suri, N Bhattacharya MD, St. Francis Medical Center, Trenton, NJ, USA; St. John Hospital and Medical Center, Detroit, MI, USA; St. Joseph's Regional Medical Center, Patterson, NJ, USA

Gastric volvulus is defined as an abnormal twisting of the stomach on itself. It can occur along the stomach's longitudinal or vertical axis. In the pediatric population congenital defects, such as the foramen of Bochdalek and eventration are many times involved. Symptoms include, but not limited to abdominal pain, distention, vomiting, and upper gastrointestinal hemorrhage.

We present a case of a 2-month-old female with symptoms of abdominal swelling and vomiting following feeds for a duration of one month. Subsequently, the history, physical examination, and diagnostic testing revealed a longitudinal gastric volvulus. Laparoscopic gastropexy was undertaken and the patient was successfully discharged in the afternoon post-op day one.

Classically treatment modalities of gastric volvulus includes anterior gastrostomy placement, open anterior gastropexy, or open posterior gastropexy with treatment of the underlying pathology. We suggest that laparoscopic gastropexy for repair of gastric volvulus during infancy is equally successful and minimally invasive when compared to the open approach.

Interesting Case Report-P032

AGGRESSIVE ENDOSCOPIC THERAPY WITH INCREASING NUMBERS OF STENTS: SUCCESSFUL TREATMENT OF A COMPLETE TRANSECTION OF THE BILE DUCT AFTER LAPAROSCOPIC CHOLECYSTECTOMY., Djalma E Coelho MD, José Flávio E Coelho PhD, José Marcus R Eulalio PhD, José Eduardo F Manso PhD, Antonio A Peixoto PhD, Ricardo A Refinetti PhD, Universidade Federal do Rio de Janeiro (Brasil) Hospital Universitário Clementino Fraga Filho

A 37-year-old woman underwent laparoscopic cholecystectomy at another institution with discharge the following day. After discharge a patient evolution with upper abdominal pain and distension, jaundice, fever and tachycardia. Transabdominal US demonstrated a fluid collection into the peritoneal cavity. An urgency laparotomy with lavage the cavi-

ty and T-tube inside the right hepatic and cavity drain. The cholangiography through the T-tube revealed a normal intrahepatic duct. At the expected level of the common bile duct there appeared to be a complete transection and there was mild leakage of contrast into the peritoneum and no opacification of the proximal biliary system only two metallic clips were noted in the common bile duct (Fig1). The patient was transferred to our institution.

ERCP on the twenty postoperative days, cholangiography revealed a normal distal common bile duct (Fig 2). The guidewire passed the metallic clips and a step series of dilators, biliary stent was insert the left intrahepatic system (Fig 3). Remove the T-tube. Pneumatic dilatation with balloons was performed and 10Fx 12 cm long biliary stent was inserting the right intrahepatic system (Fig 4).

After approximately 12 weeks, second session, three stent was inserted. At a third session 12 weeks later, the stricture was further dilated if necessary, 2 stent (Fig 5, 6, 7) in place were exchange. At a forty session 12 weeks later, stents was exchange with similar technique. At later data (12 months after first stent placement) all stent were extracted and the patient was followed clinically (Fig8). At 48 months' follow up the patient was asymptomatic.

Interesting Case Report-P033

RECTAL LIPOMA PRESENTING AS A MASS AT THE ANAL VERGE, William C Conway MD, John D Webber MD, Department of Surgery, Wayne State University/Detroit Medical Center, Detroit, MI

INTRODUCTION: Colorectal lipomas are rare submucosal lesions. Although generally found to be asymptomatic, they have been known to cause pain, diarrhea, bleeding, and intussusception.

METHODS: Here we present a case report of a patient who presented with a large mass at the anal verge that was found to be a lipoma on pathological examination.

RESULTS: A 50 year old male with diabetes and hypertension presented to the emergency room complaining of feeling a mass near his anus. The patient reported two prior instances of these symptoms for which he sought medical treatment. He had been told he had a rectal prolapse, and it had been reduced twice, once under spinal anesthesia in the operating room. Upon examination the patient was noted to have a large (7x8cm), egg-shaped mass at the anal verge. Examination under anesthesia and limited colonoscopy revealed a mass with a thin stalk extending 25cm into the rectum and attaching to the rectal wall. A stapling device was used to transect the stalk, and pathological exam of the mass revealed lipoma. Repeat colonoscopy two weeks later revealed a broad stalk of normal appearing mucosa at 25cm, and no other findings.

CONCLUSIONS: Rectal lipomas can rarely present as a prolapsing mass at the anus. Endoscopic techniques are essential in accurate characterization of the lesion.

Interesting Case Report-P034

LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS IN PATIENTS WITH CONGENITAL MALROTATION, Saadiya A Haque DO, James Koren BS, Easton Hospital, Easton, PA.

Congenital malrotation of the intestines occurs in one out of every 500 births in the United States, accounting for 5% of all intestinal obstructions. It is a type of mechanical obstruction that occurs due to abnormal development of intestines during fetal life. Not all patients are symptomatic: some remain asymptomatic throughout their lives, and are only diagnosed incidentally. We report two cases of morbidly obese patients, with BMIs of 44 and 54 respectively, who had intestinal malrotation and underwent laparoscopic Roux-en-Y gastric bypass. One patient was diagnosed incidentally on the operating table, whereas the other was diagnosed earlier in her life as a result of her symptoms. The procedure was completed laparoscopically for both patients, with minimal modifications from the original technique, and both fared well post-operatively. Hence, laparoscopic Roux-en-Y gastric bypass for morbid obesity can be carried out in patients with congenital malrotation, and management of their malrotation can also be conducted laparoscopically at the time of their surgery.



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Interesting Case Report–P035

MINIMALLY INVASIVE APPROACH FOR MANAGEMENT OF SCLEROSING ENCAPSULATING PERITONITIS: THE FIRST REPORTED CASE, Brandon M Helbling MD, Alan A Saber MD, Ollie J Jackson MD, Michael K McLeod MD, Michigan State University - Kalamazoo Center for Medical Studies

Introduction: Sclerosing encapsulating peritonitis is a rare complication with high morbidity of continuous ambulatory peritoneal dialysis. Sclerosing encapsulating peritonitis was first described in 1980. Inflammatory processes within the abdominal cavity lead to the development of fibrous sheets (sclerosing) which cover the viscera and which may constrict the bowel (encapsulating), altering bowel motility. There is no agreement in the literature on whether the treatment of choice is surgical or conservative therapy.

Methods and Procedures: We present a 59 year old patient with recurrent peritonitis after having a CAPD catheter removed six months prior to her presentation. SEP was suspected after CT scan findings of a large encapsulated collection of peritoneal fluid. The patient's symptoms worsened despite treatment with antibiotics. The patient underwent diagnostic laparoscopy with drainage and irrigation of the encapsulated peritoneum with subsequent resolution of symptoms. To the best of our knowledge, this is the first reported case.

Conclusion: Laparoscopy is a safe and effective feasible diagnostic and therapeutic modality of sclerosing encapsulating peritonitis. Our complete manuscript will illustrate the management of this patient. The figures include a preoperative CT scan, intraoperative laparoscopic view of the encapsulated peritoneum, and postoperative picture. .

Interesting Case Report–P036

NON-TRAUMATIC RIGHT SIDED DIAPHRAGMATIC HERNIA PRESENTING AS SMALL BOWEL OBSTRUCTION, Samer Sbayi MD, Mohammad I Khan MD, Ravi J Chokshi MD, Pradeep S Mohan MD, Howard Hardy III MD, St. Francis Medical Center

Diaphragmatic hernias fall into one of three categories: congenital diaphragmatic hernias (CDH) presenting in the neonatal period or childhood, acute visceral herniation presenting after blunt or penetrating trauma to the diaphragm, and standard hiatal hernias (Types I-IV). The finding of a congenital diaphragmatic hernia presenting as a delayed traumatic diaphragmatic hernia with strangulation has not been reported in the literature.

We present a 24 year old man who presented to the emergency room with a two day history of nausea, vomiting, and a distended abdomen. The history, physical examination, laboratory results, and radiographic evidence yielded a diagnosis of small bowel obstruction secondary to a right sided diaphragmatic hernia. The patient was emergently taken to the operating room for an exploratory laparotomy and thoracotomy. A large incarcerated hernia was found in the right chest containing liver, small bowel, and large bowel. A small bowel resection and repair of diaphragmatic hernia was performed. The patient was hospitalized for 10 days after the surgery and subsequently discharged home in stable condition.

A congenital diaphragmatic hernia presenting as a delayed traumatic pathology is a rare finding that has not been reported. The presentation, workup and surgical intervention merit serious consideration since urgent evaluation and intervention are paramount in order to prevent an unfortunate outcome for the patient and the surgeon.

Interesting Case Report–P037

BLACK ESOPHAGUS-SOLVING THE RIDDLE., Afaq Zaman Khan MD, Iqbal Khan*, Asif Azeem MD, Shaukat A Khan MD, Spectrum Health Butterworth Hospital, Grand Rapids, Michigan, USA, AMNCH, Tallaght Dublin, Eire*

Diagnosis of Black Esophagus is based on extensive necrosis of esophageal mucosa. We present a series of three cases that were diagnosed with the same. Though it is a rare entity yet the common denominator in all 3 patients was a low perfusion state and significant co-morbidity. Vasculitis was present in 2/3 patients. Extensive workup revealed areas of micro-vascular

thrombosis without involvement of small and medium sized vessels. Treatment includes initial supportive management and then long-term follow-up for resultant stricture dilatations.

Interesting Case Report–P038

GASTRIC OUTLET OBSTRUCTION AS A PRIMARY PRESENTATION OF BREAST CANCER, Olusegun O Komolafe MD, Ellen McPake, John C Ferguson MD, Department of Surgery, Southern General Hospital, Glasgow, UK

Breast cancer is usually detected pre-clinically at screening, or clinically with local symptoms. We describe an unusual primary presentation of breast cancer with duodenal obstruction in a 76 year old lady. She was referred with intractable nausea and vomiting, for rehydration and investigation. On admission she was found to have left breast lump, confirmed on core biopsy as invasive lobular carcinoma. Endoscopy revealed a malignant duodenal stricture, confirmed histologically to be metastatic lobular breast carcinoma. Staging investigations demonstrated bony metastases, so she had a palliative gastrojejunostomy, and was discharged home successfully.

The 'classical' sites for metastatic breast cancer are the skeleton, lungs, liver, and brain. Routine staging investigations are targeted towards these organs. However a reading of the literature reveals that this is a simplification. In particular, lobular breast carcinoma, as in this case, is recognized as having atypical and unpredictable metastatic behaviour. This must be borne in mind when staging patients with lobular breast cancer. There are numerous case reports and case series of patients with metastases to various organs, with a predilection for extra-hepatic gastrointestinal spread. All these reports however describe patients with known breast cancer presenting, after an interval, with metastasis. To our knowledge, ours is the first report of a patient presenting primarily with the symptoms of a metastatic deposit.

Interesting Case Report–P039

ACUTE PHLEGMONOUS GASTRITIS, Olusegun O Komolafe MD, Fergus M Reid MD, John R Anderson MD, Department of Surgery, Southern General Hospital, Glasgow, UK

Phlegmonous gastritis is an acute inflammation of the stomach wall caused by bacterial infection. It is an uncommon condition, and a low index of suspicion usually results in delayed diagnosis, and a poor outcome. We describe two cases treated successfully in our unit.

A 37year old male was admitted as an emergency with a two-day history of upper abdominal pain and vomiting. He had a tender, distended abdomen, with a raised temperature. After resuscitation overnight, he underwent a laparotomy. He had purulent peritoneal fluid, and a thickened stomach. On incision to form a gastrostomy, the stomach wall oozed pus. Frozen section of a full thickness biopsy showed acute suppurative gastritis. The stomach was closed round the gastrostomy, and the abdomen closed after lavaged. Endoscopy the following day showed widespread gastritis. Post-operatively he was treated with antibiotics. He made a gradual recovery, the gastrostomy was removed, and he was discharged 29 days post operatively.

A 68 year old male was admitted with as an emergency with a three-week history of vomiting and weight loss. He was jaundiced with unremarkable abdominal findings. Endoscopy the next day showed a pyloric stenosis with florid oesophagitis and gastritis. CT scan revealed a thickened, stenosing first part of duodenum, and mild biliary dilatation. Biopsies showed acute phlegmonous gastritis so he was treated with antibiotics. His biliary tree was decompressed by percutaneous insertion of biliary stents and duodenal stenting to bypass the lesion. His nasogastric aspirates did not settle however, and he had a laparotomy. He was found to have a duodenal adenocarcinoma with widespread peritoneal seedling. A palliative gastrojejunostomy was carried out, he made an uneventful recovery, and was discharged on his 10th post-operative day. Once diagnosed, phlegmonous gastritis can be treated successfully by broad-spectrum antibiotics. In our first patient, the condition ran a fulminant course, with symptoms and signs leading to early intervention. He made a good recovery with antibiotics, and supportive treatment. Our second patient had



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a more indolent course, and gastritis was secondary to obstruction. He also responded well to antibiotics and bypass of the obstructing lesion.

Interesting Case Report-P040

SPLENIC RUPTURE AFTER COLONOSCOPY: AN UNCOMMON COMPLICATION., Peter F Lalor MD, Barry D Mann MD, Lankenau Hospital, Wynnewood, PA

Colonoscopy is a familiar and well-tolerated procedure, and is widely used as a diagnostic and therapeutic modality by both gastroenterologists and surgeons. Although perforation and hemorrhage are the most common complications, splenic injury or rupture is a rare but potentially lethal complication. We report a case of splenic rupture diagnosed 18 hours after colonoscopy which required emergent splenectomy. We also reviewed over 35 other cases of splenic rupture after colonoscopy reported in the English literature. Despite being an infrequent complication, splenic rupture warrants a high degree of clinical suspicion critical to prompt diagnosis. Most patients present with symptoms within 24 hours after colonoscopy, although delayed presentation days later has been described. CT scan of the abdomen is the radiological study of choice to evaluate colonoscopic complications. Splenic injury can be managed conservatively or with arterial embolization depending on the extent of trauma, but splenectomy remains definitive management. Clinical criteria are the primary determinants in choosing operative therapy over observation. Possible risk factors for splenic trauma during colonoscopy are identified, and clinical outcomes are evaluated.

Interesting Case Report-P041

LAPAROSCOPIC TREATMENT OF A URACHAL CARCINOMA, L Ludwig DO, R Bergamaschi MD, S Uranues MD, Lehigh Valley Hospital, Allentown, Pennsylvania

Introduction: The aim of this report was to evaluate the feasibility of laparoscopic resection of urachal carcinoma. Urachal carcinoma is an uncommon neoplasm. The incidence of urachal tumors is between 0.07% and 0.34% of all bladder tumors. Based on histology, urachal tumors have been classified as mucin-positive adenocarcinoma (69%), mucin-negative adenocarcinoma (15%), sarcoma (8%), squamous cell cancer (3%), transitional cell carcinoma (3%), and others (2%).

Methods: A 64-year-old man had undergone resection of the upper pole for renal carcinoma 9 years previously. In the course of a follow-up exam, a cystic tumor with a diameter of 9 cm was discovered above the urinary bladder, which gave a benign impression. Only after a year did the patient decide to undergo surgery. At that time, there had been no change in the tumor; the patient had no complaints and there was no palpable mass. Cystoscopy was negative and the laparoscopic procedure was successful. Three trocars and a Ligasure® instrument were used; the tumor was retrieved in a bag of suitable size through the incision for the kidney operation.

Results: Histologically, the tumor was a mucin-positive adenocarcinoma compatible with a urachal carcinoma. After 4 months, a new CT evaluation didn't show any evidence of tumor and the patient was free of complaints.

Conclusion: There is no consensus in the literature on the type of surgery that is most suitable for urachal carcinoma. Laparoscopic surgery is not only safe, it may be viewed as the method of choice.

Interesting Case Report-P042

LAPAROSCOPIC REPAIR OF ILEAL CONDUIT PARASTOMAL HERNIA USING THE SLING TECHNIQUE, Brian Mirza MD, Bipan Chand MD, Cleveland Clinic Foundation

Introduction: Laparoscopic parastomal hernia repair has become a viable option to overcome the challenges that face the hernia surgeon. Multiple techniques have been described over the last five years, one of which is the lateralizing ?sling? technique; in this study we report the technique and our results with the laparoscopic modified Sugarbaker repair of parastomal hernias after ileal conduit.

Methods and procedures: In 2005, two patients with ileal conduit underwent elective laparoscopic repair of symptomatic

parastomal hernia in the department of general surgery at the Cleveland Clinic Foundation. The procedure is described in details. An intact piece of mesh, with large fascial overlap is used to eliminate the potential space between the mesh and the stoma exit site. There is no defect, or slit, in the mesh thus eliminating the potential of herniation along this site, the type of mesh and the methods used for fixation are discussed. We also review the reported laparoscopic types of repairs with their advantages, flaws and reported results.

Results: After six months of follow-up, neither patient demonstrated any signs of infection, pouch malfunction, or recurrence.

Conclusion: Our early results with the laparoscopic modified Sugarbaker technique in the repair of parastomal hernias show the procedure to be safe and effective. Long term follow-up and larger series are necessary to validate the findings and track the possible late complications. <@>

Interesting Case Report-P043

PEG TUBE SITE METASTATIC COLON CARCINOMA, Prasanta K Raj MD, John C Blaney MD, Subhasis Misra MD, Richard C Treat MD, Department of Surgery, Fairview Hospital, Cleveland Clinic Health System

OBJECTIVE: To present a rare case of metastatic colon cancer on the PEG tube site and to study the pathophysiology and analyze the possible routes of tumors metastasis to the PEG tube site.

METHODS AND PROCEDURES: An interesting case of a metastatic colon carcinoma to a PEG tube site is presented. A 75-year-old male underwent a right hemicolectomy for carcinoma of the ascending colon and cecum near the ileocecal valve. Pathology showed both tumors to be T3 lesions with no lymph node involvement. Patient had a temporary PEG tube due to esophageal dysfunction secondary to esophageal dysmotility due to a cerebrovascular accident. Patient presented with a growth at the PEG tube site, which was initially treated with antibiotics and subsequently taken for surgical exploration, which showed metastatic mucinous adenocarcinoma of colonic origin.

Most reports so far have shown that metastasis to PEG tube site has been a result of direct tumor implantation from manipulation of patients with an existing upper gastrointestinal tract or head and neck cancer. The proposed route of metastasis is probably hematogenous in this case as no direct extension of the tumor was noted. Lymphatic or transcoelomic spread via retroperitoneal space may be an alternative route. We do not believe the metastasis is due to direct implantation on the abdominal incision or the laparoscopic trocar site.

CONCLUSION: We report the first case of metastatic colon carcinoma to the PEG tube site. We hypothesize that the mode of spread could be hematogenous although lymphatic or transcoelomic spread can be plausible.

Interesting Case Report-P044

LAPAROSCOPIC EXCISION OF RETROPERITONEAL MUCINOUS CYSTADENOMA: CASE REPORT, Masahiro Murakami MD, Hiroshi Yano MD, Takeshi Tono MD, Tadashi Ohnishi MD, Yoshiaki Nakano MD, Takushi Monden MD, Department of Surgery, NTT West Osaka Hospital

We reported a case of retroperitoneal tumor that was successfully excised by laparoscopic surgery. A 26-year-old woman found to have a 50 mm mass in the left lower abdomen with no symptom was found in abdominal computed tomography (CT) and magnetic resonance imaging (MRI) to have a multilocular cystic mass with a slightly enhanced lesion similar to its wall in the left retroperitoneal space. Under a diagnosis of retroperitoneal cystic tumor with a solid lesion suspected to be malignant, and we conducted laparoscopic resection. We inserted a 10-mm trocar in the upper side of umbilicus and two 5-mm trocars in the lower and left abdomen. The laparoscopic through the supraumbilical trocar clearly revealed a retroperitoneal tumor. The tumor was completely resected using an electrocautery, allowing a sufficient distance from the tumor. The specimen was extracted using a retrieval bag through the umbilical wound. The duration of surgery was 115 minutes and the intraoperation blood loss was a little. She was



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discharged from the hospital on the 7th postoperative day and has been no recurrence for 28 months. Pathological examination showed mucinous cystadenoma, with the suspicious solid lesion in preoperative imaging found to be a conglomeration of small honeycomb-like cysts. Primary retroperitoneal mucinous cystadenoma associated with a possibly malignant solid lesion in preoperative imaging and resected successfully via laparoscopic excision is rare. Laparoscopic surgery may be a good indication for retroperitoneal mucinous cystadenoma, because it is safe and better cosmetic, minimally invasive, promoting faster recover.

Interesting Case Report–P045

LAPAROSCOPIC MANAGEMENT OF LARGE MESENTERIC CYST, Jonathan Liu MD, Jack Needham MD, Glenn Parker MD, Monmouth Medical Center

Introduction: Giant cystic lesions of the mesentery are extremely rare and not much information in the literature had been written about them. There are many etiologies. As these cysts become larger the risks of morbidity from ischemia of the intestine from the mass effect within the mesentery and intestine becomes a problem. We report our laparoscopic management of a large mesentery cyst in the jejunum.

Method: Laparoscopic resection has been considered a viable alternative to open procedures for a mesentery cyst. Here we present a case of a 37 year old female with a giant symptomatic mesentery cyst. Treatment was via laparoscopic resection of the mesentery.

Result: The patient had an uneventful hospital course and was discharged from the hospital 3 days postoperatively. There was no perioperative or postoperative morbidity.

Conclusion: Laparoscopic management and treatment of mesenteric cyst can be practical and definitive way in comparison with percutaneous aspiration. Laparoscopic surgery can be a safe and definitive treatment for giant mesenteric cyst.

Interesting Case Report–P046

CHOLEDOCHOLITHIASIS WITH A SURGICAL CLIP NIDUS 18 YEARS AFTER OPEN CHOLECYSTECTOMY: A CASE REPORT AND LITERATURE REVIEW., Kerry Rodgers MD, Johelen Carleton MD, Randall S Zuckerman MD, The Mary Imogene Bassett Hospital, Cooperstown, New York.

The migration of surgical clips has been reported after a multitude of different operations, but still remains a rare event. We present the case of a 48 year-old woman who underwent open cholecystectomy in 1986. She presented to us in October 2004 with right upper quadrant abdominal pain and normal liver function tests. An ultrasound was obtained which showed choledocholithiasis. ERCP was performed and revealed a stone that seemed to surround a metal surgical clip that had presumably migrated into the common bile duct after her previous operation. The stone was removed; however, it became detached from the clip during extraction, and the clip became impacted at the ampulla of Vater. Numerous attempts to extract the clip endoscopically were required, and finally ERCP was successful.

A review of the literature reveals that surgical clip migration is a rare, but described occurrence. There have been more than 15 case reports in the last 25 years, with the first description by Walker, et al, in 1979. Clip migration has been postulated to be more common in laparoscopic procedures, but literature review suggests no significant difference. The time from original operation to symptoms from migration has been reported to be between 5 months and, in our case 18 years. In almost all cases, clip extraction has been successful endoscopically, and remains the first-line therapy. In rare cases, surgical intervention may be necessary.

Interesting Case Report–P047

LAPAROSCOPIC MANAGEMENT OF ISOLATED HYDATID CYST OF THE SPLEEN: A CASE REPORT., Davit Sargsyan PhD, Georgi Chaltikyan PhD, Stepan Hovhannesian PhD, Clinic of General Surgery #2, Yerevan State Medical University, Yerevan Armenia

We report a case of successful laparoscopic management of isolated hydatid cyst of the spleen. In MEDLINE search we have found 5 reports on laparoscopic management of hydatid

cysts of the spleen (in 2 cases splenectomies were performed and 7 cases - spleen preserving surgeries). 24-years old female patient was admitted to the clinic complaining of dull pain in left hypochondrium for 3 months. CT scan and US revealed a cystic lesion in the hilus of the spleen measuring 8 cm in diameter. ELISA test for echinococcosis confirmed the diagnosis of I type isolated hydatid cyst of the spleen. The patient was scheduled for elective laparoscopic removal of the cyst. Abdomen was accessed through the supraumbilical port. Inspection revealed large hydatid cysts in the hilus of the spleen situated deep in the parenchyma. Three additional working trocars were placed in epigastrium, left subcostal area and left mesogastrium. The cyst was punctured and hypertonic saline was injected as scolicidal agent. After 5 min exposure cyst content was aspirated and ectocyst opened with prior bipolar coagulation of the overlying parenchyma to prevent bleeding. Endocyst was evacuated without fragmentation and removed in retrieval bag. Residual cavity in the spleen was inspected, irrigated with scolicidal agent, packed with omental patch and drained. Postoperative course was uneventful despite minor segmental necrosis of the anterior edge of the spleen due to extensive coagulation of overlying parenchyma. Patient was discharged on 3rd postop day after drain removal and received a course of albendazole chemotherapy (10mg/kg/28 days) for recurrence prevention. The patient was followed-up for 18 months with no signs of recurrence. Repeated abdominal US revealed shrinking of residual cavity in the spleen. There have been many reports on successful management of hydatid cysts of the liver and this technique is becoming accepted for selected cases. Our experience with laparoscopic management of hydatid cysts indicates that this technique can be used safely in medium size cysts (less than 10 cm in diameter) without daughter vesicles (I type cysts) located superficially in accessible areas. Options for laparoscopic closure of residual cavity include omentoplasty, capitoneg unroofing and drainage (less favored). Laparoscopic removal of hydatid cysts from the spleen can be more challenging due to excess bleeding from the parenchyma and difficulties in closure of residual cavity.

Interesting Case Report–P048

GANGLIONEUROMA; A RARE DIAGNOSIS OF A RETRORECTAL TUMOR, Adam T Silverman MD, Glenn S Parker MD, Thomas R Lake III MD, Saad A Saad MD, Monmouth Medical Center

Retrorectal tumors are a rare entity for the colorectal surgeon. The most common tumor of the presacral region is a congenital cyst and the most common primary malignant retrorectal tumor is a chordoma. The authors present a case of a 20 year-old female with vague abdominal pain. Further evaluation and subsequent surgery revealed a benign retrorectal ganglioneuroma. Neurogenic tumors encompass approximately 10-15% of all retrorectal tumors with two thirds of them being benign. The role of preoperative biopsy is controversial and most surgeons will refrain from biopsying a retrorectal lesion for fear of seeding the tract or introducing infection. We describe her presentation, surgical excision and a review of the literature.

Interesting Case Report–P049

GALLSTONE PANCREATITIS IN MONOZYGOTIC TWIN CHILDREN: GENETIC OR COINCIDENTAL?, Adam T Silverman MD, Ward Dunnican MD, Nishith Bhattacharya MD, Newark Beth Israel Medical Center/Monmouth Medical Center

Gallstone pancreatitis accounts for approximately 40% of all diagnosed cases of acute pancreatitis in North America. It is more commonly diagnosed in females who are forty years of age or older, over weight and premenopausal. In the pediatric population, hemolytic conditions increase the risk of developing cholelithiasis. The incidence of gallstone pancreatitis occurring in children in the literature ranges from 5-26%, for those initially presenting with cholelithiasis. Although previous reports of cholecystitis and pancreatitis occurring with a familial tendency have been described, could there be a stronger genetic component to the expression of disease? We present an interesting case report of Asian teenage female monozygotic twins presenting with clinical, laboratory, and



radiographic evidence of acute pancreatitis. The onset of their symptoms was within hours of each other. The initial working diagnosis was acute pancreatitis secondary to an infectious or metabolic etiology. Further evaluation with laboratory and imaging studies established the diagnosis of gallstone pancreatitis. They were successfully treated with laparoscopic cholecystectomy.

Is this inflammatory process genetically predisposed or was this event coincidental? We describe their presentation, evaluation, and management as well as a review of the literature on inflammatory disease processes affecting twins. This is the first report of twins presenting with gallstone pancreatitis.

Interesting Case Report–P050

INTRAOPERATIVE LAPAROSCOPIC-ASSISTED ENTEROSCOPY IN THE DIAGNOSIS OF SMALL BOWEL LYMPHANGIOMA, Ulises Torres MD, Dressner Roy MD, Borao Frank MD, Nicole Musser BS, Monmouth Medical Center

Objective: Multiple tools can be used in the diagnosis of occult lower gastrointestinal bleed. In our case report, we offer an extraordinary alternative. This is the first reported case in English literature of intraoperative laparoscopic-assisted enteroscopy as a successful modality in the diagnosis and management of a bleeding small bowel lymphangioma.

Methods and Results: We present an 80-year-old female with significant chronic anemia and lower GI bleed in whom the ordinary diagnostic tools were exhausted. A thorough work-up, which included colonoscopy, upper GI endoscopy, push enteroscopy, bleeding scan, capsule endoscopy, and angiography, was negative or nonspecific. Laparoscopy was used successfully as the last resort. Upon laparoscopic exploration a small intraluminal abnormality was observed approximately 100 cm proximal to the ileocecal valve and marked with an intracorporeal stitch. Through a small abdominal wall incision the small bowel was delivered, enterotomy created, and push enteroscopy demonstrated a small ulcerated area with mild active bleeding. Small bowel resection with primary anastomosis was performed. The patient was discharged home on postoperative day two with no complications. The resected segment of small bowel showed a small mucosal ulcer with the histologic characteristics of lymphangioma.

Conclusion: Diagnosis of occult GI bleed can be successfully done by intraoperative laparoscopic-assisted enteroscopy once usual work-up methods have been exhausted. Benefits in utilizing advanced laparoscopic techniques in combination with endoscopy are the ability to expand the range of diagnoses throughout the entire GI tract, reduction of the hospital stay, and creation of an esthetically acceptable incision.

Interesting Case Report–P051

ESOPHAGOGASTRIC FISTULA : A UNUSUAL COMPLICATION FOLLOWING PARAESOPHAGEAL HERNIA REPAIR, Rebecca Warburton MD, Gordie K Kaban MD, University of Saskatchewan, Department of Surgery, Regina General Hospital, Regina, Saskatchewan, Canada

Objective: Fistulization between the stomach and esophagus is an unusual occurrence. We describe a case of esophagogastric fistula (EGF) following an open para-esophageal hernia (PEH) repair. A review of the literature for this complication was performed and potential mechanisms for its formation postulated.

Methods/Patient: A 73 yr old female underwent an open PEH repair in 2002 at a neighboring institution. At the time of initial presentation she complained of reflux and occasional dysphagia. Barium swallow revealed a large PEH with over a third of the stomach in the thorax. Gastroscopy revealed a large hiatal hernia and mild esophagitis. At laparotomy, the stomach was reduced and the hernia sac excised. Pledgeted silk sutures were used for crural repair and a 360^o wrap was performed incorporating the esophagus. The patient returned 2 years following the wrap with dysphagia. A barium swallow revealed mild reflux and a small residual hiatal hernia. At gastroscopy a large and distinct fistulous connection was identified between the right posterior esophagus and stomach. Biopsies were negative for malignancy. The patient declined operative intervention for correction of the fistula. Only rare cases of EGF after PEH repair have been described in the literature to

date. Potential mechanisms for this fistula formation include use of non-absorbable pledget material, unrecognized posterior esophageal injury, and excessive tension on the suture line between the wrapped fundus and esophagus.

Conclusion: esophagogastric fistula formation is an unusual complication following para-esophageal hernia repair. This can present as dysphagia or recurrent reflux symptoms. For wide, short fistulas, operative division and repair may be the only option for symptomatic patients.

Interesting Case Report–P052

THOROSCOPIC RETRIEVAL OF TRACHEOBRONCHIAL FOREIGN BODY, Robert J Wilmoth MD, Konstantinos G Papadakis MD, Alfred P Kennedy MD, University of Tennessee Medical Center and East Tennessee Children's Hospital

Introduction: Tracheobronchial foreign bodies are routinely managed effectively in the pediatric population by rigid or flexible bronchoscopy. Rarely, endoscopic methods fail, requiring open thoracotomy. We present the first case to our knowledge managed successfully by thoracoscopy and describe our technique.

Patients and Methods: A thirteen year old female presented three days after inhaling an open safety pin. Chest radiograph revealed the foreign body in the right lower lobe. Rigid bronchoscopy was unable to visualize the foreign body. Flexible bronchoscopy visualized the open safety pin deep in the posterior segments, but removal was unsuccessful, as the point had become embedded in the mucosa. The patient was then counseled for surgical intervention.

The patient was positioned in the left lateral decubitus position on a bean bag after intubation with a dual lumen endotracheal tube. The right lung was then isolated and three 5mm thoracoscopic ports were placed. Flexible bronchoscopy was then performed and a super stiff glide wire was passed through the working channel of the bronchoscope and into the lung parenchyma at the site of the safety pin. The wire was visualized as it entered the pleural space, marking the site for incision. Bronchotomy was then created using electrocautery and the safety pin was removed using standard 5mm graspers. A chest tube was left in place and the lung was inflated.

Results: Postoperatively our patient did well. She required minimal narcotic pain control. The patient's air leak stopped on POD #1, and the chest tube was removed on POD #2. She was discharged home on POD 3. Office follow-up revealed complete recovery less than two weeks after the procedure.

Conclusions: While the majority of tracheobronchial foreign bodies can be managed safely and effectively by endoscopic means, practitioners must have an alternative method for retrieval if standard methods fail. Traditional management of failed removal of tracheobronchial foreign bodies has required open thoracotomy. Our technique provided a safe, effective means for treatment with minimal morbidity and quick recovery.

Bariatric Surgery–P053

DOES PATIENT AGE HAVE AN INFLUENCE ON THE PERCENTAGE OF EXCESS WEIGHT-LOSS AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS?, Jonathan Chemouny BA, Scott Belsley MD, Alfredo C Cordova MD, Annette Wasielewski RN, Garth H Ballantyne MD, Hackensack University Medical Center

Introduction: The efficacy of Roux-en-Y Gastric Bypass (RYGB) throughout the spectrum of patient age is largely unknown. Our study evaluates patterns of percentage of excess weight loss (%EWL) in women of various ages throughout multiple follow-up visits after laparoscopic RYGB. **Methods:** All patients underwent a laparoscopic RYGB with retrocolic, antegastric two-layer hand-sewn anastomosis. All procedures were performed by a single surgeon with roux limb length of 100 cm. Retrospective analysis of prospectively maintained database evaluated body composition analysis of 1042 follow-up visits for 102 women. For each period of follow-up visits, a Kruskal and Wallis comparison with t Distribution was performed to determine the impact of age on the %EWL. **Results:** Average age of patient was 40.0 +/- 10.5 years (Range 20.0-68.6) with preoperative BMI that averaged 46.6 ± 6.2 kg/m². Percentage



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EWL varied from 39.1% to 101.3% %EWL depending on patient response and period of follow-up which averaged (20.0 months with range 9.6 months to 3.1 years). The Kruskal and Wallis comparison with t Distribution did not find statistically significant patterns in %EWL between the different age groups.

Kruskall and Wallis Comparison with t Distribution at 16-18 Months- Columns indicate: Groups compared, Difference of Mean Rank, q Stat, Significance

0-1	6.58	1.08	0.29
0-2	2.81	0.46	0.65
0-3	0.39	0.05	0.96
1-2	3.77	0.70	0.49
1-3	6.19	0.91	0.37
2-3	2.43	0.35	0.72

0=20-29y.o.; 1=30-39y.o.; 2=40-49y.o.; 3=or>50y.o.

Conclusion: Increasing patient age does not have an adverse outcome on the %EWL after laparoscopic RYGB. Further studies following long-term trends are indicated.

Bariatric Surgery-P054

RISK FACTORS FOR INTERNAL HERNIA FORMATION AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS. SERGIO J BARDARO MD, EMMA J PATTERSON MD, DENNIS HONG MD, JAY JAN MD, LAURA V JULY MD, DIVISION OF LAPAROSCOPIC AND BARIATRIC SURGERY. GOOD SAMARITAN HOSPITAL. THE OREGON CLINIC. LEGACY HEALTH SYSTEM.

Background: Internal hernia is a late complication after laparoscopic Roux-en-Y gastric bypass. We do not close any mesenteric defect during gastric bypass since there is no evidence of being beneficial. The aim of our study was to elucidate possible risk factors for internal hernia formation after laparoscopic Roux-en-Y gastric bypass.

Methods: Data on 345 consecutive patients who underwent a laparoscopic Roux-en-Y gastric bypass from October 2000 to December 2004 were analyzed retrospectively. Demographics, pre-operative weight and BMI, internal hernia formation, weight loss, % excess weight loss, type and timing of symptoms and diagnostic work-up were analyzed. Independent sample T test and Chi square test were used for statistical analysis.

Results: Eighteen of 345 patients presented with an internal hernia (5.2%) during 2 years of follow up. The mean age was 42 ± 10 years, with mean pre-operative weight 125 ± 23 Kg, and mean pre-operative BMI 46 ± 5 Kg/m². Statistical differences were determined with preoperative weight, and % excess weight loss at 12 and 18 months [p<0.05].

Patients with preoperative BMI < 50 Kg/m² developed internal hernia in 6.47%, in contrast with patients with BMI > 50 Kg/m² (3.47%) [p<0.001] Hernia repair occurred in a mean time of 20 months after surgery.

Conclusion: Our incidence of internal hernia repair is comparable with prior publications with systematic mesenteric defect closure. Risk factors for internal hernia formation are preoperative BMI < 50 Kg/m² and increased % excess weight loss at 12 and 18 months postoperatively.

Bariatric Surgery-P055

THE IMPORTANCE OF VIDEO INTUBATION TECHNIQUES IN BARIATRIC SURGERY, (BS), George Berci MD, Marshal Kaplan MD, Robert Kariger MD, Robert Naruse MD, Alejandro Sloninsky MD, Richard Tamman MD, Hagiike Masanobu MD, Cedars-Sinai Medical Center; UCLA

The astronomical increase in Bariatric Surgery would not be possible if it were not for basic laparoscopic advantages such as magnified anatomy for easier manipulation, and the possibility of coordinated assistance offered by the video image seen by the entire team.

The first step of a successful Bariatric surgery, following appropriate patient selection, assessment and preparation is rapid, uncomplicated, securing of the airway. The anatomy of the upper airway is often distorted due to a large tongue, the protrusion of abundant adipose tissue, etc. The extent of adi-

pose deposition cannot be accurately assessed preoperatively, but only at the time of laryngoscopy. The rigid laryngoscope, (used in the vast majority of intubations), provides a limited keyhole view. Multiple intubation attempts resulting in oozing or edema of the glottic area are not unusual. In some cases, the flexible intubating scope has to be used requiring additional skills and extending procedure time. The authors modified a standard Macintosh Laryngoscope by inserting a small TV camera into the handle. The image light carrier is built into the interchangeable blade.

The Video Macintosh was used in 100 consecutive cases; 80 females, 20 males; BMI range 37-68 with an average of 48.5. 98 patients were intubated on the first attempt, and only 2 cases required a second attempt. The bougie catheter was utilized to facilitate intubation in 38 cases. In no instance, was it necessary to use the flexible scope. Every patient was extubated in the OR. No repeat intubation was required in the post-operative period. The video laryngoscope is of a great benefit, especially in the morbidly obese patient who often presents a challenging airway anatomy, to complete intubation in a rapid and efficient way.

We feel that video technique is a great advantage in teaching laryngoscopy and tracheal intubation.

(During the proposed oral presentation, a few video clips will be included.)

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Bariatric Surgery-P056

LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING FOR BMI 30-35, Marcos Berry MD, Cristian Martinez MD, Lionel Urrutia MD, Clinica Las Condes Santiago CHILE

The indications for the surgical treatment of obesity are clearly defined. Nevertheless there is a group of patients with BMI less than 35 in which the therapeutic alternatives are controversial, especially if it associates to co morbidities derived from obesity. The objective of the present study is to evaluate the results at medium follow-up focused on the correction of the excess of weight and associated co morbidities.

RESULTS: Between October 2003 and May 2005, 38 procedures of Laparoscopic adjustable gastric Banding (LAGB) were carried out by the same surgical team. (Lap-Band, INAMED). The average age was 39 years, with a BMI of 32.8 (30-34.5). There was no mortality. The complication rate was 7.9% and included one abdominal wall bleeding (access port), one acute slippage and one patient with late intolerance and removal. The excess weight loss was 45.4% at 6 months and 57.7% at 12 months. The resolution or improvement of the associated co morbidities reached 84% at 6 months.

CONCLUSIONS: The LAGB is an effective and safe surgical procedure, with a low rate of complications, for the management of obese patients with BMI under 35, and should be considered in this group as an important alternative.

Bariatric Surgery-P057

LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING IN ADOLESCENT OBESE PATIENTS, Marcos Berry MD, Miguel Guelfand MD, Cristian Martinez MD, Clinica Las Condes Santiago CHILE

The prevalence of obese adolescents in western countries is about 16% and a great percentage of them will be obese in the adult life. These adolescents develop many of the diseases observed in the obese adult and have a very low self esteem. The search for efficient alternatives in the management of these patients is controversial and the Laparoscopic adjustable gastric banding (LAGB) appears as a safe and effective alternative.

The objective of this study is to evaluate the impact of LAGB in adolescent obese patients in regards to weight loss and improvement of co morbidities, at medium follow-up.

RESULTS: Between August 2004 and January 2005, 21 LAGB procedures were carried out (Lap-Band, INAMED). The average age was 17 years (13-19), with a BMI of 38.6 Kg/m² (31-51). The most frequent co-morbidities were insulin resistance and hiperinsulinism, hiperuricemy and fatty liver. 90% of them were resolved or improved at 6 months follow up. The excess



weight loss was 36.2% at 6 months and 54.1% at 12 months. There was no mortality and the complication rate was 9.5%; two band slippages at 6 months post surgery.

CONCLUSIONS: LAGB has shown to be a safe bariatric technique in adolescent obese patients, with a low complication rate in the medium follow up. Also has shown good results in terms of weight loss and resolution of co morbidities. The good results should be confirmed with long term follow-up.

Bariatric Surgery–P058

CONTINUOUS PERIOPERATIVE INSULIN THERAPY IN PATIENTS WITH, Robin P Blackstone MD, Jennefer A Kieran MD, Melissa Davis RN, Scottsdale Bariatric Center

INTRODUCTION Continuous insulin infusion (CII) has been proven to decrease morbidity in cardiac and critically ill patients (Zarich 2005; Talbot 2005, Krinsley 2005; Vanhorebeek 2005; Furnary 2004, 2003, 1999; Mesotten 2004; Hansen 2003; Furnary 2003; van der Berghe 2001; Zerr 1997). Our study investigated the implications of these findings for patients undergoing bariatric surgery.

METHODS In a retrospective review of 298 morbidly obese patients with type 2 diabetes who completed bariatric surgery between 2001 and 2005 (39 mo.), standard and CII insulin therapy modalities were compared. Group 1 (n=179) underwent glucose monitoring and treatment every 6 hours with a standard insulin sliding scale; group 2 (n=119) had CII treatment beginning perioperatively. Most (88%) received lap or open Roux gastric bypass, 5% had revisions, and 7% gastric bands. Patients were comparable in age, body mass index, and gender. Blood glucose was measured hourly; insulin infusion was adjusted to maintain blood glucose between 80 and 120 mg/dL.

RESULTS There were no significant hypoglycemic episodes or serious complications with perioperative CII. Mortality was 0%. Mean perioperative insulin was 5.8 units/hour; 54% of patients requiring >10 units/hour. Mean blood glucose was 112.6 mg/dL. Stricture rates in group 1 vs group 2 were 7.8% vs 4.2% (p<0.5); infection rates were 4.4% vs 3.3% (p<0.5).

CONCLUSIONS Perioperative CII can be administered safely in diabetic patients undergoing bariatric surgery and is effective in decreasing morbidity. Insulin requirements in this population are higher than expected; thus, patients may be grossly undertreated with the standard insulin sliding scale.

Maintaining normoglycemia with CII perioperatively appears to be protective for the patient.

Bariatric Surgery–P059

A CADAVERIC PORCINE MODEL FOR TRAINING IN LAPAROSCOPIC BARIATRIC SURGERY, R Aggarwal MD, C Boza MD, A Escalona MD, P Bellilio MD, N Devaud, A Darzi MD, L Ibanez MD, Department of Biosurgery and Surgical Technology, Imperial College London, U.K. and Department of Digestive Surgery, Hospital Clinico, Pontificia Universidad Catolica de Chile, Santiago, Chile.

Introduction: Laparoscopic Roux-en-Y gastric bypass (LRYGB) is an effective surgical therapy for morbid obesity, though has a long and arduous learning curve. Fellowships in bariatric surgery enable surgeons to reduce the length of the learning curve through preceptorship-based practice. However, many surgeons commence training on anaesthetized porcine models which is expensive, and requires specialist facilities. The aim of this study was to develop and assess the use of a cadaveric porcine model for commencement of skills acquisition in LRYGB.

Methods: Porcine small bowel harvested from one animal was filled with thickened solution, divided into 50cm lengths, and placed into a video-box trainer in a U-shape. This provided the illusion of two adjacent pieces of small bowel. Eight surgeons with varying laparoscopic bariatric surgical experience (median 38 LRYGBs, range 0-340) performed a side-to-side stapled jejuno-jejunostomy on the model, and also on patients scheduled for LRYGB. Assessment was by time taken, dexterity parameters (path length and number of movements) and scored by two blinded reviewers on a previously validated video-based rating scale.

Results: There were significant correlations between perform-

ance on the porcine model and patient for dexterity measures, i.e. left hand path length (r=0.857, p=0.007), right hand path length (r=0.810, p=0.015) and total number of movements (r=0.743, p=0.035), though not for time taken (r=0.667, p=0.071). There was also a significant correlation on video-based rating scores (r=0.727, p=0.041).

Conclusions: This model is an accurate representation of a jejuno-jejunostomy in the human procedure. It is cheap, easy to produce, and does not require any specialist storage or handling facilities. This study also stresses the importance of dexterity, rather than time, as key factors for assessment of laparoscopic skill.

Bariatric Surgery–P060

ADVANCED LAPAROSCOPIC SKILLS DECREASE THE LEARNING CURVE FOR LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Jason Breaux MD, Colleen I Kennedy MD, John S Bolton MD, William S Richardson MD, Ochsner Clinic Foundation

INTRODUCTION: The learning curve for laparoscopic roux-en-y gastric bypass (LRGBY) is reported to be 20-100 cases. The American Society for Bariatric Surgery has guidelines for training bariatric surgeons but many groups have shown that the learning curve and risk of complication is increased even after this initial training. Our aim was to investigate whether advanced laparoscopic skills could decrease the learning curve for LRGBY.

METHODS: All operations in this review were performed by the senior author. The senior authors' training included a laparoscopic fellowship without bariatric surgery, a six year surgical practice focusing on upper abdominal laparoscopic surgery, two courses on bariatric surgery at national meetings, one week of observing a bariatric program, and two mentored LRGBY cases. The hospital fully backed the obesity program and all elements were in place prior to the start of the program. Statistics are mean±standard deviation.

RESULTS: Between 12/03 and 2/05 107 LRGBY cases were performed. No cases were converted to open. Operative time was 132±36 minutes. Operative time for the first 20 cases was 152±32 and the last 20 was 113±30. Length of stay was 2.9±1.6 days. Two patients required jejuno-jejuno reconstruction, one was in the first 20 cases and one was at the end of the series. There were no anastomotic leaks and no deaths.

CONCLUSIONS: Guidelines for training bariatric surgeons should take into account a surgeons surgical skills. Surgeons with advanced laparoscopic skills can get excellent results with minimal training, although operative time does decrease with experience. A complete bariatric program including trained operative personnel and nursing staff in place at the start of the program is integral in making the program a success from the beginning.

Bariatric Surgery–P061

COST SAVINGS OF HAND SEWN VERSUS STAPLED ANASTOMOSIS IN BARIATRIC SURGERY, Melissa E Brunsvold MD, Arthur M Carlin MD, Henry Ford Hospital, Detroit, Michigan

Background: Morbid obesity has increased in incidence four-fold in the past two decades. Roux-en-Y gastric bypass has been shown to produce a significant, durable weight loss and a reduction in comorbidities. As a result the number of bariatric operations increased 500% between 1993 and 2003. This resulted in a rapid increase in the number of facilities performing bariatric surgery with a wide range in cost and variation in outcomes. Insurance companies have begun trimming coverage in a large number of states. It is therefore imperative that we determine the most efficient way to perform these operations. One key difference in performing gastric bypass surgery is found in the technique used to create the gastrojejunostomy.

Aim: To determine the operative cost savings associated with hand sewn versus stapled gastrojejunostomy and to analyze operative time difference associated with hand sewn versus stapled gastrojejunostomy in gastric bypass surgery.

Methods: We performed a retrospective chart review of all bariatric operations performed at a large medical center from 9/23/2003 to 4/12/2005. These were cross referenced with the



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Surgical Information Systems (SIS) cost and OR time data. Operative notes were reviewed to determine the method used to perform the gastrojejunostomy.

Data: There were 582 total gastric bypass operations performed during that period. Of these we found 399 cases which were both laparoscopic and contained in the SIS database. An operative note review was performed which separated the cases into 351 hand sewn, 9 circular stapled and 39 linear stapled gastrojejunostomies. Data is reported as mean +/- standard deviation.

Results: The mean operative cost of hand sewn gastrojejunostomy was \$2041 +/-458, circular stapled was \$2915 +/-731, and linear stapled was \$3080 +/- 588, (p<0.001). Mean operative time was 217 +/-40 min for hand sewn gastrojejunostomy, circular stapled was 288 +/- 128 min, and linear stapled was 255 +/- 43 min (p<0.001).

Conclusion: During Roux-en Y gastric bypass surgery, hand sewn-gastrojejunostomy results in a significant reduction in operative cost compared to stapled anastomoses. Hand sewn gastrojejunostomy also results in a significant reduction in operative time.

Bariatric Surgery–P062

CAN BARIATRIC PROCEDURES BE INCORPORATED INTO GENERAL SURGERY PRACTICE?, Robert N Cacchione MD, Benjamin D Tanner MD, Department of Surgery, University of Louisville School of Medicine

Introduction: There is a current trend to create centers of excellence for the surgical treatment of morbid obesity. We think that general surgeons who have experience in foregut procedures can adopt bariatric procedures with minimal morbidity and good weight loss results.

Methods: We undertook a retrospective review of patient records undergoing laparoscopic and open bariatric procedures. These were performed by a surgeon with a practice composed of 70% general surgical cases and 30% bariatric procedures.

Results: A variety of operative procedures were performed over a 3 year period. 132 LapBand placements, 36 open gastric bypasses, 84 laparoscopic gastric bypasses, and 13 revisions of previously performed bariatric procedures. Only one thirty day mortality occurred, this involved a patient undergoing laparoscopic gastric bypass. There was an overall complication rate of 16%. The excess body weight loss at a mean of 48 months is 62% for gastric bypass patients and 48 % for patients undergoing LapBand placement.

Conclusions: For general surgeons with experience in foregut surgery who have an interest in weight loss procedures, a bariatric practice can be melded with general surgical practice safely, and with good results in terms of morbidity, mortality and weight loss.

Bariatric Surgery–P063

ROUTINE UPPER GI SERIES FOLLOWING GASTRIC BYPASS DOES NOT ACCURATELY IDENTIFY LEAKS OR PREDICT STRICTURES., Jonathan T Carter MD, Sepideh Tafreshian MD, Umesh Tiwari MD, Fernando Herbella MD, John P Cello MD, Marco G Patti MD, Guilherme M Campos MD, Stanley J Rogers MD, Andrew M Posselt MD, Depts. of Surgery and Medicine, Univ. of California, San Francisco, USA.

INTRODUCTION: Most centers performing Roux-en-Y gastric bypass for morbid obesity obtain a routine upper GI series (UGI) in the early postoperative period to evaluate for anastomotic leaks and delayed pouch emptying. We hypothesized that routine UGI does not accurately identify leaks or predict strictures.

METHODS: From December, 1998 to April 2005, 569 gastric bypass procedures were performed at our center (60% laparoscopically). Routine UGI was obtained in 546 (96%) patients. We compared radiographic findings (leak or stricture) with patient outcome (leak or stricture) to calculate the sensitivity and specificity of the study. Univariate modeling identified risk factors for anastomotic leak or stricture; the low number of events precluded multivariate modeling.

RESULTS: Of 546 routine UGI studies, anastomotic leaks were reported in 5 (0.9%); 2 of these were later interpreted as arti-

fact. UGI failed to identify 3 leaks, yielding an overall sensitivity of 50% and PPV of 60%. In univariate analysis, only institutional experience was associated with anastomotic leak (odds-ratio (OR) 6.5 for the first 100 cases, p=0.02). Delayed emptying of contrast was observed in 109 (19%) studies, was more frequent in laparoscopic cases (26.8% vs. open 9.0%, p<0.01) and when a GIA stapler was used for the gastrojejunostomy (31.7% vs. EEA 13.6%, hand-sewn 18.9%; p=0.01). Only 10 (1.7%) patients developed strictures requiring dilatation. The PPV of delayed contrast emptying for eventual stricture formation was 6%. Risk factors for stricture formation included stapled anastomosis (OR 9.4, p<0.01), long Roux length (>100cm OR 5.4, p=0.03), antecolic Roux (OR 10.2, p=0.03), and delayed contrast emptying (OR 6.3; p<0.01).

CONCLUSIONS: Due to the overall low incidence of complications and low sensitivity/specificity, routine UGI does not accurately identify leaks or predict strictures after Roux-en-Y gastric bypass. A selective approach, reserved for patients with clinical evidence of leak or stricture, is more appropriate and cost-effective

Bariatric Surgery–P064

COMPARISON OF LINEAR VS. CIRCULAR STAPLING OF THE GASTROJEJUNOSTOMY ANASTAMOSIS FOR GASTRIC BYPASS SURGERY, Garvey Choi DO, Keith Zuccala MD, Danbury Hospital

PURPOSE: LGBY is the most common bariatric surgery performed today in the United States. The gastrojejunostomy(GJ) anastomosis can be created in several different ways. We compared the use of a linear stapler(LS) with a circular stapler(CEEA) with respect to stenosis, leak rates, bleeding, operative times and lengths of stay

MATERIALS AND METHODS: Our retrospective study included a single institution and a single surgeon's operative experience from 6/04 to 6/05. Fifty patients had their GJ performed using a CEEA and fifty using a LS device. The average age of these patients were 44 and 46 respectively. Pre op BMI's were 52.8 and 48.2 respectively. Follow up evaluations were conducted at 1, 3, 6 and 12 months unless there were complications. All patients with post-op symptoms were endoscoped by the bariatric surgeon who also performed therapeutic intervention as needed.

RESULTS: The average OR time for CEEA is 190.5 minutes and LS is 165.5 minutes. The leak rate for both techniques was zero. The stenosis rate for CEEA is 12% and LS is 0%. Nausea, vomiting and epigastric pain were the initial presenting symptoms of a GJ stenosis. The stenosis became symptomatic with the onset of solid food on post-op week 3-4. Of the 6 GJ stenoses noted, 3 were treated with a single endoscopic dilatation performed by the surgeon and 3 required a second therapeutic EGD with dilation to resolve. One patient in the linear staple group developed a staple line bleed that required endoscopic intervention. The average LOS was 2.84 days for the LS patients and 3.38 for the CEEA.

CONCLUSION: Gastric Bypass is a procedure that is performed using a variety of techniques to create the GJ. We have demonstrated the benefits of using a linear stapler over the circular EEA in our series. We feel that a linear stapling technique has a benefit over the CEEA technique in regards to stricture rates, LOS, OR times and thereby decreases the overall morbidity and cost associated with LGBP.

Bariatric Surgery–P065

CORRELATION OF BODY MASS INDEX AND PERI-OPERATIVE MORBIDITY AND MORTALITY FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Nilesh A Patel MD, Carla Christy MD, Keary R Williams MD, Greta Piper MD, Dean Smith MD, Joseph J Colella MD, Department of Surgery, Allegheny General Hospital

Extreme body mass index (>60kg/m², BMI) has been considered a relative contraindication to laparoscopic roux-en-Y gastric bypass (LRYGB). As the expertise for the laparoscopic approach increases, this limitation has been tested. Present data is limited by sample size or inadequate comparison cohorts.

The present study retrospectively reviews 762 consecutive



patients undergoing LRYGB by 2 surgeons at a single institution. A minimum follow-up of 3 months was achieved for all patients to define peri-operative morbidity. BMI was stratified as 35-50kg/m², 50-60 kg/m² and >60. Fisher's exact test was used for statistical analysis.

The overall mortality, major morbidity and minor morbidity rates were 0.5%, 6.3% and 12% respectively. The overall median length of stay (LOS) was 3 days. Table demonstrates these endpoints when stratified by BMI. A linear relationship was observed for mortality and major morbidity but not for minor morbidity or LOS. A significantly higher rate of mortality (p=0.004) and major morbidity (p=0.03) was observed in patients with BMI >60kg/m² when compared with those with BMI <59kg/m².

	35-50 (n=496)	50-60 (N=187)	>60 (N=79)
LOS (median)	3	3	4
Mortality	0 (0%)	1 (0.01%)	3 (3.8%)
Major Morbidity	25 (5.1%)	13 (7%)	10 (12.7%)
Minor Morbidity	57 (11.5%)	21 (11%)	11 (13.9%)

The present study provides one of the largest series to date where perioperative endpoints are correlated by BMI. While LRYGB is technically feasible in patients with extreme BMIs, it is associated with a significantly higher mortality and major morbidity rates. Further studies are needed with larger number of patients to define BMI as an independent risk factor.

Bariatric Surgery-P066

FOR COMPARISON: EXPERIENCE WITH A CHILDREN'S OBESITY CAMP, Christopher Cooper BS, Walter J Pories MD, David Collier MD, Sharon Sarvey RN, Charles Wilson MD, Ira Green BA, Mary L Pories BS, Mary A Rose PhD, Sylvia Escott-Stump BS, East Carolina University

INTRODUCTION: The alarming rise in childhood obesity has initiated a number of bariatric surgical initiatives. To interpret the outcomes from these approaches, a comparison with a non-surgical approach is prudent.

METHODS AND PROCEDURES: In 2003, 2004, and 2005 we measured the outcomes produced by an isolated summer camp for 74, 99, and 89 obese children and adolescents in the North Carolina Mountains with mean ages of 12.7±2.3, 13.0±1.9, and 13.2±1.8, and initial BMI's of 33.1±5.7, 33.4±6.4, and 32.9±7.0. The camp focused on a 1700/day caloric diet, daily aerobic and resistance weight training, nutrition classes, and weekly sessions with a psychologist. Changes in weight, BMI, body shape measurements and fitness level changes were assessed. Average length of stay was 4.2, 4.3, and 4.4 weeks.

RESULTS: BMI, body shape, and percent weight measures significantly improved in each of the three summers. The campers lost 1.6, 2.0, and 1.8 kg per week during each of the three years. Waist measurements decreased by 9.1±5.12.0 cm., 9.9±5.6 cm. and 8.1±5.8 cm. There were significant improvements in timed sprints, 7 mile (0.8 km) runs, and the vertical jump. In terms of recidivism, of those campers staying for 2 summers, 4.4% continued to reduce their BMI in spite of growth, 56.5% maintained their BMI below the initial baseline measurement, and 39.1% increased their BMI above baseline. Co-morbidities improved as well. One camper aged 15, 211 kg., progressed from being able to walk 3 steps to managing the 100 yard (91 meters) dash in 42 seconds after losing 35 kg in 8 weeks.

CONCLUSION: Diets, exercise and behavioral modification are useful approaches in severely obese children that can, in some, produce significant albeit expensive long term results. Recidivism is a problem. Surgical outcomes must compare favorably to these outcomes.

Bariatric Surgery-P067

LAPAROSCOPIC GASTRIC BYPASS VERSUS LAPAROSCOPIC GASTRIC BYPASS AFTER GASTRIC BANDING : RESULTS OF A RETROSPECTIVE STUDY, Giovanni Dapri MD, Oumnia Rqibate MD, Jacques Himpens MD, Guy Bernard Cadière PhD, Department of Gastrointestinal and Obesity Surgery, Saint-Pierre University Hospital, Brussels, BELGIUM

Background: Laparoscopic gastric bypass (LGBP) is a commonly performed bariatric procedure. A significant number of patients benefit from this treatment after failed laparoscopic adjustable gastric banding (LAGB). All 119 patients treated by LGBP between August 30 2001 and November 30 2004 were retrospectively studied, with a median follow-up of 9 months (1-24).

Methods: 77 patients had a primary LGBP (group A) and 42 a LGBP after a LAGB (group B). The two groups were similar: 7 men and 70 women (group A), 4 men and 38 women (group B); average age was 37,9 (15-65) for group A and 40,6 (21-60) for group B; average body mass index (BMI) was 42,4 (30-55) for group A and 41,3 (30,8-64) for group B. For group B, the mean BMI before the LAGB was 45,5 (31-70) and the median time before the LGBP was 76 months (9-192). Indication for LGBP in group B was inefficacy of LAGB in 33 patients (78,6%), dilation of gastric pouch in 4 patients (9,5%) and erosion in 5 patients (11,9%).

Results: A mechanical gastrojejunostomy was performed in 45 cases for group A and in 35 for group B, a handsewn anastomosis in 32 cases for group A and in 7 for group B. Median operative time was 120 minutes (70-370) for group A and 180 minutes (90-480) for group B (p<0,05). There was one conversion to open surgery (group A). Major early postoperative complications were registered in 10 cases (12,9%) of group A and in 11 cases (26,2%) of group B (p<0,05). Some patients had more than one early postoperative complication. An early revision was necessary for 7 patients (9%) of group A and for 9 patients (21,4%) of group B (p<0,05). Median hospital stay was 6 days (2-32) for group A and 7 days (3-49) for group B (p<0,05). Major late postoperative complication (stenosis) appeared in 1 case (1,3%) of group A and in 3 cases (7,1%) of group B (p<0,05). The decrease of BMI and % of Excess Weight Loss (EWL) was registered at 1,3,6,9,12 months and was more pronounced in group A than in group B (p<0,05). For group B the postoperative leak rate was more important when the anastomosis was performed between the stomach and jejunum rather than the esophagus and jejunum (p<0,05), but the EWL resulted similar.

Conclusions: LGBP realized after LAGB requires longer operative time, longer hospital stay, more specific complications and less EWL. In case of redo after LAGB, the construction of esophageal jejunostomy causes a similar weight loss but fewer postoperative leaks than with gastrojejunostomy.

Bariatric Surgery-P068

A NEW PROPOSAL FOR SURGICAL TREATMENT OF OBESITY. SLEEVE GASTRECTOMY AND PARTIAL INTESTINAL BYPASS. PRELIMINARY RESULTS., Silvio L S Lemos MD, Thiago A Domingos MD, Joaquim M Vinha MD, Aginaldo P Nadai MD, Clébio P Vasconcellos MD, Vilma J Simões MD, Carolina B Ferragut, UNIDERP / Santa Casa Hospital - Campo Grande/MS, Brazil

OBJECTIVE: To present the preliminary results of a new obesity surgery treatment proposal aiming to improve neuroendocrine control of hunger and satiety, avoiding blind areas in the digestive system and with little damage in the digestive physiology.

METHODS AND PROCEDURES: The evolution of those patients who agreed with the research protocol, operated from May/2004 to January/2005, was studied, with follow-up of at least six months. This new obesity treatment proposal includes sleeve gastrectomy and side-to-side enteroanastomosis between the jejunum at 100 cm distal to the ligament of Treitz and the ileum, 100 cm proximal to the ileocecal valve.

RESULTS: Thirty-six patients were operated (10 men and 26 women) ranging from 22 to 65 years old. The average BMI at pre-operative was 44.79 kg/m² (35.56 to 62.64) and six months later it was 32.86 kg/m² (24.53 to 45.8), resulting on 63.71% average excess weight loss. There were no vomiting or persistent diarrhea cases, dumping syndrome, digestive fistula or death. Diabetic insulin dependent patients presented significant improvement in the disease. Anemia occurred in two women with irregular menstruation. Four patients developed light hypoalbuminemia which was corrected with oral protein supplement.



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CONCLUSION: During the period of studies, this proposal proved efficient in reducing excess weight and controlling the diabetes with low number of complications and no death.

Bariatric Surgery-P069

GASTRIC PROLAPSE AND THE LEARNING CURVE FOR LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING ? A SINGLE INSTITUTION, MULTI SURGEON EXPERIENCE.,

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Objective: Although the incidence of the late complication of gastric prolapse has been greatly reduced by the adoption of the pars flaccida technique of Laparoscopic Adjustable Gastric Band (LAGB) placement, we sought to determine if a learning curve exists for LAGB with respect to the occurrence of gastric prolapse.

Methods: The first 500 patients undergoing LAGB by three surgeons at our institution between October 2001 and September 2005 were identified in the institutional bariatric surgery database. All of the procedures were performed using the pars flaccida technique. Procedures were grouped by individual surgeon experience and prolapse rates were determined.

Times from the date of LAGB placement to the development of symptoms of prolapse were collected.

Results: Of 500 LAGB performed, the numbers performed by the 3 individual surgeons were 24, 136, and 340. Prolapse has occurred in 18 patients for an overall incidence of 3.6%. When procedures were grouped by surgeon experience, the subsequent likelihood of a patient developing gastric prolapse was significantly higher if their procedure was within the first 50 cases performed by the individual surgeon. 15 prolapses occurred in the 124 cases which were within the first 50 performed by a surgeon (12.0%), compared to 3 of 376 (0.8%) when surgeon experience exceeded 50 cases (p<0.001).

Symptoms of prolapse developed within 1 year of LAGB placement in 12 patients and between 1 and 2 years in 6 patients. No additional prolapses have been identified in patients followed more than 2 years.

Conclusions: A learning curve exists for laparoscopic adjustable gastric banding with respect to the late complication of gastric prolapse. Prolapse is an infrequent event when a surgeon has performed over 50 cases.

Bariatric Surgery-P070

ANTECOLIC VERSUS RETROCOLIC LAPAROSCOPIC GASTRIC BYPASS FOR MORBID OBESITY, Michael Edwards MD,

Benjamin Schneider MD, James Ellsmere MD, Ronit Grinbaum MD, Vivian Sanchez MD, Daniel Jones MD, Section of Minimally Invasive Surgery, Beth Israel Deaconess Medical Center, Boston MA

Background: Laparoscopic Roux-en-Y gastric bypass (RYGBP) is the most commonly performed operation for the treatment of morbid obesity in the US. The orientation of the roux-limb (antecolic, AC vs retrocolic, RC) that provides the best patient outcome remains a controversy. The aim of this study was to compare outcomes after AC and RC RYGBP performed at our institution.

Method: Between 2003 and 2005, 347 consecutive patients underwent RYGBP (136 AC & 211 RC). The GJ was created with an EEA or GIA stapler. Outcomes comparing AC (mean BMI 47kg/m2, range 37-63) and RC (mean BMI 47kg/m2, range 37-65) fashioned roux-limbs were evaluated retrospectively. Endpoints (mortality, %EWL, conversion, re-operation, leak, bleeding, wound infection, SBO, stricture, hernia, and ulceration) were evaluated by multivariate analysis.

Results: Gender, age, BMI and comorbidity were comparable.

Outcomes (n)	Antecolic (%)	Retrocolic (%)	P value
Leak (15)	9.5	0.9	0.0005
Stricture (21)	0.7	9.5	0.001
Conversion (13)	0	3.7	0.003

Leak rate in the AC group remained significant when surgeon

or GJ technique was controlled for (p = 0.027 & 0.038, respectively). All other outcome variables were comparable. Mean hospital length of stay (LOS) was 3.5 days (AC, n=66) and 3 days (RC, n=160). Mean %EWL was 53% (AC, n=53) and 52% (RC, n=57) at 6 months, and 70% (AC, n=65) and 67% (RC, n=53) at 12 months. Mortality rate was 0.6%.

Conclusions: Mortality and complication rates were consistent with reported benchmarks. The AC group had a lower stricture rate, but a higher leak rate, which is contrary to published literature suggesting no difference in leak rates with an AC vs RC fashioned roux-limb. When surgeon or GJ technique were controlled for, AC oriented roux-limb remained an independent predictor for leak.

Bariatric Surgery-P071

BENCHMARKING HOSPITAL OUTCOMES FOR LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING, M Edwards MD, R

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Background: Since FDA approval, the number of laparoscopic adjustable gastric banding (LAGB) performed in the US has increased exponentially. The aim of this study was to compare initial experience to FDA study and evidence based literature reviews.

Methods: Between 2003-2005, 86 patients with mean age 43 years (21-64) and BMI 45.6kg/m2 (35-69) underwent LAGB. Outcomes (conversion, re-operation, death, perforation, erosion, prolapse, port flip and %EWL) were evaluated retrospectively and compared to available benchmarks.

Results: Gender, age and BMI were comparable. Comorbidities included DM (30%), HTN (55%), dyslipidemia (52%) and GERD (35%).

Outcomes	BIDMC (%)	FDA (%)	TEC (%)
Mortality	1.2	0.7	0-1
Conversion	1.2	5.0	0-5
Reoperation	9.3	9.0	2-24
Prolapse	2.3	24	1-12
Erosion	0	1.0	0-8

All other outcomes (perforation (0%), port flip (4.7%), hernia (0%), and wound infection (0%)), were comparable. Three bands (2 prolapse, 1 patient request) were removed (3.5%). One death occurred secondary to an anesthesia complication. Mean follow-up was 10 months (n=82, 1-27). Mean %EWL was 26% at 6 months (n=53, 2.8-55) and 33% at 1-year (n=43, 0-87), which is comparable to published data. Co-morbidities resolved/improved in 82-99%.

Conclusions: Most patients achieved improvement of comorbid illnesses. Short-term outcomes were comparable to established benchmarks. With new bariatric accreditation standards, hospitals will need to demonstrate that their clinical outcomes are consistent with best practices.

Bariatric Surgery-P072

LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS: EXPERIENCE IN THE PONTIFICIA UNIVERSIDAD CATOLICA DE CHILE, Alex Escalona MD,

Nicolás Devaud MD, Gustavo Pérez MD, Fernando Crovari MD, Fernando Pimentel MD, Sergio Guzmán MD, Alejandro Raddatz MD, Luis Ibáñez, Departamento de Cirugía Digestiva, Pontificia Universidad Católica 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. The aim of this study was to evaluate the experience in the treatment of morbid obesity with this method at our institution. Methods and procedure: Information was obtained from the prospective database of all patients who underwent laparoscopic RYGBP from August of 2001 to August of 2005. The median follow up is of 21 months.

Results: In this period 754 patients were underwen RYGBP. Mean age was 36 ± 10 years and 75 % are women. Mean body mass index (BMI) was 41 ± 5 (Kg/m2). The presence of HTA, DM II, and dyslipidemia was observed in 29, 13 and 41 percent of patients respectively. In 11 patients (1,4 %) conversion to open surgery was needed. The mean operative time was 114 ±



39 minutes. The hospital stay was 4.0 ± 2.5 days. Postoperative complications were observed in 68 patients (9 %). In 16 of them (2,1 %) reoperation was needed. There were no deaths. The excess of weight loss to the 12 and 24 months was of 95 and 93 percent respectively. Conclusion: Laparoscopic Roux-en-Y gastric bypass is a good alternative of surgical treatment of the morbid obesity.

Bariatric Surgery–P073

GASTRECTOMY OF THE BYPASSED STOMACH IN LAPAROSCOPIC ROUX-IN-Y GASTRIC BYPASS; INDICATION AND RESULTS, Alex Escalona MD, Nicolás Devaud MD, Gustavo Pérez MD, Fernando Crovari MD, Fernando Pimentel MD, Sergio Guzmán MD, Luis Ibáñez MD, Departamento de Cirugía Digestiva. Pontificia Universidad Católica de Chile

Introduction: Laparoscopic Roux-in-Y Gastric Bypass (LRYGBP) has proven to be a safe and effective technique for the treatment of morbid obesity. Gastric cancer has evolved as an important cause of death due to malignant tumors, worldwide. The post surgical evolution of the bypassed stomach has this way become a controversial issue.

Objective: To evaluate the indication and surgical results of patients who have undergone resection of the bypassed stomach during a LRYGBP in our institution. Methods and

Procedures: Clinical and post-surgical data of patients who underwent LRYGBP since August 2001 to September 2005 was reviewed. Indication of gastrectomy of the bypassed stomach was analyzed. Operative time, weight loss, oral intake, hospital stay and post operative complications were compared among patients with LRYGB and those with LRYGBP and gastrectomy of the bypassed stomach. Results: Since August 2001, 779 patients have undergone LRYGBP. 6 patients have undergone LRYGBP and gastrectomy of the bypassed stomach. Indication for gastrectomy in 4 patients was intestinal metaplasia and in two cases family history for gastric cancer. The mean BMI after 12 months in patients with LRYGBP and gastrectomy was 31,9 Kg/m². The mean operative time in this group was 145 minutes, compared to 117 minutes in patients with standard LRYGBP. Hospital stay in patients with LRYGBP and gastrectomy was 6 days (range 3-8), and 4 days in standard LRYGBP, beginning oral intake the 2nd day post surgery in both groups. Post operative complications were observed in two patients, abscess of the duodenal stump and stenosis of the gastrojejunostomy respectively.

Conclusion: Inability to follow through endoscopy the evolution of the bypassed stomach has turned its gastrectomy a controversial indication. Among patients with high risk for gastric cancer, gastrectomy of the bypassed stomach during LRYGBP proves to be a safe and feasible alternative. A longer operative time and hospital stay was observed in this group.

Bariatric Surgery–P074

DOES C-REACTIVE PROTEIN DECREASE PROPORTIONATELY TO BODY MASS INDEX IN BOTH GASTRIC BYPASS AND GASTRIC BAND PATIENTS?, Michael Faloon MS, Scott J Belsley MD, Daniel Farkas MD, Annette Wasielewski RN, Garth H Ballantyne MD, Hackensack University Medical Center

INTRODUCTION: Morbid obesity is a pro-inflammatory state with systemic markers that decrease post-operatively in bariatric patients proportionally to increasing weight loss. Study aims describe changes in C-reactive protein (CRP) levels from pre- to post-operatively in laparoscopic gastric bypass and band patients and analyze the relationship between the changes in CRP levels and body mass index (BMI).

METHODS AND PROCEDURES- 54 laparoscopic gastric bypass patients and 51 gastric band patients with body composition follow-up and measured C-reactive protein levels were included in statistical analysis. Linear regression analysis evaluated changes in CRP levels compared to baseline and to the respective post-operative changes in total body weight and body mass index at the time of follow-up.

RESULTS- Linear Regression demonstrates that CRP decreases with decreasing BMI (T Statistic 7.74 $p < .01$ ANOVA of Regression F-Stat 60.0 $p < .01$) regardless of whether the patient underwent banding or bypass.

	Bypass	Band
Female	83.3% (n=45)	78.5% (n=40)
Preop BMI	47.5 kg/m ²	46.4 kg/m ²
Change CRP	- 0.38 mg/L	-0.23 mg/L
Change BMI	-12.79 kg/m ²	-4.62 kg/m ²
Av. Follow-Up	183.10 days	86.12 days

CONCLUSION: C-reactive protein levels significantly fall post-operatively in both gastric bypass and gastric band patients. The decreases in CRP levels significantly correlate with days of post-operative follow-up, decrease in patient weight and decrease in patient BMI. No statistical difference was seen in this effect between gastric bypass and gastric banding.

Bariatric Surgery–P075

SYMPTOMATIC BRADYCARDIA FOLLOWING SURGICAL WEIGHT LOSS, Joshua Felsher MD, Liam Haveran DO, Vera Freeman MD, Robin Mason RN, Richard Perugini MD, Donald Czerniach MD, John Kelly MD, Demetrius Litwin MD, UMASS Memorial Medical Center

Introduction: Among the cardiovascular findings characteristic of the Metabolic Syndrome seen in the morbidly obese are hypertension, tachycardia and baroreflex impairment. It has been shown that autonomic nervous imbalance, with a predominance of sympathetic tone, is to some extent responsible for these symptoms. Significant weight loss leads to a shift from sympathetic dominance to a balanced autonomic state. However, the effects of marked weight loss on the morbidly obese that do not have sympathetic dominance may actually be detrimental. Symptomatic bradycardia may be realized due to a pathologic predominance of vagal tone following surgical weight loss. We present five cases of symptomatic bradycardia in postoperative gastric bypass patients who achieved excellent weight loss.

Results: The five patients presented are all part of our single institutional series of over 800 consecutive laparoscopic gastric bypass operations. All five patients were female. The mean age at surgery was 47 years. The mean pre-operative BMI was 50.6 kg/m². Pre-operative electrocardiogram demonstrated sinus rhythm in all patients, with a mean heart rate of 68 beats per minute. One patient had a heart rate under 60 beats per minute preoperatively. The mean % excess body weight loss at 6 months and 12 months postoperatively was 65.9% and 80.7% respectively. All patients suffered one or more episodes of symptomatic bradycardia within 14 months of surgery. Symptoms were characterized by an otherwise unexplained syncopal episode in all patients. The mean time to development of symptoms was 10 months. Electrocardiograms performed during these episodes demonstrated a sinus bradycardia in each instance, with a mean heart rate of 49 beats per minute. Two of the five patients have undergone pacemaker placement with improvement in symptoms, and a third is awaiting the procedure.

Conclusions: Gastric bypass surgery as a treatment modality for morbid obesity has been proven to result in significant weight loss and resolution of many co-morbidities characteristic of the Metabolic Syndrome. However, elevated vagal tone in those who do not demonstrate autonomic imbalance preoperatively may have detrimental consequences. We propose that the autonomic resetting enacted by such weight loss may result in unanticipated bradycardia in those who do not have preoperative sympathetic predominance.

Bariatric Surgery–P076

NONCLOSURE OF DEFECTS DURING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Atul K Madan MD, Christopher W. Finell, MD, David S Tichansky MD, Craig A Ternovits MD, Raymond J Taddeucci MD, Section of Minimally Invasive Surgery, Department of Surgery, University of Tennessee Health Science Center, Memphis, TN

Introduction: Internal hernias have been described after laparoscopic Roux-en-Y gastric bypass (LRYGB). The worry of internal hernias has prompted recommendations of routine closure of defects during LRYGB by some surgeons. Our belief is that not all techniques require closure of defects. We hypothesize that non-closure of defects would not cause a sig-



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nificant clinically evident internal hernia rate.

Methods: All patients who were operated on between December 2002 and June 2005 were included in this study. The technique that was utilized included an antecolic, antegastric gastrojejunostomy, division of the omentum, a long jejunojunostomy performed with three staple lines, a short (less than 4 cm) division of the small bowel mesentery, and placement of the jejunojunostomy above the colon in the left upper quadrant. Clinical records were reviewed for reoperations.

Results: There were a total of 300 patients. Only one patient was reoperated on for suspected internal hernia. Adhesions causing anastomotic kinking were found. The anastomosis was revised. No internal hernia was noted in this patient. In the first 100 patients, 97% had complete 1 to 2.5 year follow-up. None had reoperation due to internal hernia.

Conclusions: Internals hernias are not common after this particular method of LRYGB. Before adopting routine closure, surgeons should consider their technique, follow-up, and incidence of internal hernias. Routine closure of these defects is not always necessary.

Bariatric Surgery-P077

5-YEAR EXPERIENCE WITH LAPAROSCOPIC GASTRIC BYPASS IN A PRE-PAID HEALTH CARE SYSTEM, Robert A Frankel MPA, John H Payne MD, Carlos A Weber MD, Mark S Yamamura MD, Kaiser Moanalua Medical Center, Honolulu, HI

INTRODUCTION: We reviewed 5-year outcomes of a multidisciplinary structured weight loss surgery program at Kaiser Hawaii.

METHODS: A retrospective analysis was conducted on 342 consecutive patients who underwent laparoscopic gastric bypass (LGBP) between May, 2000 and September, 2005. We weighed patients upon orientation, prior to surgery, and compiled the latest post-op weight data. Patients more than 12 months post-op were analyzed for weight loss (n=273). We reviewed the incidence of the following complications: anastomotic/staple-line leak, anastomotic stricture, incomplete gastric division, internal hernia, marginal ulcer, pulmonary embolism (PE) and death. We recorded conversions; tracked operative time and post-op length of stay for all patients in the group.

RESULTS: Mean pre-op BMI was 49.4 kg/m² (35-75). Average weight loss was 98 lbs (14.4%±7.99). Mean percent excess weight loss (EWL) was 58% after at least 1 year post-op (67±13.8%). Mean percent EWL was 69% for patients 12-24 months post-op, 62% for patients 25-36 months post-op, 59% at 37-48 months post-op, and 52% at 49-60 months post-op. Overall complications occurred in less than 20% of our patients. These included: anastomotic/staple-line leak 2.2%, anastomotic stricture 10%, incomplete gastric division 1%, internal hernia 2.2%, marginal ulcer 2.5%, and PE 1%. There was one early (<30 days) death and one late death. All major complications occurred in patients with a BMI>48 kg/m². Conversion rate was 1-2%. Average operative time and length of stay for the last 100 cases was 177 minutes and 4 post-op days respectively.

CONCLUSIONS: Laparoscopic gastric bypass is a procedure which can be performed safely with excellent weight loss results in a pre-paid, vertically integrated health care system. Our results are consistent with published outcomes obtained at high volume specialty centers.

Bariatric Surgery-P078

THE ECONOMIC IMPACT OF OBESITY ON THE NEW MEXICO ECONOMY, Eldo E Frezza MD, Bradley T Ewing PhD, Texas Tech University

Objective: We posit that obesity increases absenteeism; this lost productivity yields lost output, jobs, and income to the state of New Mexico through the economic multiplier. This study quantifies New Mexico's loss in jobs, income, and output attributable to obesity-related illnesses.

Materials and Methods: We constructed a regional economy model using input-output (I-O) analysis, which estimates margins and regional purchase coefficients (RPC). Margins refer to the prices of purchases made by final consumers (or households) of goods and services. RPC measures the percent of

spending from local suppliers. The data were obtained from IMPLAN to estimate a complete set of economic accounts. The lost work days are then converted to full-time job-equivalents, i.e., the "jobs" lost due to obesity, which are then entered into the IMPLAN model.

Results: Assuming a New Mexico obese worker has one more day of absence or other downtime per month than a normal weight worker, then we obtain the following results based on 2002 economic data. The state experiences a loss in total output of \$9.65 million per year. This loss is one measure of the economic impact of obesity on the New Mexico economy and takes into account both direct and secondary impacts. The loss represents how much more the economy would produce if these workers followed the average absence/downtime patterns of normal weight workers. To put the loss in perspective, the loss in potential output from obesity is equivalent to slightly more than \$500 per person and, in total, is about 1.8% of total Gross State Product.

Conclusion: To date, no study has specifically addressed to what extent obesity affects a local economy. Our results estimate lost jobs, income (in dollars), and output (in dollars) attributable to obesity-related illnesses in the state of New Mexico.

Bariatric Surgery-P079

WHO SEEKS BARIATRIC SURGERY? A COMPARISON OF PATIENT DEMOGRAPHICS, Eldo E Frezza MD, Bradley T Ewing PhD, Texas Tech University

Objective: The purpose of this study is to understand who the "customers" of bariatric surgery are and, in addition, to ascertain what type of background these people have.

Materials and Methods: We obtained and reviewed a sample of 150 patients in terms of their age, race, education level, employment status and occupation, and bariatric surgical choice. The analysis further lends itself to making inferences about the surgical choices of patients based on the broader region's West Texas and Eastern New Mexico population statistics.

Results: Of the patients reviewed, 87.5% were female, 62% were Caucasian, 28% were Hispanic, 4.5% were African American and 0.5% were Native American. Regarding educational level, 50% had a high school degree, 20% Bachelor's degree, 6% Associate's degree and 13% Master's degree. In terms of work, 82% were employed and only 10% were deemed homemakers. In terms of occupations, 32% were nurses, secretaries or managers, 4.5% were supervisors in companies and 3% were students. The highest number who sought surgery, 8% were 45-year-old patients. The next group was 4.5% with patients aged 30, 33, 39 and 43.

Conclusion: It is expected that the results will help us to eventually develop an economic model capable of evaluating the cost-effectiveness of obesity surgery as well as aid policy makers, health care professionals and organizations in making decisions about surgery provision.

The information from this study will be important to policy makers, health care professionals and organizations with respect to making better decisions regarding the provision of resources for bariatric surgery.

Bariatric Surgery-P080

CHOLECYSTECTOMY FOR ASYMPTOMATIC CHOLELITHIASIS IN MORBIDLY OBESE PATIENTS UNDERGOING WEIGHT REDUCTION SURGERY: IS IT NECESSARY? William D Fuller MD, Mohamed R Ali MD, Jason Rasmussen MD, University of California, Davis Medical Center

Background: Patients undergoing rapid weight loss following gastric bypass surgery are predisposed to cholelithiasis with a number of these patients progressing to develop gall stone related complications. Bile salt therapy has been shown to effectively reduce the incidence of gallstone formation in gastric bypass patients. The purpose of this study was to evaluate the natural history of patients undergoing gastric bypass with known asymptomatic cholelithiasis in whom prophylactic cholecystectomy was not performed at the time of surgery.

Methods: One hundred forty-four patient charts from a single year experience in gastric bypass surgery at UC Davis Medical

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Center were reviewed.

Patients undergoing gastric bypass surgery were routinely screened for cholelithiasis by ultrasound. Patients who did not have cholecystectomy were started on ursodiol at 300 mg p.o. t.i.d for six months.

Results: Thirteen males (9.0%) and 131 females (91%) underwent gastric bypass surgery. The mean BMI (kg/m²) was 46.03 (SD=6.5), mean weight 278 lbs (SD =44.4) and mean age was 43.10 years (SD=8.55). Thirteen of the 144 patients (9.0%) had asymptomatic cholelithiasis preoperatively but did not undergo cholecystectomy at the time of surgery. Of these patients one went on to develop symptoms necessitating cholecystectomy at up to one year followup. Nine patients (6.0%) had concurrent cholecystectomy and gastric bypass surgery. Comorbidities of our patient population included diabetes (14%), hypertension (48%), GERD (50%), dyslipidemia (35%), obstructive sleep apnea (31%), and musculoskeletal complaints (69%).

Conclusions: Gallstone related complications secondary to gastric bypass surgery are well-known. Our data suggests that it may not be absolutely indicated to perform prophylactic cholecystectomy at the time of gastric bypass surgery for asymptomatic cholelithiasis. We believe this phenomena needs to be further studied in a randomized control trial.

Bariatric Surgery–P081

GASTRIC BAND CONVERSION TO SIMPLIFIED LAP BYPASS. A 42 CASES SERIES, Almino C Ramos MD, Manoela Galvao MD, Andrey Carlo MD, Edwin G Canseco MD, Abel H Murakami MD, Marcus Lima MD, Manoel P Galvao Neto MD, Gastro Obeso Center, Sao Paulo, Brazil

INTRODUCTION: Adjustable Gastric band (AGB) is one of the effective surgical options to treat morbid obese patients. It's also the main bariatric procedure in some countries such Australia. Due to its restrictive manner, some patients such as the sweet eaters could not loose enough weight and some of them will need a revisional surgery. Our option in those patients is to convert the AGB in a Simplified Lap Bypass.

CONTENT; In a series of 1174 patients treated with AGB in a 5 years period, 152p (13%) had unsatisfactory weight loss. Among them 42 were converted to lap bypass. There was 32 (76%) females, the operative time varies between 105 to 198min (M = 125min).. Operative technique: the previous AGB porth incisions are used to access the abdominal cavity, the adhesions are taken down following the AGB catheter, the anterior fundoplication is opened until it reaches the his angle, the band is opened and removed, the dissection of the small curvature begins under the band location, then a gastroplasty over an boogie is done, the transit is than reconstructed with an calibrated (11-12mm) end to side stapled gastrojejunostomy and a antecolic Roux-an-Y bypass on the supra mesocolic space with 1,5m of alimentary limb and 80cm of biliopancreatic limb. A drain is usually left in place.

RESULTS; 4 (9,5%) patients had G-J stenosis treated with endoscopic balloon dilatation. No conversion, significant bleeding, leak or deaths happened in this series.

CONCLUSION: Converting failed AGB to lap bypass is a very useful and safe tool to achieve success in revisional bariatric surgery.

Bariatric Surgery–P082

PROSPECTIVE STUDY OF A NEW MODEL OF SILICONE BAND IN GASTROPLASTY, Almino C Ramos MD, Manoela Galvao MD, Andrey Carlo MD, Edwin G Canseco MD, Marcus Lima MD, Abel H Murakami MD, Manoel P Galvao Neto MD, Gastro Obeso Center, São Paulo, Brazil

INTRODUCTION; The banded gastroplasty with Roux and Y bypass, also called Vertical Banded Gastroplasty (VGB) or even by names of surgeons who design it like Drs Mal Fobi and Rafael Capella is one the options and standards to treat morbid obesity. In order to solve the lack of specifically design band to be applied on this surgery in Brazil, a new model of silicone band was design. This silicone band is adjustable to the diameter of gastroplasty and has its fabrication process controlled. AIM: Evaluate the initial results of new model of silicone band to be used in VGB.

CONTENTS: Between feb-03 and feb-04, 137 patients with lap VGB using the new silicone band were prospectively analyzed. 89 (65%) female with age range of 14-64 (M= 36,5y), BMI of 37-66 Kg/m² (M= 44 Kg/m²). The issues analyzed were divided between the surgical and the silicone ring ones. Operative technique: 5 trocars; His angle dissection; gastric small curvature dissection; vertical gastroplasty (5-6cm) between endo linear staplers; silicone band placement behind the gastroplasty with goldfinger 1cm above gastroplasty end; anterior closing of silicone band with Ethibond® 2-0 suture for a 6,2cm diameter over a 12mm boogie; the other technical steps follows the Roux and Y reconstruction.

RESULTS: No conversion or deaths occurred. The mean BMI goes from 44 to 28, 4 Kg/m². Surgical times varied from 50 to 154 min (M= 89 min), days in hospital were 1, 5-6d (M= 3d). Silicone band placement time varied between 55seg to 4min15seg (M=1min40seg), in 130 patients (94%) the ring placement was considered easy. Bypass complications were 3%. Re-operation was 0, 7%. No complications due to this new silicone band such as bleeding on dissection, band migration, slippage or intolerance due to vomiting happened.

CONCLUSIONS: this new silicone band to be used in VGB had demonstrated to be safe and effective on this prospective study

Bariatric Surgery–P083

UNUSUAL CAUSES OF VOMITING AFTER GASTRIC BYPASS, Alvaro I Garcia MD, Mohammed Kalan, Sriramanan Anandbabu M.B.B.S., M.S., Georgetown University and Orlando Regional Medical Center

We report 2 unusual cases of persistent vomiting after open Roux en Y Gastric Bypass. The cause of vomiting in each case was confirmed during re-operation. Simple corrective measures were instituted with relief of this symptom in each case. The first patient is a 28 y/o male with a BMI of 40 and who underwent an uncomplicated antecolic REYGBP. The patient presented complaining of intractable vomiting and severe abdominal pain. He had lost 40 pounds in weight. An upper endoscopy showed a patent gastrojejunostomy and a marginal ulcer. He was treated with PPI's with subsequent complete healing of the ulcer by endoscopy. He continued to have persistent vomiting and further work up with CT scans and Upper GI that showed no abnormalities. At around 20 weeks after surgery, another upper GI endoscopy, showed regurgitation of stagnant food from a ?blind pouch? near the gastrojejunostomy. Further questioning revealed a ?binge eating? pattern of behavior of the patient. The patient was re-explored. At laparotomy, he was noted to have a large, redundant and pendulous blind end of the jejunum, beyond the gastrojejunostomy. This elongated portion of the jejunum was divided with a GIA stapler at 1 cm from the gastrojejunostomy. His symptoms resolved after surgery and he continues to make an expected weight loss. The second patient is a 32 y/o female with a BMI of 42 . She underwent an uncomplicated retrocolic REYGBP and was discharged on POD #3. She presented 2 weeks later with intractable nausea and vomiting. She underwent a CT scan, upper GI contrast studies and an upper GI endoscopy. The studies were consistent with a significant narrowing of the Roux limb of the jejunum at the level of the transverse mesocolon, apparently caused by external compression. The patient was re-explored. At surgery, she was found to have a very tight, firm compression band in the transverse mesocolon opening that transmitted the roux limb of the jejunum. In addition, she was noted to have narrowing at a second site proximal to the entero-enterostomy, resulting from aggressive scarring in the mesocolon. A manual dilatation of the opening in the transverse colon was performed but was felt to be inadequate. An entero-enterostomy that bypassed the narrowed jejunum was fashioned. The patient noticed prompt resolution of symptoms and continued to lose weight satisfactorily.

Bariatric Surgery–P084

THE PROCEDURE OF MESH WRAPPING THE GASTRIC POUCH IN CADAVER STUDY, Ke Gong MD, Michel Gagner MD, Sergio Bardaro MD, Kazuki Ueda MD, Weill Medical College of Cornell University, Department of Surgery, New York, NY, USA.



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BACKGROUND: Of the most commonly offered surgical procedures, Roux-en-Y gastric bypass (RYGB) appears to offer the best long-term results. However 5-15% of patients will not achieve successful weight loss after RYGB. Factors such as a dilated gastric pouch or dilated gastrojejunal anastomosis can contribute to failed weight loss.

OBJECTIVE: To describe the surgical technique of wrapping the gastric pouch with a PTFE mesh to prevent gastric pouch dilatation.

METHODS: Three frozen cadavers underwent this procedure. They had a mean age of 86 years and a mean body weight of 110 kg corresponding to a mean BMI of 32.8 kg/m². We created a 20-30 ml gastric pouch and subsequently, the gastrojejunostomy was performed with a circular stapler. After the gastrojejunal anastomosis, the gastric pouch is wrapped with the mesh. The mesh size is 8 cm x12 cm. The mesh is cut as shown in figure 1. An avascular window of the small bowel mesentery proximal to the anastomosis is created using the harmonic scalpel without damaging the vascularization. The mesh is positioned through the window around the gastric pouch with the rough side against the pouch. Then, the linear stapler is used to fix the mesh. Finally, the mesentery window is closed with 3-0 silk sutures (figure 2).

RESULTS: The median operative time was 75 minutes. All the procedures were successfully completed without event. The gastric pouch, gastrojejunal anastomosis and the stump of the jejunum are all totally wrapped within the mesh. After fixing the mesh, it can not migrate because it is locked with the surrounding anatomical structures. No tissue and organs were damaged during the procedure.

CONCLUSION: This procedure of wrapping the gastric pouch was not difficult. The gastric pouch, gastrojejunal anastomosis and the stump of the jejunum are all totally wrapped within the mesh. It may be effective in the prevention of dilatation of the gastric pouch.



Bariatric Surgery–P085

THE ROLE OF ROUTINE UPPER GI STUDIES FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Jon C Gould MD, Michael J Garren MD, Valerie Boll RN, James Starling MD, University of Wisconsin

Introduction: Many bariatric surgeons routinely attain an upper GI series (UGI) post-operatively following laparoscopic Roux-en-Y gastric bypass. The purpose of this radiographic study is to evaluate for an anastomotic leak. The clinical benefit and sensitivity of routine radiographic evaluation of this anastomosis may be marginal compared to the associated costs.

Methods: Data was prospectively collected on 288 patients to undergo laparoscopic gastric bypass. All patients underwent dilute barium UGI on post-operative day (POD)#1. Two patients also underwent an additional UGI within the first 14 days post-op.

Results: Three patients developed a leak from the gastrojejunostomy at POD#2, 10, and 12. The patient with the leak diagnosed on POD#2 underwent a normal UGI on POD#1. Several hours following this negative study, this patient was explored due to ongoing pain and tachycardia. A gastrojejunostomy leak was identified and repaired. The two patients to present in a more delayed fashion both had normal post-op UGI's and were discharged home on POD#2. Both returned to the emergency room at a later date. One was taken straight to the operating room without a study secondary to diffuse peritoneal signs and clinical instability. The final patient underwent a second negative UGI and was laparoscopically explored due to a high clinical suspicion. A leaking gastrojejunostomy was identified and repaired in both. Post-op UGI sensitivity and specificity for a leak is 0% and 100% respectively. The overall cost associated with UGI in this study is \$80,000 (mean \$278/patient).

Conclusion: This data suggests that routine UGI following laparoscopic gastric bypass suffers from low sensitivity and significant cost. The only real change in clinical management

based on this test was a slight delay in operative intervention in one case. In our experience, UGI following routine laparoscopic gastric bypass is no longer indicated.

Bariatric Surgery–P086

PREGNANCY AFTER BARIATRIC SURGERY: WHEN IS IT SAFE? R Grinbaum MD, M Edwards MD, D. Jones MD, L Veglia RN, J Ellsmere MD, V Sanchez MD, B Schneider MD, Department of Surgery, Beth Israel Deaconess Medical Center, Boston MA

Background: Malnutrition and vitamin/mineral deficiencies after bariatric surgery may result in adverse maternal-fetal outcomes. We strongly emphasize to patients that they wait 18 months before considering pregnancy. The aim of this study was to estimate the incidence of pregnancy after lap band (LAGB) and gastric bypass (RYGB), and whether postponing pregnancy affected perinatal outcome.

Methods: Of 1663 bariatric procedures since 2000, we have identified by self report 16 pregnancies in 14 patients (5/724 (0.7%) RYGB, 6/853 (0.7%) laparoscopic RYGB, 3/86 (3.5%) LAGB). 5 patients are currently pregnant. Maternal-fetal outcomes of 11 pregnancies were retrospectively reviewed. Endpoints (percent excess weight loss (%EWL), pregnancy weight gain, time to pregnancy and maternal-fetal complications) were evaluated.

Results: Mean age (32yrs, 25-41), preoperative BMI (48kg/m², 39-72) and pre-pregnancy BMI (33kg/m², 23-51) were reviewed. Mean %EWL was 51% (range 9-92). 50% (7/14) had diabetes. All had resolution of diabetes prior to pregnancy with no occurrence of gestational diabetes. 83% (10/12) of pregnancies occurred in patients not using contraception. Mean weight gain was 6.2kg (-23 to 15). 50% had vaginal deliveries. Mean birth weight was 2327g (764-4345). Patient with complications (n=4) and without complications (n=7) had a mean time to pregnancy after bariatric surgery of 4.5 and 16.7 months, respectively. Complications included miscarriage (n=1), cervical incompetence (n=2), preeclampsia (n=1), macrosomia (n=1), prematurity (n=2) and necrotizing enterocolitis (n=1). Both patients with cervical incompetence had premature deliveries. One patient had a 23kg weight loss resulting in a miscarriage. Deficiencies in iron, B12 and folate occurred in 26%, 13% and 0%, respectively, without adverse outcomes. Patients with LAGB had less %EWL (p = 0.004) and earlier pregnancies (p = 0.024).

Conclusion: Pregnancy occurred more commonly and sooner after LAGB than gastric bypass. Pregnancy is usually uncomplicated. Adverse outcomes were more likely in early postoperative pregnancies. We now request that pregnancy be postponed 2-years and early contraception encouraged.

Bariatric Surgery–P087

DEMOGRAPHIC FEATURES OF PATIENTS CHOOSING ADJUSTABLE BAND AND BYPASS, Masanobu Hagiike MD, Sergey Lyass MD, Ritu Chopra MD, Scott A Cunneen MD, Theodore M Khalili MD, Edward H Phillips MD, Center for Bariatric and Minimally Invasive Surgery, Cedars-Sinai Medical Center, Los Angeles, California

Introduction: The decision between adjustable band and gastric bypass for weight loss is controversial. Both patients and physicians have bias and reasons for their preferences. Objective: Analyze the demographic data and characteristic of patients undergoing bariatric procedures in a large urban teaching center to evaluate possible differences in choice of procedure.

Participants: Consecutive patients undergoing laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic adjustable gastric band (LAGB) from 1999 to 2005. Data was collected and analyzed retrospectively.

Results: A total of 1445 patients underwent bariatric procedures (1132 LRYGB's and 313 LAGB's). There was no significant difference in gender distribution though there was a prevalence of females in both groups (F/M 878/254 for LRYGB vs. 230/83 for LAGB). LRYGB pts were younger than LAGB pts (43 +/- 11 vs. 46 +/- 13, respectively, p<0.001). LRYGB pts had higher BMI (49 +/- 7.3 (35-83) vs 46 +/- 7.3 (33-73), p<0.0001).



Caucasians were more likely to undergo LAGB vs LRYGB (83% vs 76%, $p=0.0062$), while Hispanic pts were more likely to have LRYGB (11% vs 6% $p=0.02$). The distribution of African Americans and Asians were similar in both groups (12% vs 10% $p=0.2$, and 1% vs. 1%, $p=NS$, respectively). The most common comorbid condition was joint degenerative disease (48% LRYGB and 43% LAGB). Other comorbidities included: hypertension (47% and 42%), sleep apnea (37% and 38%), gastroesophageal reflux disease (30% and 32%), diabetes (23% and 24%), asthma (10% and 9%) and coronary artery disease (CAD) (4% and 8%). In the LAGB group there was a significantly higher number of comorbidities per patient (mean 2.58 vs. 1.87, $p<0.001$). Logistic regression showed that advanced age and Caucasian race were significantly associated with LAGB. Conclusion: Younger patients with higher BMI are more likely to undergo LRYGB than LAGB. Older Caucasians are more likely to choose LAGB as a choice of bariatric procedure. The higher number of comorbidities in LAGB patients may represent physician and/or patient bias that the adjustable band is safer in ?sicker? patients.

Bariatric Surgery–P088

ACUTE GASTRIC REMNANT DILATATION AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Soo Hwa Han MD,

Stephen White MD, Kevin Patel MD, Erik Dutson MD, Darshni Vira BS, Douglas Russell BS, Amir Mehran MD, David Geffen School of Medicine at UCLA, Los Angeles, CA Section of Minimally Invasive and Bariatric Surgery

Background: Acute gastric remnant dilatation is a rare post-operative complication after laparoscopic roux-en-y gastric bypass (LRYGB). We report a case of gastric remnant dilatation following an uneventful LRYGB in a young type I diabetic female patient. She had never been diagnosed with autonomic neuropathy or gastroparesis pre-operatively. However, a post-operative upper gastrointestinal (UGI) study revealed severe hypomotility of the gastric remnant.

Methods: Retrospective review of our institution's experience with 600 LRYGB patients over the past 32 months revealed one case of acute gastric remnant dilatation following LRYGB. Results: The patient developed diarrhea, nausea and vomiting on post-operative day 5. She did not experience any abdominal pain and had intact sensorium. However, she remained persistently tachycardic and became severely acidotic to a pH of 7 despite aggressive fluid resuscitation and medical management of her diabetic ketoacidosis. A computed tomography (CT) scan of the abdomen was suggestive of acute gastric remnant dilatation. Exploratory laparoscopy confirmed the diagnosis. There was no evidence of anastomotic leak or stricture or distal bowel obstruction. A gastrostomy tube was placed for decompression and drainage of the gastric remnant. The patient became nauseated and vomited after the gastrostomy tube was clamped on post-operative day 7. An UGI study revealed severe hypomotility of the gastric remnant. Metoclopramide therapy was initiated and the patient was discharged home with the gastrostomy tube in place. Her symptoms abated over the next few weeks.

Conclusion: Gastric emptying is slow in approximately half of the patients with long-standing type I diabetes. However, only 20% of the affected patients may be symptomatic. This case raises questions as to whether there is a need to screen all long-term type I diabetic patients with a gastric emptying study pre-operatively and whether gastrostomy tube placement should become a routine part of the LRYGB in patients diagnosed with delayed gastric emptying.

Bariatric Surgery–P089

THE PARS FLACCIDA APPROACH IS A SAFE ALTERNATIVE TO THE PERIGASTRIC TECHNIQUE IN LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Soo Hwa Han MD,

Stephen White MD, Kevin Patel MD, Erik Dutson MD, Carlos Gracia MD, Darshni Vira BS, Douglas Russell BS, Lingchen Liao BS, Amir Mehran MD, David Geffen School of Medicine at UCLA, Los Angeles, CA Section of Minimally Invasive and Bariatric Surgery

Background: In laparoscopic roux-en-y gastric bypass (LRYGB), the creation of the gastric pouch has traditionally been performed via a perigastric approach, where a plane is

developed between the lesser curve and its mesentery. This can frequently be difficult and result in excessive bleeding. The pars flaccida technique may provide an easier and safer approach. The use of this technique, however, results in the transection of one of the gastric branches of the anterior nerve of Latarjet. The aim of this study was to confirm the safety of this practice.

Methods: From September 2004 to June 2005, 287 LRYGB were performed at our institution. Based on surgeons' preference, 157 subjects were operated using the pars flaccida technique and the rest were performed using the perigastric approach. The data for comorbidities, post-operative complications, readmissions and reoperations were collected retrospectively. The statistical analysis was rendered using the t-test. All patients had a minimum of 30 day follow-up period.

Results: The two groups were comparable in sex, age, body mass index, pre-operative comorbidities and post-operative complications. We did not identify any gastric remnant dilatation, dysphagia or lesser curve necrosis, which are known complications of highly selective vagotomy, in either group.

Conclusion: In LRYGB, the pars flaccida technique offers a safe alternative to the perigastric approach. Bariatric surgeons, however, should be familiar with both techniques as the former method may not be possible in all cases.

Bariatric Surgery–P090

THE IMPLEMENTATION OF A MULTIDISCIPLINARY BARIATRIC MEETING (MBM) FOR PROSPECTIVE HIGH RISK BARIATRIC SURGICAL PATIENTS: THE PROCESS AND ITS REWARDS, Shar Hashemi, MD,

Jessica Folek MD, Charles Choy MD, Heather F McMullen MD, Jeffrey M Nicastro MD, Gene F Coppa MD, Staten Island University Hospital, Staten Island, New York

INTRODUCTION: Surgery quality and outcomes is becoming an important marker in the fast growing segment of Bariatric Surgery. Since the creation of the National Institutes of Health's Longitudinal Assessment of Bariatric Surgery (LABS) in September 2003, a multidisciplinary approach to bariatric surgery has become increasingly accepted. We illustrate our rigorous evaluation of high risk patients interested in bariatric surgery and postoperative outcomes in the cases that were initially presented to the MBM.

METHODS: Records were reviewed for all bariatric operations performed at the Staten Island University Hospital between May 2003 and December 2004. Cases were characterized as high or low risk. High risk patients were referred to the MBMs. At the MBMs, a team of experts analyzed the each surgical option, the option to deny surgery, and the option to perform less invasive surgery along with need to perform further workup. Mortality, pre- and post-op Body Mass Index, patients' preference for an operation type, actual procedure performed, the reason for referral to MBM, the result of MBM, and the months to follow-up were the outcomes measures assessed.

RESULTS: 1200 bariatric operations have been performed since 1998. 295 patients underwent bariatric surgery during the 20-month period we reviewed. 27.50 % of patients were referred to the MBM. Within the MBM patient set, the bariatric operations performed included lap RYGB (35.8%), lap band (22.2%), DS (16.0%), and Revisional (11.1%). Average age was 45 and 41 for high risk and entire patients, respectively. Average age and BMI for MBM patients were 45 and 57, respectively. Average age and BMI for the 295 patients was 41 and 50, respectively. The MBM reasons included: 1. Cardiac (13.6%) 2. BMI only (56.8%) 3. Revision (14.8%), 4. Denied any surgery (6.25%) 5. Less invasive surgery performed (12.3%) 6. Less invasive surgery recommended (13.6%). Peri-operative mortality rate is 0%.

CONCLUSIONS: 1. The greatest morbidity and mortality were in the super-morbidly obese (BMI>55) and those undergoing surgery.

2. A team that performs morbid obesity surgery must be composed of experts from the disciplines of surgery, nutrition, psychology, anesthesia, nursing, cardiology, pulmonary, and gastroenterology.

3. The institution of a Multidisciplinary Bariatric Meeting results in a 0% perioperative mortality.



POSTER ABSTRACTS

Bariatric Surgery-P091

LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING: THE GOOD & THE BAD, Liam Haveran DO, Joshua Felsher MD, Vera Freeman MD, Donald Czerniach MD, Richard Perugini MD, Demetrius Litwin MD, John Kelly MD, UMASS Memorial Medical Center

Introduction: Laparoscopic adjustable gastric banding (LAGB) is the most performed and preferred operation for surgically induced weight loss outside of this country. LAGB is becoming more popular in this country, but to date, there is a paucity of data in the American literature. We have previously described our initial results with LAGB, demonstrating 38% EBWL at one year and 45% at two years. Overshadowed by this early data was a subset of the population whose postoperative course was less successful. We present our series of patients undergoing LAGB, focusing on those patients with poor weight loss and those lost to follow-up.

Methods: We performed a retrospective analysis of data on all patients who underwent LAGB at our institution from October 2001 through July 2005. All patients qualified for bariatric surgery according to NIH consensus guidelines.

Results: One hundred and eighty patients underwent LAGB during the study period. There were 145 females (80%). The average age and Body Mass Index (BMI) were 47 ± 11.1 years (range 20-76), and 44 ± 5.6 kg/m² (range 35-64), respectively. There were no mortalities, nor conversions to open band placement. Post-operative complications occurred in 17 (9.4%) patients, including major complications in 10 patients (5.6%) and minor complications in 7 (3.9%) patients. Mean percent excess body weight loss (%EBWL) at 6, 12, 18, 24, and 36 months were $24.9 \pm 10.4\%$ (n = 130), $34.6 \pm 12.9\%$ (n = 86), $39 \pm 14\%$ (n = 43), $44.3 \pm 18.9\%$ (n = 26) and $44.1 \pm 25\%$ (n = 12), respectively. There were 5 conversions to laparoscopic gastric bypass. Poor weight loss was seen in 18 of 130 (13.8%) patients at 6 months postoperatively, 9 of 86 (10.4%) patients one year postoperatively and 4 of 26 (15.4%) patients two years postoperatively. Finally, 30 (19.4%) patients undergoing LAGB were lost to follow-up during their postoperative course.

Conclusions: Laparoscopic adjustable gastric banding is a safe and effective bariatric procedure resulting in significant weight loss with low morbidity. However, the marked weight loss realized in a majority of the patient population may overshadow poor weight loss and follow-up in a small, but significant minority. Further research is needed to establish the long-term efficacy of LAGB.

Bariatric Surgery-P092

VISUALLY ASSESSING THE LIVER AT SURGERY RELIABLY PREDICTS BUT DOES NOT EXCLUDE SEVERE LIVER DISEASE IN PATIENTS UNDERGOING BARIATRIC SURGERY, Thomas Hirai MD, Timothy Lapham MD, Hazem Elariny MD, Oscar Chan MD, Zobair Younossi MD, Department of Surgery, Inova Fairfax Hospital, Falls Church, VA

Purpose: To assess whether a hepatic visual assessment score (HVAS) is useful in predicting hepatic pathology in morbidly obese patients undergoing bariatric surgery.

Methods: Study design: Prospective collection of HVAS with retrospective review of pathology. 117 consecutive patients undergoing laparoscopic bariatric surgery with liver biopsy received a score using our HVAS. The HVAS took into consideration the size, color, texture, fullness/thickness, and firmness of the liver. Each of these factors was graded from 1 to 5. The liver surface was evaluated for the presence of leukoplakia or surface neovascularity (1 if present). Thus, the HVAS ranged from 5 to 27, and was categorized as mild (5-10), moderate (11-14) or severe (15-27). Biopsy changes were considered mild if not more than two of the following were found on histology: mild steatosis, mild NASH or mild fibrosis. Fisher's exact test was performed to test for significant associations between histology and three categories of the HVAS. P-values < 0.05 were considered statistically significant.

Results: The average age was 43 ± 11 years. The mean BMI was 47.9 ± 9 . 83% were females. Steatosis was present in 83% of patients (49% moderate or severe). NASH was present in 56% of patients, and cirrhosis or bridging fibrosis in 6%. There

was a statistically significant association between the HVAS and histology (p=0.0015). None of the subjects with a severe HVAS had a normal biopsy. Although severe HVAS and severe pathology correlated statistically, only 11% of moderate cases and 25% of mild cases actually had a normal biopsy. The negative predictive value of a mild HVAS to exclude moderate to severe disease was only 47.8% (less valuable than flipping a coin). Conversely, the positive predictive value of a severe HVAS to predict moderate to severe disease was 94.4%.

Conclusions: Visually assessing the liver for disease (using our HVAS) accurately predicts severe histopathology, but is of no value in excluding moderate to severe disease. Therefore, liver biopsy is recommended routinely for all patients undergoing bariatric surgery.

Bariatric Surgery-P093

INSULIN-GLUCOSE METABOLISM IS NOT AFFECTED BY ROUX-LIMB LENGTH Ih-Ping Huang MD, Nana Gletsu PhD, Scott A Lynch MD, Thomas R Ziegler MD, Leena Khaitan MD, C. Daniel Smith MD, Edward Lin DO, Department of Surgery, Division of GI and General Surgery, Emory University School of Medicine, Atlanta, Georgia

INTRODUCTION: We have previously demonstrated that improvements in insulin-glucose metabolism following roux-en-Y gastric bypass (RYGB) is associated with reduction in C-reactive protein (CRP) levels, an acute phase protein produced primarily by hepatocytes. This study prospectively seeks to determine if such improvements are associated with the length of the roux-limb, which has important implications in determining the optimal procedure for patients with insulin-resistant diabetes undergoing weight-loss surgery.

METHODS: Twenty-eight patients with morbid obesity were enrolled in this General Clinical Research Center study at baseline, 1 month post-op and 6-months post-op. Along with CRP measurements, parameters derived from frequently-sampled IV glucose tolerance test were insulin-secretion, insulin-resistance, and HOMA-index (hepatic insulin sensitivity). These patients either had a 150-cm roux-limb (n=8) or a 100-cm roux-limb (n=20). Differences were compared with the student t-test and reported as mean \pm SEM.

RESULTS:

	0 month	1 month	6 months
HOMA (100cm)	3.42 ± 0.67	1.60 ± 0.25	$0.95 \pm 0.14^*$
HOMA (150cm)	3.11 ± 0.45	1.38 ± 0.26	$0.82 \pm 0.18^*$

* p<0.05

Although there were overall improvements, HOMA-index, insulin-secretion and insulin-resistance were virtually identical between patients with the 100-cm and 150-cm roux-limbs (p=NS) at every time point. Contrary to our hypothesis, patients with shorter roux-limbs manifested lower CRP levels than the longer roux-limb group at 6 months (0.24 ± 0.03 vs. 0.80 ± 0.18 , p<0.04).

CONCLUSIONS: Insulin-glucose metabolism does not appear to be affected by the length of the roux-limb. Whether the roux-limb affects insulin-resistant diabetes at all remains to be determined. The lower CRP levels associated with shorter roux-limb lengths suggest that a gut-liver interaction exists following intestinal malabsorption procedures.

Bariatric Surgery-P094

CRITICAL CARE ISSUES IN MORBIDLY OBESE: AN ANALYSIS OF PATIENTS EXPERIENCING MAJOR COMPLICATIONS FOLLOWING LAPAROSCOPIC GASTRIC BYPASS, Todd F Huzar MD, Bashar Fahoum MD, Piotr Gorecki MD, New York Methodist Hospital

Introduction: Efficacy and safety of operations for morbid obesity has been established. However, surgical weight reduction procedures carry a risk of perioperative morbidity and mortality.

Methods: 290 patients underwent laparoscopic gastric bypass at our institution between August 2001 and February 2005. A detailed, prospective analysis of patients who experienced major postoperative complications requiring early reoperations and intensive care was conducted.



Results: Seven patients experienced early major postoperative complications requiring emergent re-operation (2.4%).

Complications and hospital data are listed in the Table. Mean initial patient's BMI was 48.6 kg/m² (42-57). At the time of reoperations the mean APACHE II score was 15.7 (5-25). The mean time between the initial operations till re-operation was 20.6 hours. The mean time spent in the ICU was 14.4 days (4-34 days) and the mean hospital stay was 21.7 days (6-42). Mean return to normal activity was 35 days (15 -81 days).

There was no mortality in this series and no long term disability. In spite of complications, all patients were satisfied with their decision to undergo weight reduction surgery as declared at 6 to 12-month follow-up visits. ICU care issues will be analyzed.

Conclusions: Major complications following laparoscopic gastric bypass are infrequent but carry significant morbidity. Early detection of postoperative complication and its expedited and proper management are of essential in order to minimize further morbidity and avoid the mortality.

Discussion: Morbid Obesity has become major health issue in the United States over the last decade. Laparoscopic Gastric bypass surgery has become the mainstay of treatment, however, like any other surgical procedure, the complications can be rather serious. Complications such as GI bleeding and leaks are many laparoscopic bypass series. Patient care in the individuals in the critical care setting can be difficult and very demanding on the ICU.

Bariatric Surgery-P095

LIFE-SAVING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS

IN A SUPER MORBIDLY OBESE MALE, Richard K Inae MD, Christopher H Moon MD, John Payne MD, Kaiser Permanente, Tripler Army Medical Center, Honolulu, Hawaii 96859

The benefits of surgery for morbid obesity are well known. Although associated with a slightly longer operative time, the laparoscopic approach compared to the open approach is thought to have additional unique benefits such as a shorter hospital stay, decreased post-operative pain, earlier return to work, decreased wound infection, and decreased inflammatory reaction. We report a case of a 24 year-old super obese male, BMI 160, who required life-saving bariatric surgery. At age 21 he weighed 1250 pounds. Not only was his lifestyle severely hindered, his medical condition approached critical. He was admitted for aggressive monitored weight loss and treatment of his multiple comorbidities which included severe diabetes, uncontrolled hypertension, obstructive sleep apnea necessitating mechanical assistance, life-threatening lymphedema and recurrent cellulitis of his lower extremities. In a hospital setting he effectively lost 660 pounds, BMI 72, over the course of four years. At that time he underwent a laparoscopic roux-en-y gastric bypass. The procedure was performed in the standard fashion with five trocars placed: a 5mm subxiphoid port, a mid-line 10mm port 16.5 cm from the xiphoid, two 12mm ports in the right upper quadrant, and one 12mm port in the left upper quadrant. A 150 cm roux limb was created and anastomosed 20 cm distal to the ligament of Treitz. Post-operative recovery was uneventful with patient returned to monitored environment three days later. Since surgery he has lost an additional 150 lbs. His comorbidities improved with resolution of his diabetes. Effective treatment for morbid obesity entails a multidisciplinary approach. We conclude that in the super morbidly obese, a laparoscopic approach is not only feasible, but also provides greater surgical access to the abdominal contents. Surgical treatment was an integral part of alleviating his life threatening comorbidities.

Bariatric Surgery-P096

OUTPATIENT LAPAROSCOPIC GASTRIC BYPASS SURGERY,

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Objective: To analyze our initial institutional experience with "outpatient" (23 hour hold) laparoscopic gastric bypass surgery (LGB), and evaluate whether inpatient hospitalization following LGB is necessary.

Methods: The records of all patients undergoing outpatient LGB surgery during a 6 month period ending in May 2005 at our institution were reviewed. All LGB operations were performed by 1 team of surgeons with overall experience exceeding 1000 cases. Strict guidelines for patient selection were developed before starting the outpatient program. These guidelines included the following: BMI <55 in women, BMI <50 in men, age <50, no major comorbidities, residence within 60 miles of the medical center. Postoperatively, all patients were placed on an outpatient LGB dietary pathway. Patients were required to meet various criteria prior to release from the hospital. These criteria included normal hemodynamic parameters, adequate oral intake, sufficient ambulation, and adequate pain control. Data collected included demographics, operative time, estimated blood loss (EBL), length of stay, morbidity, mortality, and readmission rate.

Results: Our study group included 60 patients (mean age 40 years, mean BMI 46). The mean operative time for the group was 104 minutes and the mean EBL was 15 cc. 50 patients (83%) were successfully discharged within 23 hours of surgery. 8 patients (13%) stayed an extra day because of inadequate oral intake. 2 patients (3%) experienced postoperative hemorrhage requiring additional hospitalization. At the time of discharge, all patients no longer required injectable pain medication and were ambulating without difficulty. 1 patient (2%) was readmitted due to a postoperative small bowel obstruction. There were no deaths in the study group.

Conclusion: Outpatient LGB is a reasonable approach in carefully selected patients. A clearly defined postoperative dietary pathway and discharge criteria ensured that these patients are safely and expeditiously discharged.

Bariatric Surgery-P097

DRAIN-AMYLASE LEVELS REPLACING UPPER GI SERIES TO DETECT ANASTOMOTIC LEAKS AFTER GASTRIC BYPASS

SURGERY, Magued Khouzam MD, Sophia Lee MD, Steve Lee MD, Luke Wolfe MS, John Kellum MD, James Maher MD, Division of General Surgery, Minimally Invasive Surgery Center; Virginia Commonwealth University, Richmond, Virginia

INTRODUCTION: The use of contrast upper GI study to rule out anastomotic leaks after gastric bypass surgery is imperfect and is not without risks. We hypothesized that amylase levels from a juxta-anastomotic drain might be a sensitive way to detect leaks, even prior to their clinical manifestation.

METHODS: We reviewed the charts of all the patients who underwent gastric bypass surgery between 9/04 and 6/05. Only the patients who had drain-amylase levels checked were included in the study. Clinical data including tachycardia, pain, fever, abnormal physical exam, elevated WBC count, radiological evaluation and / or surgical exploration was used to diagnose the leaks.

RESULTS: Elevated levels of drain amylase were found to correlate consistently with anastomotic leaks. Fisher's Exact Test was used for statistical analysis. Drain amylase levels >400 U/L had a sensitivity of 100% and a specificity of 92.65% (p<0.0001) for leaks. Mean drain amylase level in patients with leaks was 6,822.1 U/L (range <31 U/L - 193,600.0 U/L)

	Amyl. <400 U/L	Amyl. >400 U/L	Total
No Leaks	63 Pt / 92.65%	5 Pt / 7.35%	68 Pt
Leaks	0 Pt / 0.00%	12 Pt / 100.00%	12 Pt
Total	63 Pt	17 Pt	80 Pt

CONCLUSION: The routine check of amylase levels from a juxta-anastomotic drain is a noninvasive, safe and sensitive test for the detection of anastomotic leaks after gastric bypass surgery and can replace the contrast upper GI study.

Bariatric Surgery-P098

PRE-OPERATIVE EGD MAY IDENTIFY PATIENTS AT RISK FOR MARGINAL ULCERATION FOLLOWING ROUX-EN-Y GASTRIC

BYPASS, Grace J Kim MD, Guillermo Garcia MD, Nicole M Fearing MD, Lillian S Kao MD, Philip L Leggett MD, The University of Texas-Houston Health Science Center



POSTER ABSTRACTS

Marginal ulcers have been reported to occur in between 1 to 16% of patients undergoing Roux-en-Y gastric bypass (RYGB), and they can be effectively treated with acid suppression. The objective of this study was to determine whether patients at a higher risk of developing a marginal ulcer after laparoscopic RYGB (LRYGB) could be identified pre-operatively. A retrospective review of a prospectively collected database of 65 consecutive patients undergoing LRYGB over a 14-month period at a single institution using a standardized technique with a stapled anastomosis was performed. Pre-operative EGDs were classified as normal if no pathology or a hiatal hernia without an inflammatory process was identified. EGDs were classified as abnormal if gastritis, esophagitis, or ulceration was identified. All patients underwent a pre-operative EGD, and all patients with symptoms of epigastric pain, vomiting or gastrointestinal bleeding over one month after LRYGB underwent a post-operative EGD. Univariate analysis using Fisher's exact test was performed to determine whether pre-operative EGD findings were associated with marginal ulceration. Twenty-two out of 65 consecutive LRYGB patients had complaints requiring a post-operative EGD, seventeen of whom were female. BMIs ranged from 37 to 70 (mean 48 ± 7.8). Of these patients requiring a postoperative EGD, 17% (11/65) had gastritis and 11% (7/65) had esophagitis pre-operatively. The overall incidence of symptomatic marginal ulcers among LRYGB patients was 17% (11/65). Of the 5 patients with normal pre-operative EGDs, 1 patient (20%) developed a marginal ulcer. Of the 17 patients with abnormal pre-operative EGDs, 10 patients (59%) developed a marginal ulcer ($P = 0.31$, Fisher's exact test). Patients with evidence of an inflammatory process on pre-operative EGD may have a higher risk of developing post-operative marginal ulceration. Further study should be performed to assess whether prophylactic treatment of patients with abnormal pre-operative EGDs with acid suppression reduces the incidence of post-operative marginal ulcer formation.

Bariatric Surgery-P099

LAPAROSCOPIC BARIATRIC SURGERY: WHAT ELSE ARE WE UNCOVERING? LIVER PATHOLOGY AND PREOPERATIVE INDICATORS OF ADVANCED LIVER DISEASE IN MORBIDLY OBESE PATIENTS UNDERGOING BARIATRIC SURGERY, Matthew Kroh MD, Rockson Liu MD, Bipan Chand MD, The Cleveland Clinic Foundation

Background: Nonalcoholic fatty liver disease (NAFLD) is the most common cause of chronic liver disease in the U.S., and obesity is the most common cause of NAFLD. The purpose of this study was to examine the incidence of NAFLD among morbidly obese patients undergoing bariatric surgery and to determine if advanced liver disease can be predicted by demographics, co-morbidities, and/or pre-operative biochemical profiles.

Methods: 135 non-consecutive patients (109 female, average age 46) with mean BMI 50 (SD 7.6) who underwent liver biopsies during bariatric surgery were studied. Patient data including age, BMI, co-morbidities, and preoperative liver function tests were analyzed against liver biopsy pathology. Patients with known preoperative liver disease were excluded from the group analyzed.

Results: 87% of patients had abnormal liver biopsy results; with 60% demonstrating steatosis and 27% advanced liver disease (7% steatohepatitis, 16% fibrosis, and 4% cirrhosis). Patients were grouped according to liver biopsy pathology. Group A included patients with normal results or steatosis and Group B included those patients with steatohepatitis, fibrosis, or cirrhosis. Of 37 patients in Group B, 27% had abnormal pre-operative liver function tests compared to 10% of patients in Group A ($p < 0.02$). Patients in Group B were more likely to have hyperlipidemia ($p < 0.02$) and a significantly higher BMI ($p < 0.04$). Diabetes, male gender, and age did not predict advanced liver disease.

Conclusion: Abnormal liver pathology is common in the morbidly obese population. In our group, more than one-quarter of morbidly obese patients undergoing bariatric surgery have advanced liver disease. Patients with abnormal preoperative liver function tests, hyperlipidemia, and increased BMI should heighten the surgeons' awareness of possibly advanced liver disease.

Bariatric Surgery-P100

OUTCOMES IN LAPAROSCOPIC REVISIONAL BARIATRIC SURGERY, Pratibha B Lal MD, Jay C Long MD, Sheilendra S Mehta MD, Garth Davis MD, Robert Davis MD, Patrick R Reardon MD, The Methodist Hospital

Introduction: The rate of revision for any type of bariatric surgery is reportedly between 10 to 25%. Reoperative bariatric surgery is technically challenging and; therefore, more often performed as an open procedure. The purpose of this study is to review outcomes in laparoscopic revisional bariatric surgery.

Methods: A retrospective review of laparoscopic revisional cases performed during June 2002 to August 2005 was performed. Data extracted include: primary operation, patient demographics (age, gender, BMI), intraoperative complications, operative time, postoperative length of stay (poLOS), and postoperative complications.

Results: A total of 85 laparoscopic bariatric cases were performed. 31(36.5%) of the cases were revisional. Primary operations included: vertical-banded gastroplasty(VBG)(17), Nissen fundoplication (5), Molina band (7), Roux-En-Y-gastric bypass(RYGB)(1), and horizontal gastroplasty(1). The primary bariatric procedures were converted to a RYGB except for one case where the Molina band was simply removed and a second case where a gastro-gastric fistula was divided following a RYGB. In the group of patients that had a VBG converted to RYGB, mean age was 45, BMI 41.3, OR time 461 minutes, and poLOS 2.3 days. In the group of patients that had a Nissen converted to RYGB, mean age was 41, BMI 37.3, OR time 382, and poLOS 2.2 days. In the group of patients that had a Molina band converted to RYGB, mean age was 47, BMI 46.7, OR time 380 minutes, and poLOS was 3.33 days. Overall, there were no conversions to open, no major intra-operative complications, and no mortalities. In the group of patients that had a Molina band converted to RYGB, there was one gastric remnant leak and one postoperative small bowel obstruction due to incarcerated ventral incisional hernia. Both cases required emergency reoperation.

Conclusion: Despite technical difficulty and longer operative times, laparoscopic revisional bariatric surgery is feasible. PoLOS times are considerably shorter than open procedures, with less wound complications.

Bariatric Surgery-P101

THE RELATIONSHIP BETWEEN PREEXISTING COMORBIDITIES AND PERIOPERATIVE COMPLICATIONS INCLUDING WEIGHT LOSS AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS(LRYGBP) : A SERIES OF 520 PATIENTS, Hongchan Lee MD, Christine Te MD, Julio A Teixeira MD, Division of Bariatric Surgery, Department of Surgery, St. Luke's-Roosevelt Hospital Center, NY,USA

Background; LRYGBP has been proven to be safe and effective option in the treatment of clinically severe obesity. However, specific preexisting comorbidities(e.g. Diabetes, Hypertension, Arthritis/Lower Back Pain, Obstructive Sleep Apnea, Pulmonary disease,etc.) have not been studied with regards to their significance on perioperative complications as well as weight loss.

Aim; To examine the impact of preexisting comorbidities independently and/or in combination, on the incidence of perioperative complications and follow-up weight loss after LRYGBP. **Methods;** 520 consecutive patients were examined on preexisting comorbidities and percent of excess body weight loss(%EBWL) at 1-2-year after LRYGBP. The patients were divided into single group (one preexisting comorbidity) or multiple combination groups (>two preexisting comorbidities). Each group was compared to a control group with no preexisting comorbidity group. The data was prospectively collected and retrospectively analyzed using logistic regression and Student's t-test.

Results; 28(5.3%) patients had perioperative complications (small bowel obstruction, gastric distention, stricture, leak, bleeding, etc). Some patients had more than 1 complication. The most common single and multiple combined preexisting comorbidities were Arthritis/LBP (n=135, 20.6%) and Arthritis/Pulmonary Disease (n=26, 5%), respectively. 1- and 2-



year weight loss follow-up data were available for 226 cases(43%) and 63 cases(12%), respectively. Multivariate analysis by logistic regression showed there was no association between preexisting comorbidities and perioperative complications(odds ratio=1.37; 95% confidence interval, 0.46-4.05; p=0.57). Student's t-test of 1- and 2- years %EBWL between those with comorbidities and the control group also showed no statistical significance (p=0.1).

Conclusion; Preexisting comorbidities independently do not adversely impact outcomes after LRYGBP. In addition, the cumulative effect of multiple comorbidities do not have an association with worse outcomes.

Bariatric Surgery-P102

SURGICAL COMPLICATIONS IN BARIATRIC PATIENTS: WHAT THE GENERAL SURGEON SHOULD KNOW., Sergey Lyass MD,

Scott A Cunneen MD, Michael Feizbakhsh MD, Masanobu Hagiike MD, Nishi K Gregg MD, Edward H Phillips MD, Theodore M Khalili MD, Center for Minimally Invasive and Bariatric Surgery, Cedar-Sinai Medical Center, Los Angeles, CA

The number of bariatric procedures performed in the USA increased from 100,000 in 2003 to an estimated 200,000 in 2005. The total number of bariatric patients will soon exceed 1 million. Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) and Laparoscopic Adjustable Gastric Banding (LAGB) are the most common bariatric procedures performed. Surgical morbidity in bariatric patients ranges from 5 to 25%. A substantial portion of complications occur after the patient is discharged from the hospital. The general surgeon is often the first physician to evaluate the patient for complications following discharge.

Objective: The aim of the study was to analyze common surgical complications following discharge after weight reduction surgery.

Methods: Early and late surgical complications were analyzed in consecutive patients who underwent LRYGB and/or LAGB in a single institution from December 1999 to August 2005. The data was collected concurrently in a computerized database and analyzed retrospectively.

Results. 1138 LRYGB's and 309 LAGB's were performed during the study period. The overall surgical morbidity was 6.5% (n=74) for LRYGB. 41 (55%) of the 74 patients with complications in the LRYGB group had been discharged and were readmitted for the treatment. In these patients 10 (0.9%) had a SBO, 4 (0.35%) developed a leak from the gastro-jejunosomy, and 4 patients (0.4%) had intra-peritoneal or gastro-intestinal hemorrhage. Gastro-gastric fistula, marginal ulcers and anastomotic stricture occurred in 8 (0.7%), 5 (0.44%) and 3 (0.3%) patients respectively. 21 (62%) of these patients required surgical intervention. Gallstones developed in 7 patients and 3 of them underwent cholecystectomy. The major surgical morbidity after LAGB was 8.7% (n=27). Morbidity after LAGB included band slippage in 14 (4.5%), band obstructions in 4 (1.3%), and erosion in 3 (1%) patients. All these patients required reoperation. Cholecystectomy was performed in 3 patients with gallstones. There was no mortality associated with these complications in both groups.

Conclusions. Surgical complications after bariatric surgery, although uncommon, may lead to serious consequences. Patient may potentially present to another institution for management and general surgeons should know how to diagnose and manage these complications.

Bariatric Surgery-P103

THE EFFECT OF PREOPERATIVE KNOWLEDGE ON WEIGHT LOSS AFTER LAPAROSCOPIC GASTRIC BYPASS, Atul K

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Introduction: Gastric bypass surgery has been demonstrated to be effective treatment for morbid obesity. Unfortunately, not all patients have the same weight loss after surgery. It may be that the more informed patients will have more weight loss than those less informed patients. No study has investigated the relationship between initial preoperative knowledge and weight loss after laparoscopic gastric bypass surgery.

Methods: All patients who underwent laparoscopic gastric bypass for a 6 month period were included in this study. Our preoperative education process includes a 21 question true/false test given at the appointment immediately before surgery. Patients repeat the test until all questions are answered correctly. We compared percentage of excess body weight loss (EBWL) between patients who correctly answered all the questions the first time (pass patients) and patients who did not correctly answer all the questions the first time (fail patients).

Results: There were 104 patients involved in this study; although complete data were only available on 98 patients. The average preoperative body mass index was 48 kg/m². 48% of patients answered all the questions correctly for the first time. Follow-up ranged from 1 to 2 years on all 98 patients. Pass patients had an average of 73% EBWL, while fail patients had an average of 76% EBWL (p = NS).

Conclusions: Preoperative knowledge, assessed by a test, did not predict success after laparoscopic gastric bypass surgery. Patients who do not, at first, have full knowledge of bariatric surgery should not be discriminated against undergoing surgery if they are eventually properly educated.

Bariatric Surgery-P104

ARE AFRICAN-AMERICANS AS SUCCESSFUL AS CAUCASIANS AFTER LAPAROSCOPIC GASTRIC BYPASS? Atul K

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Introduction: Laparoscopic gastric bypass (LGB) has been demonstrated to provide weight loss comparable to open gastric bypass. It has been suggested that African-Americans (AA) are not as successful as Caucasians (CA) after bariatric surgery. Our hypothesis was that AA are just as successful in CA after LGB.

Methods: A retrospective chart review was performed on all African-American (AA) and Caucasian (CA) patients who underwent LGB for a 6 month period. Success after LGB [defined as (1) 25% loss of preoperative weight, (2) 50% excess body weight loss (EBWL), or (3) weight loss to within 50% ideal body weight] was compared by ethnicity.

Results: 102 patients were included in this study. 97 patients (30 AA patients and 67 CA patients) had at least one year follow-up data available. Preoperative data did not differ between both groups. There was a statistically significant difference in percentage of EBWL between AA and CA (66% versus 74%; p < 0.05). However, there was no ethnic difference in the percentage of patients with successful weight loss (as defined by any of the above three criteria). Furthermore, there was no statistical difference between the percentages of AA and CA patients who had improved or resolved diabetes and hypertension.

Conclusions: LGB offers good weight loss in all patients. While there may be more percentage of EBWL in CA patients, no ethnic difference in successful weight loss exists. More importantly, comorbidities improve or resolve in the equally between AA and CA patients. LGB should be considered successful in AA patients.

Bariatric Surgery-P105

LAPAROSCOPIC RETROCOLIC ROUX-EN-Y GASTRIC BYPASS

IN PATIENTS WITH BMI > 60KG/M², C A McCloskey MD, I Raftopoulos MD, G I Padovan MD, A P Courcoulas MD, University of Pittsburgh Medical Center

INTRODUCTION: Roux-en-Y gastric bypass (RYGBP) is a commonly performed operation for morbid obesity. The laparoscopic approach to RYGBP has gained widespread acceptance due to its benefits of reduced pain, improved postoperative pulmonary function, and reduced recovery time. However, it has been suggested that the complication rate is higher when laparoscopic Roux-en-Y gastric bypass (LRYGBP) is performed in patients with a BMI>60kg/m². This proposed increase in complication rates, as well as concern for increased technical difficulty in these patients has led some surgeons to favor a two-stage approach. We report our series of patients with a



POSTER ABSTRACTS

BMI>60 in which a LRYGBP was performed in retrocolic fashion with a low rate of postoperative complications.

METHODS: Retrospective analysis was performed on a single university bariatric surgery group database from 01/01/2004-03/15/2005 to identify those patients with a BMI>60 who underwent LRYGBP. Relevant data was prospectively recorded. Those cases that were converted to open surgery were not included. In all patients the Roux limb was performed in the retrocolic fashion.

RESULTS: Of 43 patients with a BMI>60 who underwent LRYGBP, 83.4% were female with a mean age of 40.2 (16-54), median BMI of 64.5kg/m² (60-78.9) and a total co-morbidity mean of 4.7 (2-9). Twenty-three patients had one or more additional procedures; 3 cholecystectomy (6.9%), 5 hernia repair (11.6%), 4 liver biopsy (9.3%), 11 adhesiolysis (25.5%), and combination of cholecystectomy and hernia repair in 2 (4.6%). There were no perioperative deaths and only 3 perioperative complications in the form of: 1 grade I liver laceration, 1 negative laparoscopic re-exploration on postoperative day 2, and 1 port site breakdown. Mean operating time was 3:37 (1:41-5:42). Mean length of stay was 3.5 days.

CONCLUSIONS: Our series suggests that laparoscopic Roux-en-Y gastric bypass is feasible in super-obese patients with a BMI>60, with acceptable morbidity. Given the technical challenges in this group of patients due to a frequently foreshortened jejunal mesentery and dense omentum, we feel that constructing the Roux limb in the retrocolic plane increases the chance of successfully performing this procedure laparoscopically and minimizes tension on the anastomosis. Accomplishing the operation in one stage is efficient and avoids the cost and morbidity associated with a second procedure.

Bariatric Surgery-P106

LAPAROSCOPIC VBG TO ROUX-EN-Y GASTRIC BYPASS REVISIONAL SURGERY, Sheelendra S Mehta, Jay C Long, Pratibha B Lal, Garth Davis, Robert Davis, Patrick R Reardon, The Methodist Hospital, Houston, Texas

INTRODUCTION: While vertical banded gastroplasty(VBG) was a common weight loss procedure in the past, most bariatric surgeons have abandoned the procedure for other operations primarily due to high rate of complications and failures. These complications include dilatation of the gastric pouch, obstruction, reflux, band erosion and inadequate weight loss. We believe that conversion to a Roux-en-y gastric bypass(RYGB) is the procedure of choice in these patients. While this conversion is widely accepted, there is very limited experience with the procedure being performed laparoscopically.

METHODS: A retrospective analysis of our experience with 16 consecutive patients over a 4 year period between 2002 and 2005 was carried out for patients who underwent a laparoscopic conversion of a VBG to RYGB. Based on our review of the current literature, this analysis represents the largest single series of laparoscopic VBG to RYGB conversions. The primary reason for re-operation included inadequate weight loss, gastroesophageal reflux, and symptoms of pain and vomiting.

RESULTS: The mean OP time was 451+/-95min, EBL183+/-175cc, and LOS 2.4+/-0.6 days. The mean preop BMI was 42+/-9. The average wt loss was 48+/-21(n=12) and 64+/-33lbs(n=3), at 6mos and 18 mos, respectively. All operations were completed successfully without open conversion. The average hospital stay was comparable to first time bariatric surgery patients. There was a universal improvement in the symptoms of pain and vomiting, and 81% had resolution of GERD.

CONCLUSION: Based on this review, a laparoscopic approach to VBG to RYGB revisional surgery provides a comparable result to the open procedure. Furthermore, this approach provides all the advantages of minimally invasive surgery such as quicker recovery with a decreased hospital stay and rapid return to normal activity. In addition this approach mimimizes all the wound complications seen in the open procedure.

Bariatric Surgery-P107

TRANSGASTRIC ANVIL PLACEMENT REDUCES PORT-SITE INFECTION IN LAPAROSCOPIC GASTRIC BYPASS, John E Meilahn MD, Laurie S White, Victoria Frain RN, Temple University School of Medicine, Philadelphia, PA

Introduction: The use of a circular stapler for the gastrojejunostomy in laparoscopic gastric bypass requires anvil delivery either by the trans-oral or by the trans-gastric route. Port-site infections are reported in 4% to 10% of trans-oral placements. We investigated the use of trans-gastric 21 mm anvil placement in laparoscopic gastric bypass, and its effect on reduction of port-site infection rates.

Methods: Laparoscopic gastric bypass was performed on 193 patients (176 female, 17 male). Mean BMI was 48.4 (range 39.0 to 69.1). Cefazolin (2 grams IV) was given immediately before surgery. All gastrojejunostomies were constructed using a 21 mm circular stapler (Ethicon ECS21). After the first horizontal application of a linear stapler (Ethicon 45 mm) on the lesser curvature for pouch formation, the Harmonic scalpel (Ethicon) was used to make an opening into the pouch immediately below the horizontal staple line, and then used to make a gastrotomy on the anterior left stomach. The 21 mm anvil, with an attached suture, was placed within the cardia via the gastrotomy. A 5 mm articulator (Jarit 600-580) was placed in the gastric pouch opening to retrieve the suture and the anvil, which was pulled into position. Vertical linear stapling then completed pouch formation. The Roux limb was approximated (170 were retrocolic, retrogastric) and the 21 mm circular stapler was inserted via the left upper quadrant port site. Methylene blue dye testing then confirmed staple line integrity. The left gastrotomy was closed with two firings of the linear stapler.

Results: Staple line integrity was confirmed in all cases, with no air or blue dye leakage. Water-soluble contrast studies on the first postop day were done in all cases, and did not show any leakage, but one patient leaked on the second postop day and required a laparotomy for repair. Bleeding from the stapled gastrotomy closure did require reoperation in one patient. There was one right-sided port site infection, but there were no cases of infection at the left upper quadrant stapler insertion port site. There were no intraabdominal abscesses, and there was no mortality.

Conclusion: The trans-gastric route for 21 mm circular stapler anvil delivery markedly reduces infection rates at the stapler insertion port site, compared with reported infection rates using the trans-oral route.

Bariatric Surgery-P108

THE USE OF CLOSED SUCTION DRAINS IN DIAGNOSIS AND MANAGEMENT OF STAPLE LINE LEAKS IN BARIATRIC SURGERY, Ragui Sadek MD, Angela Shen MD, Victor Moon MD, Sanam Ahmed MD, Heather McMullen MD, Jeffrey Nicastro MD, Gene F Coppa MD, Staten Island University Hospital, Staten Island, NY

BACKGROUND: Gastrointestinal leakage is a serious complication of bariatric surgery. Early postoperative upper gastrointestinal (UGI) series has been used to determine the presence of leaks, but they have been unreliable in detecting them in our patient population. Closed suction drains (CSD) placed intraoperatively may provide more accurate information in the detection of postbariatric surgery staple line leak.

METHODS: Retrospective chart review of 216 consecutive bariatric patients was performed from May 1, 2003 to June 30, 2004. There were 67 men and 149 women. The average preoperative body mass index (BMI) was 50.3. Each patient had an UGI study on postoperative day 1. Routine clinical monitoring was performed during hospitalization, as was the nature of CSD. Correlation between onset of clinical signs/symptoms and the character of CSD was studied.

RESULTS: Four of 216 patients (1.9%) were determined to have leaked based on the presence of purulent CSD, elevated white cell count, and tachycardia. Two of the four patients had fever. None of these patients had leakage demonstrated on UGI. All patients were treated non-operatively with bowel rest, total parenteral nutrition (TPN) and intravenous antibiotics with resolution of their symptoms.

CONCLUSION: Early detection of gastrointestinal leakage is crucial in the successful management of bariatric surgical patients. Routine negative postoperative UGI does not exclude the presence of gastrointestinal leakage. Purulent CSD, leukocytosis, tachycardia, and fever were the main determinants of leakage. UGI should be reserved for patients with these signs of leakage.



Bariatric Surgery–P109

A COMPARISON OF OUTCOMES AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS IN AFRICAN-AMERICANS AND CAUCASIANS, Manish S Parikh MD, Dinee W Collings BA, Helen G Lo BA, George A Fielding MD, Christine J Ren MD, New York University School of Medicine

Race may affect outcomes after bariatric surgery. This study compares outcomes in terms of weight loss and comorbidity resolution between African-Americans (AA) and Caucasians (C) after laparoscopic Roux-en-Y gastric bypass (RYGB).

Data from all patients undergoing RYGB between October 2000 and July 2004 was prospectively collected and entered into an electronic registry. Propensity score matching analysis was used to match Caucasians to African-Americans, based on age, gender and pre-op body mass index (BMI). Pre-op comorbidities (diabetes, hypertension, obstructive sleep apnea, hypercholesterolemia and hypertriglyceridemia) were compared. Operative (OR) time, length of stay (LOS), comorbidity resolution and percent excess weight loss (%EWL) were compared.

36 AA RYGB patients were matched to 29 C RYGB patients. The pre-op mean (+/- sd) age and BMI were 38 years [25 ? 45 years] and 48 +/- 7kg/m², respectively. 58% of the AA group and 59% of the C group had 1 or more comorbidities (p = NS). Median OR time and LOS were similar in both groups: 130 minutes and 72 hours, respectively. Both groups had improvement or resolution of all comorbidities. %EWL is listed in the table below:

	1 year	2 year	3 year
AA %EWL	59.5 +/- 17.9	64.5 +/- 15.2	66.6 +/- 15.2
C %EWL	64.9 +/- 18.9	64.4 +/- 27.6	61.6 +/- 20.3
p-value	NS	NS	NS

We did not find a significant difference in outcomes after RYGB between African-Americans and Caucasians.

Bariatric Surgery–P110

DOES THE PRESENCE OF ASYMPTOMATIC CHOLELITHIASIS PREOPERATIVELY PREDICT THE DEVELOPMENT OF CHOLECYSTITIS IN THE WEIGHT LOSS PERIOD FOLLOWING BARIATRIC SURGERY?, Alexander Perez (1) MD, John R Romanelli (1) MD, Jane Garb (1) MS, Aron L Gornish (2) MD,

(1) Department of Surgery, Tufts University School of Medicine, Baystate Medical Center, Springfield, MA (2) Atlantic Surgical Group, P.A., Oakhurst, NJ

INTRODUCTION: Morbid obesity alone and rapid weight loss are risks for the development of cholelithiasis. Typically, patients who are found to have cholelithiasis prior to bariatric surgery undergo concomitant cholecystectomy. Furthermore, patients who do not have cholelithiasis preoperatively often are managed on ursodiol postoperatively to help decrease the formation of cholelithiasis during the weight loss period. Unfortunately, compliance with ursodiol therapy is poor. Laparoscopic cholecystectomy, when combined with laparoscopic Roux-en-Y gastric bypass, significantly increases operative time and hospital length of stay. The purpose of this study was to see if preoperative asymptomatic cholelithiasis was a predictor for the development of cholecystitis during the weight loss period.

METHODS: The study was a retrospective review conducted on 143 patients who underwent gastric bypass surgery at a single institution by a single surgeon from February, 2002 to November, 2004. All patients underwent ultrasonography preoperatively to determine the presence of cholelithiasis. Patients who suffered from symptomatic disease underwent concomitant cholecystectomy. The remainder of patients was observed postoperatively without ursodiol therapy with follow-up ranging from 6 months to three years.

RESULTS: Of 143 patients to undergo gastric bypass surgery, 2 died in the initial postoperative period from non-surgical causes. 29/141 (20.6%) had prior cholecystectomies. Of the remaining 112 patients, 25 (22.3%) had cholelithiasis and 3 (2.7%) had biliary sludge preoperatively. 84/112 (75.0%) patients had normal sonograms. Of the 28 patients with cholelithiasis or

sludge, 5 (17.9%) had symptoms of biliary colic or prior episodes of acute cholecystitis and underwent cholecystectomy at the time of their gastric bypass. In the population of patients with normal ultrasounds, 8/84 (9.5%) developed cholecystitis, biliary colic, or biliary dyskinesia and required cholecystectomy during the weight loss period. Of the remaining 23 patients with abnormal ultrasounds, only 1/23 (4.3%) went on to develop biliary colic that required cholecystectomy (p=0.71). The positive and negative ultrasound groups were similar in gender and BMI (p>0.05), but not in age (39±10 vs. 44±11, p=0.03).

CONCLUSION: Asymptomatic cholelithiasis did not significantly increase the need for cholecystectomy after bariatric surgery and can be managed safely without the use of ursodiol.

Bariatric Surgery–P111

THE INFLUENCE OF H. PYLORI INFECTION ON POSTOPERATIVE MARGINAL ULCER AND STRICTURE FORMATION IN BARIATRIC SURGERY PATIENTS, Alexander Perez, MD1, John R Romanelli, MD, FACS2, Mary D Menola, RN2, Aron L Gornish, MD, FACS2, 1Department of Surgery, Tufts University School of Medicine, Baystate Medical Center, Springfield, MA;

2Atlantic Surgical Group, P.A., Oakhurst, NJ

INTRODUCTION: Studies have shown that the preoperative H. pylori infection rate in bariatric surgical candidates can be as high as 20 - 30%. Marginal or anastomotic ulcers present with epigastric or substernal chest pain, nausea and food intolerance. The reported incidence is as high as 16.5%. The purpose of this study was to compare preoperative H. pylori-positive patients with H. pylori-negative patients to examine if there was an influence on the rate of marginal ulcer and stricture formation.

METHODS: The study was a retrospective review of 143 patients who underwent gastric bypass surgery at a single institution by one surgeon from February, 2002 to November, 2004. All patients were tested for H. pylori infection by serology preoperatively. All patients who were positive were treated with lansoprazole-based regimens at least four weeks preoperatively. The chart review identified patients who developed marginal ulcers and/or anastomotic strictures with a six month to three year follow-up.

RESULTS: Of 143 patients to undergo gastric bypass surgery, 2 died in the initial postoperative period from nonsurgical causes. Of the remaining 141 patients, preoperative H. pylori results were recovered in 128 patients. The H. pylori positive and negative groups were similar in gender, although significantly different in age (47.7±11.6 vs. 41.0±10.3, p=0.02) and BMI (51.5±7.6 vs. 48.0±6.2, p=0.04). 16/128 (12.5%) of patients in this series were positive for H. pylori. Marginal ulcers were present in 11/128 (8.6%) of patients, including five concomitant with an anastomotic stricture. Strictures were present in 14/128 (10.9%) of patients. Of the eleven marginal ulcer patients, three (27.2%) were H. pylori positive preoperatively and eight (72.7%) were H. pylori negative. This was not statistically different (p=0.28). Of the fourteen stricture patients, three (21.4%) were H. pylori positive preoperatively, and eleven (78.6%) were H. pylori negative, also not statistically different (p=0.52).

CONCLUSION: There does not appear to be a statistically significant increase in marginal ulcer or stricture formation in patients who are H. pylori positive preoperatively and treated. Further studies to identify the etiology of marginal ulcer and/or anastomotic stricture formation in bariatric surgery patients are warranted.

Bariatric Surgery–P112

DIABETES MELLITUS IS INVERSELY CORRELATED WITH POSTOPERATIVE FASTING GLUCOSE LEVEL FOLLOWING GASTRIC BYPASS, Richard A Perugini MD, Joshua Felsher MD, Donald Czerniach MD, Vinetta Hussey RN, Demetrius Litwin MD, John J Kelly MD, University of Massachusetts Medical Center

Introduction: Gastric bypass has been demonstrated to cure diabetes mellitus in the severely obese. However, there have been reports of profound hypoglycemia in patients who have undergone gastric bypass. These patients required curative



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distal pancreatectomy; pathology has revealed nesidioblastosis. Identification of the population at risk for postoperative hypoglycemia would be important in directing therapy for severe obesity. We present our research to identify factors inversely correlated with fasting glucose level (glu-fast) one year following gastric bypass.

Methods: This is a prospectively accumulated database from a consecutive series of 33 patients undergoing laparoscopic gastric bypass at an academic bariatric surgery program.

Independent variables included preoperative age, weight, BMI, excess body weight (EBW), preoperative fasting glucose, preoperative fasting insulin, insulin resistance (as estimated by HOMA-IR), beta cell sensitivity (as estimated by HOMA-B) and percent of EBW lost at one year following surgery.

Independent correlation coefficients were determined between these variables and glu-fast one year postoperatively. Student's t-test was used to identify whether presence of hypertension (HTN), of diabetes mellitus (DM), or of dyslipidemia was correlated with fasting glucose one year postoperatively.

Results: Presence of DM was associated with lower fasting glucose level postoperatively (with DM = 78 + 13 g/dl, without DM = 90 + 10 g/dl; $p = 0.02$). No other factor investigated was associated with fasting blood sugar in the postoperative period.

Conclusion: Diabetes mellitus is inversely correlated with fasting glucose levels following gastric bypass. This is the first report of such a correlation, and should prompt investigation into the mechanism. If corroborated, this finding suggests that severely obese patients with diabetes are at risk for pathological hypoglycemia.

Bariatric Surgery-P113

RESULTS OF LAPAROSCOPIC GASTRIC BYPASS (LGB) IN PATIENTS WITH BMI >60., Richard M Peterson MD, Andrew Averbach MD, Kuldeep Singh MD, St. Agnes, Hospital Baltimore, MD

Objectives: Megaobesity is considered a relative contraindication to LGB. Some investigators raised the limit to BMI >60 or >70 and reported the feasibility of a laparoscopic approach in this group of patients. A number of authors consider the open approach as the only available alternative.

Methods: LGB was performed with 5 ports and a Nathanson liver retractor technique. Length of Roux limb was based on BMI <50 (50 cm) and BMI >50 (150 cm). Retrocolic, retrogastric gastrojejunostomy was constructed with articulating EndoGIA 45/3.5 stapler and 2.0 Surgidac Endostitch with a hand sewn outer layer. Intraoperative endoscopy was routinely used to verify patency and integrity of anastomoses.

Results: Of 886 patients, 105 (11.8%) had BMI of 60-100.3 (average BMI 66.5, weight 184.4 kg) and constitutes study group. Remaining 781 patients with BMI 35-59.9 (average BMI 48.2, weight 137.5 kg) were included in control group. No significant differences in age, gender and co-morbidities were noted between groups. Conversion rate was 4.7% and 1.1%, respectively. Conversions in the study group were for: stiff abdominal wall (3), adhesions (1) and colon malrotation (1). Average surgery time was 158 and 151 minutes. Morbidity appeared higher in the study group (12.8% vs. 5.7%; $p < 0.05$). Major morbidity occurred with similar frequency (5.1% vs. 4.6%). Anastomotic leak rates were 0% and 0.5%. Re-operations were required in 1.2% and 0.98%. Mortality in the study group was 1.04% (1 patient ? pneumonia) and 0.28% (PE and MI one patient each ($P < 0.05$)). With 70% follow-up at 1 year average BMI and %EBWL were 44.6 (-21.9) and 50.5% in the study group compared to 33.5 (-14.7) and 61% in the control group, respectively. Study group patients had statistically lower rate of resolution / improvement of diabetes and hypertension.

Conclusion: LGB in patients with BMI >60 can be performed with acceptable results that favorably compare to national statistics. Morbidity and mortality are only slightly higher than in patients with BMI <60.

Bariatric Surgery-P114

THE SAFETY OF LAPAROSCOPIC GASTRIC BYPASS (LGB) WITH RESIDENT PARTICIPATION, Richard M Peterson MD, Kuldeep Singh MD, Andrew Averbach MD, St. Agnes, Hospital Baltimore, MD

Objectives: With LGB being one of the most frequently performed laparoscopic procedures the issue of residents training is increasingly important. Limited information is available on safety of LGB performed with participation of surgical residents.

Methods: Retrospective analysis of 886 patients who underwent LGB at a teaching hospital from 2002 ? 2005 was performed. Study endpoints included operative time, intraoperative complication rates (IOC), reoperation rates, leak rates, and overall morbidity. There were a total of 21 residents (PGY 2-5) assisting/performing LGB. They were grouped by the number of cases: Group 1 ? 1 to 20 cases ($n=12$); Group 2 ? 21 to 40 cases ($n=5$) and Group 3 ? >40 cases ($n=4$). The initial 100 cases were excluded to account for attending's learning curve and cases performed by two attending served as the control. LRYGP was performed in a retrocolic, retrogastric fashion with partially stapled, partially hand-sewn gastrojejunostomy. Routine intraoperative endoscopy was utilized to confirm patency and integrity of anastomosis.

Results: There were no significant difference in patient's characteristics between the groups. Average age of patients was 42.4 (18 ? 68), BMI 50.7 and weight 143.9 kg. Conversion rate was 1.46%, reoperation rate - 0.85%, morbidity - 7.54% and mortality was 0.34% with no difference across all study groups. For Groups 1, 2 and 3 respectively the average time was 189.5, 144.5 and 147.9 min.; IOC rates were 26.9, 10.8 and 9.2%; leak rates were 2.34, 0 and 0.39%. Differences between Group 1 and Groups 2/3 were statistically significant. For control group these parameters were respectively: 153.3 min., 11.5% and 1%.

Conclusions: Results indicate that LGB can be safely performed with resident participation, with morbidity, mortality and conversion rates comparable to attendings only and national benchmarks. It appears that basic laparoscopic skills develop after at least 20 LGB. After 40 cases experience residents can advance to performing LGB under supervision.

Bariatric Surgery-P115

RETROCOLIC, RETROGASTRIC LAPAROSCOPIC GASTRIC BYPASS (RRLGB) DOES NOT RESULT IN INCREASED LATE MORBIDITY, Richard M Peterson MD, Andrew Averbach MD, Kuldeep Singh MD, St. Agnes Hospital, Baltimore, MD

Objective: RRLGB is faulted for increased incidence of internal hernia and antecolic/ antegastric positioning of the Roux limb was advocated as an alternative. Without closure of potential hernia spaces it did not change the outcome and a Roux limb necrosis was described.

Methods: LGB was attempted in 886 cases and completed laparoscopically in 873 (98.5%). Average BMI was 50.7 (35-100.3). Mesocolic window was developed from within the omental bursa. Roux limb was brought upward after completion of jejunojunctionostomy (JJA) with cut mesenteric edge facing left. Potential hernia defects were routinely closed with two running 2.0 Surgidac Endostitches from infracolic aspect approximating base of small bowel mesenteric division, beginning of the jejunum and base of mesocolon. The second running stitch was used to secure Roux limb within the mesocolic window and obliterate the left paraduodenal peritoneal recess.

Results: Conversions to open bypass were required due to stiffness of abdominal wall, adhesions and colon malrotation. In 2 patients with incomplete colon rotation an antecolic Roux limb position was chosen. Average follow-up in these 871 patients was 30 months. Overall rate of small bowel obstructions was 1.15%. There were no cases of intestinal obstruction due to internal hernia. In 80% of cases postoperative obstruction was a result of adhesions or fixed kink at JJA. One patient developed a tight stricture of the Roux limb at the level of mesocolon and another one due to torsion of the Roux limb within the mesocolic window both requiring reoperation. Total morbidity attributable to RRLGB combined with inability to develop mesocolic window was 0.46%. Anastomotic leaks developed on 0.44% of patients.

Conclusion: With adequate closure of mesenteric defects RRLGB does not result in increased frequency of internal hernia. No incidents of Roux limb necrosis and low leak rate indicate that retrocolic/retrogastric route probably is a preferred one.



Bariatric Surgery–P116

ROUTINE USE OF INTRAOPERATIVE ENDOSCOPY DECREASES GASTROJEJUNOSTOMY (GJA) RELATED MORBIDITY OF LAPAROSCOPIC GASTRIC BYPASS (LGB)., Richard M Peterson MD, Andrew Averbach MD, Kuldeep Singh MD, St. Agnes Hospital, Baltimore, MD

Objective: GJA is a crucial component of LGB. Circular stapler technique is associated with 1.5-5.8% leak rate and 1.6-6.3% stricture rate. Use of a GIA stapler and partially hand-sewn GJA is an alternative that can be associated with higher complexity and morbidity.

Methods: LGB was attempted in 886 and completed in 873; open bypass was performed in 12 cases. Average BMI was 50.7 (35-100.3). Two thirds of the inner layer was stapled with Endo-GIA 45/3.5 and the anterior 1/3 was completed with 2.0 Surgidac Endostitch (SES) with a diameter of the anastomosis between 12-16 mm. The outer layer was hand sewn with a running 2.0 SES. In 26 "open" cases the exact same technique was utilized short of using SES. At completion of the GJA, the Roux limb was clamped and upper peritoneal cavity filled with saline. Proximal pouch and Roux limb were distended with air and visually inspected with intubation of GJA.

Results: Average added OR time was 10 min. Endoscopy related complications occurred in 0.33% and no resultant postoperative morbidity. Intraoperative air leak was detected in 55 (6.1%) cases and suture line was reinforced in 37 of them; in 7 cases airleak was transient with high insufflation pressure and could not be reproduced. Clinical leaks developed in 4 cases (0.44%) with the rate of 3.7% in intraoperative endoscopy positive and 0.23% negative cases. In 3 (0.33%) cases GJA appeared too tight and was reconstructed. Postoperative anastomotic leak all cases was managed conservatively. There were no early strictures. Delayed strictures requiring endoscopic dilatation developed in 6 patients (0.68%).

Conclusions: Routine intraoperative endoscopy allows verification of patency and integrity of GJA thus reducing potential anastomotic related morbidity by 92.7% (from 6% to 0.44% (<0.05)). Procedure associated morbidity is minimal and did not result in postoperative problems.

Bariatric Surgery–P117

CORRELATION OF PATIENT AGE AND PERI-OPERATIVE MORBIDITY AND MORTALITY FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS, Nilesh A Patel MD, Greta Piper MD, Keary R Williams MD, Carla Christy MD, Dean Smith MD, Joseph J Colella MD, Department of Surgery, Allegheny General Hospital

As the data supporting laparoscopic roux-en-y gastric bypass (LRYGB) continues to grow, its role in patients deemed "advanced in age" is being reconsidered. The present study evaluates the safety of LRYGB in patients of various age subsets including patients greater than 60 years of age.

The present study retrospectively reviews 762 consecutive patients undergoing LRYGB by 2 surgeons at a single institution. Age was stratified as <40 years, 41-60 years, and >60 years, and obesity-related preoperative comorbidities were also recorded. Fisher's exact test was used for statistical analysis.

The overall mortality, major morbidity and minor morbidity rates were 0.5%, 9.1%, and 19.7% respectively. The overall median length of stay (LOS) was 3 days. The table below demonstrates a linear relationship observed for mortality and major morbidity but not for, minor morbidity, or LOS. A significantly higher number of comorbidities ($p = <0.05$), rate of major morbidity ($p=0.013$) and mortality ($p = 0.02$) were observed in patients of age >60 years.

	<40y (N =317)	40-60y (N=427)	>60y (N = 37)
LOS (median)	3.7	4.2	6.8
Mortality	1 (0.3%)	1 (0.2%)	2 (5.4%)
Major Morbidity	24 (7.6%)	36 (8.4%)	9 (24%)
Minor Morbidity	66 (21%)	64 (15%)	20 (54%)

The present study provides one of the largest series to date where perioperative endpoints are correlated with age. These data suggest that LRYGB is feasible in patients of "advanced

age" and but may be associated with higher morbidity and mortality rates. Further studies are needed with larger number of patients to define age as an independent risk factor

Bariatric Surgery–P118

QUALITY CONTROL OF BARIATRIC SURGERY THROUGH A CENTERS OF EXCELLENCE PROGRAM, Walter J Porjes MD, Alan Wittgrove MD, Kenneth Champion MD, Gary Pratt BA, East Carolina University

OBJECTIVE OF THE STUDY: Less than 1% of the 8 million Americans with a BMI ≥ 40 have access to bariatric surgery even though the procedures produce durable weight loss, full remission of comorbidities, prolong life, and reduce health care costs. The lack of access is in part explained by uneven surgical outcomes, payer resistance and prohibitive malpractice insurance premiums.

METHODS: To respond to this crisis, the American Society for Bariatric Surgery (ASBS) developed rigorous standards for rendering bariatric surgical care including 1) required resources, 2) around the clock coverage by qualified bariatric surgeons, 3) standardization of care paths, 4) long-term followup, and 5) reporting of outcomes verified by site inspections. To assure credibility, the leadership of the ASBS founded the Surgical Review Corporation (SRC), an independent, non-profit organization with governance that includes representation from industry, payers, nursing, hospital administration as well as surgeons. The decisions regarding the qualifications of the centers are made by a separate Review Committee, composed of experienced bariatric surgeons.

RESULTS: As of September 2005, over 500 hospitals and over 900 surgeons are in the application process. Of the 106 hospitals that completed the applications for Full Approval, 62 have completed site inspections. 21 Centers have been announced; additional centers will be announced on a monthly basis. The 12 month documentation from the 106 hospitals includes data from 33,117 patients who underwent bariatric surgery with a mortality rate of 0.3%, about the same as cholecystectomies — in a very challenging population. We are now collating the prevalence of complications such as leaks or pulmonary emboli and "drilling down" on the 99 deaths to determine systems errors.

CONCLUSIONS: A Centers of Excellence program provides a structure for the setting of national standards, for the collection of national outcomes data, and for continuous quality improvement based on shared data in a cooperative process between surgeons and stakeholders. The response of payers suggests that this is an effective approach for getting access to bariatric surgery for our patients.

Bariatric Surgery–P119

LAPAROSCOPIC DUODENAL SWITCH FOR SUPER-OBESITY: EARLY WEIGHT LOSS RESULTS, Vivek N Prachand MD, Section of General Surgery, University of Chicago

The optimal surgical procedure for the treatment of super-obesity (SupOb, BMI ≥ 50 kg/m²) remains controversial. Weight loss results following Adjustable Gastric Banding and Roux-en-Y Gastric Bypass are often inferior in terms of percentage excess body weight loss (%EBWL) and BMI compared to results obtained in individuals with severe obesity (SevOb, BMI 35 - 50) despite typically greater magnitude of weight loss. Laparoscopic Biliopancreatic Diversion with Duodenal Switch (DS) may offer results in terms of %EBWL, BMI, and absolute weight loss for SupO that are comparable if not superior to those obtained by other bariatric procedures.

A retrospective review of a prospectively maintained database was conducted with specific evaluation of SupOb patients who underwent totally laparoscopic DS (100 cm common channel, 250cm alimentary limb) by a single surgeon at a university teaching hospital. Patients whose weight loss outcomes at ≥ 9 months post-op were available were analyzed.

Between 11/02 and 12/04, 74 patients underwent totally laparoscopic DS, of whom 60 were SupOb. Weight loss data for 56 patients (49 women, 7 men) was available for review. Pre-op demographics include mean age 39.1 yrs ± 8.71 (23 - 53), weight 163.7kg ± 20.8 (126.7 - 236.6), BMI 58.2 kg/m² ± 5.7 (50.2 - 72, 19 patients (34%) with BMI ≥ 60), mean number of



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comorbidities 3.82 ± 1.82 . 25 patients (45%) had prior abdominal surgery. There was one mortality (PE) and the median LOS was 4 days. The mean absolute weight loss was $78\text{kg} \pm 16.9$, %EBWL was 75.5 ± 12.8 , and BMI at ≥ 9 months was 30.5 ± 5.6 . 53/56 patients achieved at least 50% EBWL, and 51 patients achieved a BMI < 40 , with 31 patients (55%) reaching a BMI ≤ 30 .

Conclusion: Laparoscopic Duodenal Switch offers excellent weight loss in superobese individuals.

Bariatric Surgery-P120

LAPAROSCOPIC GASTRIC BYPASS IN PATIENTS WITH BMI OVER 80, Asnat Raziell MD, Howard Lederer MD, Todd A Kellogg MD, Henry Buchwald MD, Sayeed Ikramuddin MD, The University of Minnesota, Minneapolis, MN

Introduction: Laparoscopic gastric bypass (LRYGBP) has been safely performed in morbidly obese patients since the mid 1990's. Until recently, a BMI above 50 has been considered a relative contra-indication to LRYGBP. We describe our LRYGBP experience in patients with BMI over 80.

Materials and Methods: We retrospectively reviewed 500 charts of patients undergoing LRYGBP at the University of Minnesota between November 2001 and October 2003.

Patients either underwent an ante-colic or retro-colic LRYGBP with a 15cc isolated gastric pouch and a linear stapled gastrojejunostomy over a 30F endoscope. Roux limb length varied based on BMI. For patients with a BMI above 80, a very long limb technique was used, half the length of the small bowel.

Results: Four of 500 patients had a BMI above 80. Average pre-operative BMI 87, mean age 37, female to male ratio 3:1, mean operative time 214 minutes (164-245 minutes), estimated blood loss 25 cc, Mean length of Roux limb 297cm (210-380). There were 3 Retro-colic and 1 Ante-colic gastrojejunostomies, one patient had a concomitant ventral hernia repair, mean length of hospital stay was 4 days. Complications: one patient had prolonged intubation due to pre-existing severe pulmonary hypertension. Mean follow up time was 2.75 years. Mean % Excess Body Weight Loss was 75.66% (68.42 ? 87.44)

Conclusion: LRYGBP is feasible in patients with a BMI greater than 80 and should not be considered a contra-indication.

Bariatric Surgery-P121

LAPAROSCOPIC VERSUS OPEN REVISION OF FAILED GASTRIC RESTRICTIVE PROCEDURES TO ROUX-EN-Y GASTRIC BYPASS, Josh E Roller MD, David A Provost MD, University of Texas Southwestern Medical Center at Dallas

INTRODUCTION: Morbid obesity is a growing epidemic and despite the success of surgical therapy, up to 25% of patients will require operative revision for failed primary bariatric procedures. Although the efficacy of primary laparoscopic roux-en-y gastric bypass (RYGB) has been demonstrated, the role of laparoscopic revisional RYGB is still under investigation. Here we compare our results of laparoscopic versus open revision to RYGB of failed open restrictive bariatric procedures.

METHODS: A retrospective review of all patients undergoing revision of a failed bariatric procedure to RYGB from 1997 through 2005 at a multi-center academic institution was conducted. Those patients who underwent laparoscopic revision (LR) were compared to those who had undergone open revision (OR).

RESULTS: A total of 65 patients underwent revision of a failed primary open bariatric procedure to RYGB. LR was performed in eleven patients and OR in 54 patients. There were no conversions to open in the LR group. Mean age (49.5 and 46.9 years, $p = 0.4$) and preoperative BMI (44.8 and 45.2, $p = 0.8$) were similar in the LR and OR groups, respectively. The average time to revisional surgery was 12.8 years for LR patients and 11.8 years for OR patients ($p = 0.69$). Hospital length of stay (3.5 vs. 6.8 days, $p = 0.047$) and blood loss (182 vs. 314cc, $p = 0.003$) were both significantly less in the LR group. However, operative time (219 vs. 163 minutes, $p < 0.001$) was longer for the LR group. There were no major perioperative complications in the LR group compared to 9.3% in the OR group ($p = 0.58$) and there were no mortalities in this study. Percentage of excess weight loss (%EWL) at short-term follow-up (mean 3.3 months) was 34.6% in the LR group and 60.6% in

the OR group (mean 23 months).

CONCLUSION: Although operative times were longer, LR to RYGB resulted in a decreased hospital length of stay, less blood loss, and a significant reduction in major perioperative complications. Follow-up data for weight loss is short-term, however, our preliminary results are promising. LR of failed bariatric procedures to RYGB is technically demanding but affords patients the same advantages provided by primary laparoscopic RYGB.

Bariatric Surgery-P122

DOES DIVISION OF THE NERVE OF LATAJET DURING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS INFLUENCE DELAYED EMPTYING OF THE GASTRIC POUCH IN THE EARLY POSTOPERATIVE PERIOD? John R Romanelli (1) MD,

Alexander Perez (1) MD, Jane Garb (1) MS, Wahid S Girgis (2) MD, Aron L Gornish (3) MD, (1) Department of Surgery, Tufts University School of Medicine, Baystate Medical Center, Springfield, MA (2) Jersey Shore University Medical Center, Neptune, NJ (3) Atlantic Surgical Group, P.A., Oakhurst, NJ

INTRODUCTION: Delayed emptying of the gastric pouch after laparoscopic Roux-en-Y gastric bypass is a poorly understood phenomenon which is accompanied by deleterious clinical and economic repercussions. Our aim was to evaluate the role of nerve of Latarjet division in the development of postoperative delayed pouch emptying and its relationship with clinical symptoms, length of operative time, and length of hospital stay.

METHODS: Prospective single-blinded clinical trial comparing nerve of Latarjet-sparing (NS) vs. nerve-dividing (ND) technique during laparoscopic Roux-en-Y gastric bypass. All bypasses were performed in a single institution by a single surgeon. There were a total of 71 patients (NS: 41 and ND: 30). Patients were not randomized to the two groups; they underwent division of the nerve of Latarjet if anatomically necessary to facilitate gastric pouch dissection. Patients in NS group had the nerve of Latarjet preserved. Gastric pouch emptying was determined by UGI swallows on postoperative day 1, all of which were evaluated by the same radiologist in a blinded fashion. Normal emptying was defined as visible contrast within the Roux limb within 120 minutes.

RESULTS: Both groups had similar ($p > 0.05$) age, gender, and BMI. Patients in the ND group had a significantly lower ($p < 0.05$) incidence of normal postoperative gastric emptying on UGI swallow (14/30; 47% vs. 30/41; 73%). All patients with delayed gastric emptying were unable to tolerate clear liquids by mouth postoperative day 1. Length of operative time (121 ± 24 min vs. 116 ± 30 min, $p: 0.48$) and hospital stay (4 ± 1.9 days vs. 4.4 ± 1.1 days, $p: 0.34$) were similar between groups.

CONCLUSION: Patients who underwent the nerve of Latarjet-sparing technique during laparoscopic Roux-en-Y gastric bypass had a significantly lower incidence of delayed gastric emptying without a prolonged length of operative time. Although length of stay was not significantly affected, the clinical difference could become important with the trend towards earlier discharge. Further randomized studies may be indicated to determine the mechanism by which gastric emptying is altered following division of the nerve of Latarjet.

Bariatric Surgery-P123

EFFECT OF TYPE 2 DIABETES MELLITUS CONTROL AFTER SLEEVE GASTRECTOMY IN MOBID OBESITY, Han Sangmoon MD, Kim Wonwoo MD, Department of Surgery, Kangnam CHA Hospital, College of Medicine, Pochon CHA University.

Introduction: Obesity is a frequent cause of insulin resistance and poses a major risk for diabetes. The effects of sleeve gastrectomy on diabetes have not been elucidated. This report documents that the sleeve gastrectomy provides control for diabetes, prior to significant body weight losses

Methods and procedures: We retrospectively reviewed 14 type II diabetic patients who underwent laparoscopic isolated sleeve gastrectomy between May 2003 and October 2004. Fourteen patients had type II diabetes treated by oral hypoglycemic agents. Preoperative, 4 weeks and 3 months following surgery, all patients checked weight, body mass index (BMI), waist circumference, hip circumference, blood



pressure, HbA1c and fasting glucose.

Results: Fourteen patients with a mean preoperative body mass index(BMI) of 39.1±4.2kg/m²(31.9-47.5kg/m²) underwent laparoscopic sleeve gastrectomy. Changes in mean BMI were minimal(preop;39.1±4.2kg/m², postop(4week);35.5±3.8kg/m²), but there were significant decrease in blood fasting glucose(P<0.001), HbA1c(P<0.001), systolic blood pressure(P<0.001), diastolic blood pressure(P=0.009). Ten patient did not require medications after surgery(4 week), the other 4 patient stop the medications after surgery(3 months)

Conclusion: Further evaluation is needed to analyze effect of sleeve gastrectomy in treating type II diabetes mellitus. But just with restrictive procedures as isolated sleeve gastrectomy also can control type II diabetes mellitus in early weight loss stage of morbidly obese patients.

Bariatric Surgery-P124

GASTROJEJUNAL ANASTOMOTIC STENOSIS IS LOWER USING LINEAR RATHER THAN CIRCULAR STAPLING DURING ROUX-EN-Y GASTRIC BYPASS, Bruce D Schirmer MD, Sang Kuon Lee MD, C. Joe Northup MD, Janet Dix P.A.-C., Michael S Miller, Anna D Miller RN, Department of Surgery, University of Virginia Health System, Charlottesville, VA

Introduction: Stenosis of the gastrojejunal anastomosis is a relatively frequent complication following Roux-en-Y gastric bypass. Stenosis rates have been attributed to multiple factors. We wished to investigate whether using a linear versus a circular stapler was important in determining the rate of gastrojejunal stenosis following Roux-en-Y gastric bypass.

Methods: A retrospective study was carried out on 877 patients who underwent Roux-en-Y gastric bypass in our institution from Jan. 1996 to Aug. 2004. We compared patients undergoing circular stapling technique (CS, n= 247) with patients undergoing linear stapling (LS, n= 630) for creation of the gastrojejunostomy. The incidence of stenosis, time to occurrence of the stenosis, number of dilations required to treat it, anastomotic leak rate, incidence of marginal ulcer, 1-, 2-, and 3-year percentage of excess weight loss (% EWL), and 30-day mortality were compared.

Results: Of the 48 (5.5%) patients overall who developed gastrojejunal stenosis, there was a significantly greater incidence of stenosis in the CS group (43, or 17.4%) than in the LS group (6, or 1%, p<.001). Postoperative time to occurrence (CS = 3.1±1.1, LS = 7.2±6.0 months) and number of dilations required (CS = 1.16±.06, LS = 1.50±.34) were not significantly different between groups. The incidence of gastrojejunal leaks was not different between groups (CS = 3, or 1.2%; LS = 2, or 0.3%). However, marginal ulcers occurred more frequently in the CS group (3.2%) than the LS group (0.8%, p<0.05). One-, 2-, and 3-year % EWL were 64.9%, 69.4% and 65.3% for CS group and 64.3%, 67.2% and 67.2% for the LS group, respectively, which were not statistically significant. Thirty-day mortality (CS = 1.6%, LS = 0.3%) was not significantly different.

Conclusion: In our experience, the linear stapling technique for the construction of the gastrojejunal anastomosis during Roux-en-Y gastric bypass is associated with less anastomotic stenosis and a lower marginal ulcer rate than the circular stapling method, with comparable weight loss outcomes for both techniques.

Bariatric Surgery-P125

EFFECTS OF GASTRIC STIMULATION ON GLYCEMIC CONTROL IN OBESE, TYPE II DIABETIC PATIENTS BY LAPAROSCOPIC IMPLANTED DEVICE – FIRST RESULTS OF A FEASIBILITY STUDY, Rudolf A Weiner MD, A. Bohdjalian MD,K. Schindler MD, B. Tripp MD, S. Kretschmer MD, B. Ludvik MD, M. Schramm MD, R. Jung MPH, C. Rosack MD, G. Prager MD, 1 Dept. of Surgery, Medical University of Vienna, Austria

BACKGROUND: Various bariatric surgery procedures have shown a significant improvement in glycemic control in obese Type 2 diabetics within a few days after surgery. However, the exact mechanism remains unknown. A novel gastric stimulation modality, The TANTALUS? System, was developed by MetaCure N.V. The system, which is implanted laparoscopically, detects food intake and delivers a unique stimulation with the goal of achieving an improved glucose control and weight

loss. Preliminary studies have shown that gastric electrical stimulation may induce weight loss. The aim of this study was to demonstrate improved glucose levels and weight loss in obese and type 2 diabetic patients.

AIMS & METHODS: In a prospective, multi-center, open label pilot study to evaluate the affect of TANTALUS therapy on weight loss and diabetes, 22 (9 m, 13 f) caucasian, obese (BMI 41.7±1.0 kg/m², range; 33.3 to 49.7) individuals with type 2 diabetes mellitus (T2DM) with HbA1c of 8.3±0.2% and fasting plasma glucose (FPG) 175.8±13.4 mg/dL treated with insulin and/or oral hypoglycemic agents were implanted laparoscopically with a TANTALUS System (MetaCure NV.). The system consists of a pulse generator and three bipolar leads. Interim results from the first ten patients that reached 14 weeks of therapy are reported here.

RESULTS: Device implantation was successful in all patients without significant therapy-related adverse events. After 14 weeks of therapy (n=10), excess body weight decreased by 12.7 ± 2.6% (p<0.05 vs. baseline) and FPG decreased from 178.3 ± 21.0 to 130.0 ± 11.8 mg/dL (p<0.05). Average reduction in HbA1c was 1.0± 0.4%. Sulphonylurea therapy was stopped in 2 patients and was reduced in 2 others.

CONCLUSIONS: Interim results with the TANTALUS system show that the system is well tolerated and can potentially improve glucose levels and induce weight loss in obese diabetic patients who are not ideally controlled by conservative treatment.

Bariatric Surgery-P126

CONCURRENT GASTRIC BYPASS AND REPAIR OF ANTERIOR ABDOMINAL WALL HERNIAS, Rob Schuster MD, Ramzi S Alami MD, Myriam J Curet MD, Sherry M Wren MD, John M Morton MD, Bassem Y Safadi MD, Palo Alto Veterans Health Care System Departments of Surgery and Stanford University School of Medicine Department of Surgery

Introduction: Many patients seeking surgical treatment for morbid obesity present with anterior abdominal wall hernias. Although principles of hernia repair involve a tension-free repair with the use of prosthetic mesh, concern exists for concurrent gastric bypass due to entrance into the gastrointestinal tract and mesh infection. We report our series of patients undergoing gastric bypass and simultaneous anterior anterior wall hernia repair.

Methods: All patients who underwent simultaneous gastric bypass surgery and anterior abdominal wall hernia repair were reviewed.

Results: 12 patients underwent concurrent gastric bypass and anterior wall hernia repair. There were 5 women and 7 men with an average age of 54.9 ± 8.5 years (range 35 to 64) and average body mass index (BMI) of 50.4 ± 10.3 kg/m² (range 38 to 70). Two open, and 10 laparoscopic gastric bypass operations were performed. Nine patients (75%) underwent incisional hernia repairs and 3 patients (25%) underwent umbilical hernia repair concurrent with gastric bypass. Average size of defect was 14.7 ± 13.4 cm². One patient had primary repair and 11 patients had prosthetic mesh repair: polypropylene in 3 patients (25%) and polyester in 8 patients (67%). With a 14.1 ± 9.3 month follow-up, there were no mesh infections and 2 recurrences, one in the patient who underwent primary repair and one in a patient repaired with polyester mesh but with 2 previous failed incisional hernia repairs.

Conclusions: Concurrent gastric bypass and repair of anterior abdominal wall hernias is safe and feasible. In order to optimize success, tension-free principles of hernia repair with the use of prosthetic mesh should be followed since no mesh infections occurred in our series.

Bariatric Surgery-P127

THE USE OF RETRIEVABLE INFERIOR VENA CAVA FILTERS IN GASTRIC BYPASS SURGERY, Rob Schuster MD, Ramzi S Alami MD, Myriam J Curet MD, John M Morton MD, Stanford University School of Medicine, Department of Surgery

Introduction: Pulmonary embolus (PE) is a potentially devastating and fatal post-operative complication in morbidly obese patients. For patients undergoing gastric bypass surgery at particularly high risk for deep venous thrombosis (DVT), we



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inserted prophylactic temporary inferior vena cava (IVC) filters preoperatively. This study was undertaken to review the safety and efficacy of retrievable prophylactic IVC filters in morbidly obese patients undergoing gastric bypass.

Methods: All patients who underwent gastric bypass surgery and preoperative insertion of retrievable IVC filters were reviewed. Indications for IVC filter insertion were: history of DVT or PE, venous stasis disease, and weight > 400 pounds. Demographic data, procedure details, and clinical course were recorded and analyzed.

Results: 19 patients underwent preoperative IVC filter placement before gastric bypass surgery. There were 9 women and 10 men with an average age of 50.2 ± 6.4 years (range 39 to 59) and average body mass index (BMI) of 58.4 ± 6.1 kg/m² (range 49 to 74). BMI greater than 50 kg/m² was present in 18 of 19 patients (95%). All patients received preoperative subcutaneous heparin and pneumatic compression stockings. All patients had successful IVC filter placement. IVC filter retrieval postoperatively was performed in 15 of 19 patients (79%) with 3 left for clinical reasons and 1 (5%) left due to technical inability to retrieve. There were no complications directly attributable to IVC filter placement or retrieval. There were no deaths. Five patients (26%) developed DVT or PE postoperatively. Follow-up was 14.7 ± 24.8 months (range 2 to 30).

Conclusions: Prophylactic IVC filter placement and retrieval can be safely undertaken in high-risk gastric bypass patients. IVC filter retrieval was unable to be performed in only one patient due to technical inability. We recommend preoperative IVC filter placement in selected patients as these data demonstrate that these patients are at high risk for DVT and PE.

Bariatric Surgery-P128

CORRELATION OF ANASTOMOTIC AND RADIOGRAPHIC MEASUREMENTS OF ANASTOMOTIC STRICTURES AFTER ROUX-EN-Y GASTRIC BYPASS, Kalihl Shillingford MD, Samuel Szomstein MD, Raul J Rosenthal MD, Bariatric Surgery, Cleveland Clinic Florida

Introduction: Postoperative strictures present as one of the most common late complications of Roux-en-Y gastric (RYGBP) surgery. Evaluation of the stricture often means both radiologic and endoscopic studies. The objective was to determine the correlation between radiologic and endoscopic findings in determination of clinically significant anastomotic strictures.

Methods: A retrospective review of 52 symptomatic patients following RYGBP. Evaluation included endoscopy, gastrografin GI series, or both. 30 patients had upper GI performed in AP, lateral, and oblique projections reviewed by one radiologist and measurements taken of a single best projection. 52 patients had endoscopy with approximation of anastomotic diameter by means of comparison to endoscope; 30 patients had both studies.

Results: There was clinically significant correlation between radiologic and endoscopic findings using the endoscopic method.

Conclusion: Upper GI can be used instead of endoscopy in evaluating postoperative anastomotic strictures.

Bariatric Surgery-P129

WEIGHT LOSS RESULTS ARE NOT IMPROVED BY LONGER ROUX LIMB LENGTHS IN SUPER-OBESE PATIENTS UNDERGOING LAPAROSCOPIC GASTRIC BYPASS, Ian S Soriano MD, Darshni Vira BS, Katie Tobin BS, Erik Dutson MD, William Bertucci MD, John Yadegar MD, Deborah Frick RN, Carlos Gracia MD, Amir Mehran MD, Albert Einstein Medical Center, Philadelphia, PA. David Geffen School of Medicine at the University of California - Los Angeles

Background: In patients undergoing laparoscopic roux-en-y gastric bypass (LRYGB), the ideal roux limb length, especially in the super obese patients with BMI>50, has been debated. Increased malabsorption and weight-loss results have been advocated by proponents of longer roux limbs. Others point to increased nutritional deficiencies these patients might face. At our institution, a standard sized limb is created for all patients. We prospectively reviewed our experience, analyzing for weight-loss differences between the two groups at one year.

Methods: From January 2003 to June 2005, 591 patients underwent LRYGB at UCLA. A standard 80cm roux limb length was created regardless of BMI. Pre/post-operative data were prospectively collected. 97 patients had complete 1-year follow-up records and were included in this study. Data was analyzed using ANOVA with significant difference defined as $p < 0.05$. Previous data analysis has shown that our obese and super-obese patients are matched for age and co-morbidities. Incomplete records were excluded.

Results:

	Super-Obese	Non-super Obese	p value
Patients	54	43	
Initial BMI	54.4	44.5	<0.05
Pre-op BMI	51.1	42.2	<0.05
1-year BMI	33.9	29.6	<0.05
% EBWL	62.2	67.6	0.09

Conclusions: The use of a standard roux limb length in super-obese patients produced weight loss results comparable to obese patients when performed in a structured, multi-disciplinary program that emphasizes thorough preoperative preparation and education. Long-term follow-up will determine whether these results continue beyond one year.

Bariatric Surgery-P130

ALGORITHM FOR MANAGEMENT OF PATIENTS WITH SUSPECTED SMALL BOWEL OBSTRUCTION AFTER LAPAROSCOPIC GASTRIC BYPASS SURGERY, Eliana A Soto MD, Stephen Merola MD, New York Hospital at Queens

Small bowel obstruction after laparoscopic gastric bypass is a known complication with reported incidence rates ranging from 0.4% to 10%. Often, patients do not present with classic history and physical findings for small bowel obstruction. Further compounding the matter is that radiological studies are often normal in patients who do have small bowel obstruction. As laparoscopic bypass surgery is becoming more common, it is important to establish an algorithm for the management of the patient with possible small bowel obstruction, especially when they are being treated by non-bariatric surgeons. We reviewed the literature and our own experience with eight patients at our institution who presented with suspected small bowel obstruction after laparoscopic gastric bypass over a two-year period, and devised guidelines for the management of these patients including physical examination, radiological studies and surgical treatment.

Bariatric Surgery-P131

LAPAROSCOPIC REVISION FROM LAP-BAND TO GASTRIC BYPASS, Hadar Spivak MD, Oscar R Beltran MD, Plamen Slavchev MD, Hagith Yonath MD, Erik B Wilson MD, Department of Surgery, Park-Plaza Hospital, Houston, Texas

Objective: This study examines the feasibility and outcome of performing laparoscopic Roux-en-Y gastric bypass (RYGBP) as a revision procedure after failed LAP-BAND.

Methods and Procedures: In the past 5 years, we have performed more than 1000 LAP-BAND procedures. Due to inadequate weight loss and/or complications, we laparoscopically converted 26 (23 females) of these patients (mean age 43.5 years) from LAP-BAND to RYGBP.

Key steps in the revision procedures were: (1) identification and release of the band capsule; (2) careful dissection of the gastro-gastric sutures; (3) creation of a small gastric pouch; and (4) Roux-en-Y anterior colic anterior gastric pouch-jejunum anastomosis. Revisions took place at a mean 28.7 months (range: 11 to 46) after the original gastric banding. Change in BMI between revision and post-revision was evaluated with paired t-tests.

Results: Mean BMI prior to the LAP-BAND procedure was 46.2 kg/m² (range: 39.9 to 53.0) and mean weight was 127 kg (range: 99-155). The lowest mean BMI achieved by this group with the LAP-BAND prior to revision was 39.6 kg/m² (range: 30 to 49.2). The mean BMI at the time of revision was 43.1 kg/m² (range: 33.1 to 50), the mean revision operative time was 110 minutes (range: 85-175), and the mean hospital stay was 2.8



days (range: 1-10). Complications: 1 patient underwent reoperation and splenectomy for a bleeding spleen. After conversion to RYGBP, mean BMI decreased to 33.9 kg/m² at 6 months ($P < 0.001$) and 31.5 kg/m² at 12 months ($P < 0.001$).

Conclusions: Laparoscopic conversion from LAP-BAND to RYGBP is safe and can be an alternative for patients who failed the LAP-BAND procedure. However laparoscopic revision surgery is technically challenging and should be performed only by surgeons who have completed the learning curve for laparoscopic RYGBP

Bariatric Surgery-P132

LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING. RESULTS IN PATIENTS AGED OVER 60 YEARS, craig j taylor MD, laurent layani MD, John Flynn Gold Coast Hospital, Queensland Australia

Introduction: Laparoscopic Adjustable Gastric Banding (LAGB) has been shown in numerous studies to be an effective treatment for morbid obesity in younger patients, leading to improvements in related co-morbidities and quality of life. Currently little is known how these improvements apply to the older population.

Methods: A retrospective review was conducted of all patients aged 60 years or older who underwent LAGB by a single surgeon. A detailed questionnaire was sent to all patients requesting details of any changes to their medical co-morbidities or medication requirements following surgery. Questions probing quality of life issues and overall satisfaction were also asked.

Results: Thirty-seven patients with a mean age of 65.8 years (range 60 ? 72) and a preoperative mean Body Mass Index of 42.2kg/m² (range 33-54) underwent LAGB. The mean percentage of excess weight lost was 49% at 48 months.

Complications include one slippage and 2 portsite infections. There were no deaths. Disease improvement was reported in 80% of diabetics, 79% with hypercholesterolaemia, 75% with Obstructive sleep apnoea, 72% with heartburn, 69% with hypertension, 60% with back pain, 56% with anxiety or depression, 50% with chronic respiratory diseases, and 46% with hip or knee pain. Medication requirements reduced or ceased in 66% who required musculoskeletal analgesics, 43% of diabetics, 33% using bronchodilators, and in 29% with hypertension. Sleep improved in 48%, self esteem increased in 70%, and 72% had a better outlook on life. Eighty-two percent were either moderately or extremely happy that they had undergone LAGB, and 91% said they would or had recommend LAGB to other older people.

Conclusion: LAGB achieves good results in patients aged over 60 years. The established benefits of LAGB in the younger population also apply to older patients, where co-morbidity improvement may be even more important to remaining quality of life.

Bariatric Surgery-P133

WEIGHT LOSS PSYCHOLOGICAL READINESS TEST SCORES DO NOT CORRELATE WITH SUCCESSFUL WEIGHT LOSS AFTER LAPAROSCOPIC GASTRIC BYPASS, David S Tichansky MD, Whitney S Orth MS, Atul K Madan MD, Raymond J Taddeucci MD, Section of Minimally Invasive Surgery, Department of Surgery, University of Tennessee Health Science Center, Memphis, TN

Introduction: Surgery is the only treatment for morbid obesity which is scientifically proven to be successful long-term. For patients, this treatment is a life-altering event. Multiple tools have been utilized to prepare patients and determine their readiness for such an event. Previous investigators have reported varying results in terms of patient preparedness with use of preoperative education and questionnaires. Herein, we study the effectiveness of a pre-weight loss psychological readiness test in predicting weight loss outcome after laparoscopic gastric bypass.

Methods: 103 consecutive patients were enrolled in the study by completing a psychological weight loss readiness test during their pre-operative office visit. Percent excess body weight (EBW) loss at one year or greater was analyzed against the score of each section of the test and the total score of the test

using Pearson's correlation coefficient test.

Results: Complete test results and one year weight loss data were available on 100 patients. Correlation coefficients for each section and total test versus EBW loss were Section 1: $r = 0.08$, $p = 0.42$; Section 2: $r = 0.00$, $p = 0.99$; Section 3: $r = -0.10$, $p = 0.31$; Section 4: $r = 0.04$, $p = 0.72$; Section 5: $r = 0.01$, $p = 0.94$; Section 6: $r = 0.14$, $p = 0.17$; and Total score: $r = -0.02$, $p = 0.88$. Neither any single test section score, nor the total test score, had a statistical significant correlation with EBW loss.

Conclusion: Psychological weight loss readiness tests do not correlate with post operative weight loss outcome. This test should not be utilized to determine which patients undergo laparoscopic gastric bypass. Additional tools for preoperative preparation and evaluation of patients still need to be investigated.

Bariatric Surgery-P134

SLEEVE GASTRECTOMY WITH WRAPPING USING PTFE TO PREVENT GASTRIC ENLARGEMENT IN A PORCINE MODEL, Kazuki Ueda MD, Michel Gagner MD, Luca Milone MD, Sergio J Bardaro MD, Ke Gong, Dept. of Surgery, Kinki University School of Medicine & Weill Medical College of Cornell University

Background: The safety and efficacy of a laparoscopic sleeve gastrectomy for morbid obesity has been well established. However, short term weight regain may occur due to gastric dilatation. The aim of the study was to prevent the gastric dilatation. We designed the sleeve gastrectomy with wrapping using PTFE dual mesh.

Methods: Nine Yorkshire pigs weighing 20-25 kg underwent the sleeve gastrectomy with wrapping using PTFE dual mesh (wrapping group) or sleeve gastrectomy only (control group) to compare weight loss. The operative procedure in the wrapping group was performed: 1) omental dissection with left gastroepiploic vessels and short gastric vein dissection, 2) creation of gastric sleeve (approximately 200 ml 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 (12X9 cm) and attach with endoscopic linear staplers. The postoperative animals were weighed weekly.

Results: Two mortalities occurred due to staple line failure, no perioperative complications occurred in the other animals. Operation time was longer in the wrapping group (210+/-87 min) than in the control group (198+/-60 min). The sizes of the removed stomach were almost similar in both groups (wrapping vs. control = 148+/-41g vs. 123+/-6g). Postoperative weight gain up to 8 weeks was significantly slower in the wrapping group than in the control group ($p = .0007$).

Conclusion: Sleeve gastrectomy with wrapping using PTFE dual mesh is feasible and slow weight gain in a porcine model producing less gastric distention. This may have an application in humans.

Bariatric Surgery-P135

ONE SHOT PRE OPERATIVE INTRATHECAL ANALGESIA LIMITS POSTOPERATIVE COMPLICATIONS IN WEIGHT LOSS SURGERY AND CAN BE SAFELY PERFORMED WITHOUT ALTERING DVT PROPHYLAXIS, Sivamainthan Vithiananthan MD, Karen Norowski BS, Gregory Incalcaterra MD, Winthrop University Hospital

Intro: Patients undergoing Weight Loss Surgery have higher incidence of Sleep apnea and respiratory compromise preoperatively. Eventhough laparoscopic surgery minimises further respiratory compromise in these patients compared to open surgery, post operative pain management and immediate post-operative respiratory decompensation after extubation are important considerations for these patients and may be related complications. Patient controlled analgesia could be harmful for pts with sleep apnea. We believe that intra-thecal analgesia (THEC) works preemptively to reduce respiratory compromise, prevent reintubation and minimize pain post operatively. We were also concerned of any adverse effect of preop DVT prophylaxis and THEC.

Methods: We performed a retrospective analysis of 94 consecutive patients undergoing gastric bypass (GB) and lap adjustable banding (LAB). They were all offered one shot intrathecal analgesia (THEC) immediately prior to general anes-



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thetia. Successful pts received 0.3 mg of astramorph and 25 micgm as THEC. Pts received sub cut heparin or LMWH as prophylaxis before THEC. A DVT prophylaxis of combined Heparin or LMWH, compression stockings and early ambulation was instituted post op. Postoperative extubation duration, site of extubation, pulm complications and pain medications were monitored. Student t-test was used to analyze statistical significance.

Results: There were 79 lap GB and 4 open GB and 11 LAB in this group. Average preop wt, BMI and excess weight were 301, 48.7 and 171. 90% had sleep apnea diagnosed preoperatively. 92 out of 94 patients were extubated in the OR within minutes of completion of surgery($p<0.05$). The 2 patients were weaned and extubated in the recovery room. No one failed extubation. All except 3 had successful placement of THEC ($p<0.05$). One pt without sleep apnea history was placed on PCA . Others received IV or IM morphine prn the the day of surgery or POD 1 and then oxycodone elixir or similar po narcotics. No one required more than po pain meds after POD2. No pneumonia or bronchitis was extubated postop. 1 case of DVT and subsequent Pulm embolism was diagnosed. No complication from THEC was noted. All pts walked within 2-4 hours post op when extubated in the OR.

Conclusion: THEC allows for successful immediate extubation, early ambulation, excellent post op pain control and prevent pulmonary compromise in bariatric patients. It can also be done safely without altering routine DVT prophylaxis.

Bariatric Surgery-P136

ANASTOMOTIC STENOSIS IN GASTRIC BYPASS: SUCCESSFULLY TREATABLE WITH SINGLE ENDOSCOPIC DILATION AND IS UNPREDICTABLE BY UGI SERIES, Sivamainthan Vithiananthan MD, Karen Norowski BS, Arlene Stein BS, James Grendell MD, Winthrop University Hospital

Introduction: Gastro jejunal anastomotic stenosis (STEN) is a known complication of gastric bypass (GB) surgery. Numerous reports have indicated the need for more than one endoscopic dilation (DILAT) for successful treatment. We wanted to evaluate the success rate of endoscopic dilations for symptoms and the ability to predict subsequent stenosis by UGI series that are done on post op day 1.

Method: We performed a retrospective review of the consecutive patients undergoing (GB) in our program. GJ anastomosis(GJA) was created by firing of the Linear Blue load GIA followed by snug 2 layer suture closure over a 34 F bougie (10 cases) or anastomosis by 21 Ethicon EEA Stapler (1 case). STEN diagnosis was made by endoscopy on pts with persistent nausea and vomiting . Inability to pass the Olympus endoscope (9.7mm) across the GJA was the diagnostic criteria for STEN. Standard through-The- Scope Balloon dilation up to a maximum of 12 mm was carried out as the goal treatment. Student t-test was used to analyze statistical significance.

Results: Among the 136 GB pts, 13 underwent Endoscopy and 11(8%) were diagnosed with STEN. 2 had normal findings. Average preop wt, BMI and excess weight for STEN were 355, 54 and 213. For pts without stenosis were 306, 49 and 176. Excess % Weight loss data at 6weeks, 6months and 12 months were similar in STEN and nonstenotic pts (15%, 41%, 75% vs. 22%, 45%, 70% $P=NS$).Only 4/11 with STEN had slow emptying at the gastrojejunal anastomosis on UGI series on POD1.

Majority of pts (10/11) required only one DILAT and had no evidence of stenosis subsequently ($P<0.05$). One required 3 DILAT and a subsequent cholecystectomy for chronic cholecystitis for persistent symptoms. One had an anastomotic ulcer. No complications resulted from DILAT or from stenosis.

Conclusion: In our study group, GJ stenosis symptoms were successfully treated with one endoscopic balloon dilation to 12 mm. If symptoms persist after one dilation one must look for alternate causes for the symptoms. UGI series done on POD1 is not a reliable predictor of stenosis. There is no significant weight loss benefit from stenosis in our study.

Bariatric Surgery-P137

CORRELATION OF PATIENT DEMOGRAPHICS AND CO-MORBIDITIES WITH GASTROJEJUNOSTOMY STRICTURE FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS,

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Gastrojejunostomy ulcers and strictures remain the most common cause of dysphagia following laparoscopic Roux-en-Y gastric bypass (LRYGB). The reported incidence in the literature ranges from 5-27%. Presently little or no data exists in regards to the pathophysiology of strictures and even less is known of their correlation with patient-dependant variables. The present study retrospectively reviews 731 consecutive bypasses performed by 2 surgeons at a single institution to determine patient-dependant variables associated with symptomatic stricture formation. All gastro-jejunal anastomoses were performed using an anti-gastric, anti-colic approach with a 25mm EEA stapler. A minimum of 3 month (range 3-48 months) follow-up was available for all patients.

The overall stricture rate for this series was 9.8% (72/731). The median time to symptomatic dysphgia with stricture on endoscopy was 49 days (range 21-315 days). All strictures were serially dilated until relief of dysphgia or to a maximum of 15mm. The mean number of dilations prior to relief was 1.8. Dilation alone was successful in 97% of patients with no endoscopy related complications. Only 2 patients required laparoscopic revision of their gastrojejunostomy.

Rate of stricture formation did not correlate to patient age or body mass index. No correlation was seen with surgeon's experience or patient co-morbidities including gastroesophageal reflux disease, diabetes, NSAID dependant osteoarthritis, hypertension or hypercholesterolemia. A trend for a higher incidence in female patients was observed ($p=0.05$). The present study suggest that GJ strictures following LRYGB has poor correlation with patient dependant factors other than gender. The incidence of strictures was not altered by surgeon's experience. The present series is also one of the largest to demonstrate the safety and efficacy of serial endoscopic dilation as the treatment of choice for these strictures. Future studies should be directed at determining the influence of surgical technique on stricture formation.

Bariatric Surgery-P138

INFLUENCE OF COMPLICATIONS AND EXTENT OF WEIGHT LOSS ON QUALITY OF LIFE (QOL) IN PATIENTS UNDERGOING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS (LRYGB),

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INTRODUCTION: Obesity decreases QOL but bariatric surgery improves it. This study evaluates the effect of LRYGB, postoperative complications, and percent excess body weight loss (EBWL) on QOL.

METHODS: SF-36 were administered preop (n=505), one year (n=237) and two years (n=106) following LRYGB. Student's t-test and multiple logistic regression analysis were used to compare groups. Complications were defined as requiring additional intervention or hospitalization. 1998 US norms served as the controls.

RESULTS: Bariatric patients scored significantly lower on all scales compared to controls. This improves after LRYGB (see table). A complication or $<50\%$ EBWL has a negative effect at 2 years but was significantly improved from baseline.

CONCLUSIONS: QOL in bariatric patients is worse than controls but is improved 1 and 2 years after LRYGB. A complication or $<50\%$ EBWL loss slightly decreases this improvement.



SCALES	FREOP	1 YR	2 YR	p*	p**
Physical Function	31.5	52.3	52.7	<0.0001	0.512
Role of Physical	38.9	54.1	51.8	<0.0001	0.025
Body Pain	35.5	54.7	51.8	<0.0001	0.027
General Health	35.3	56.9	54.6	<0.0001	0.023
Vitality	35.2	57.4	52.2	<0.0001	<0.0001
Social Function	36.5	53.3	49.4	<0.0001	0.003
Role Emotional	41.9	52.9	49.4	<0.0001	0.003
Mental Health	43.4	54.3	50.2	<0.0001	0.001

*Student's t test analysis of 1 YR and 2 YR versus FREOP scales.
 **Student's t test analysis of 1 YR versus 2 YR.

Basic Science (cellular bio, physiology)—P139

HEPATIC CELLULAR IMMUNOLOGICAL ANTI-TUMORAL DEFENCE AND HEMATOGENOUS COLORECTAL TUMOR SPREAD AFTER CO₂- AND HE-LAPAROSCOPY COMPARED TO LAPAROTOMY IN AN EXPERIMENTAL MODEL, Devdas T Inderbitzin MD, Grisca Marti, Simone Eichenberger, Lukas Kraehenbuehl MD, Hoptal Cantonal Fribourg, Fribourg, Switzerland / University of Fribourg, Fribourg, Switzerland

INTRODUCTION: The influence of laparoscopy and gas quality on hepatic cellular immunological anti-tumoral defence and hematogenous tumour spread is still under debate. As hepatic macrophages play a key-role in hepatic anti-tumoral reaction, this study aims to assess the overall intra-hepatic macrophage count and hematogenous tumor load in an experimental model.

METHOD: 27 male syngenic WAG/Rij rats were randomized into three operative groups: CO₂- and He-laparoscopy at 12 mmHg (CO₂/He-LS; n=9 each) and laparotomy (LT; n=9) as negative control. Total operating time was 90 min. At 45 min after setup rats were given a defined intra-portal injection of CC531s colon adenocarcinoma cells by a silicon catheter. Animals were sacrificed on days 7, 14 and 28 after surgery. Mean density of macrophages (Antibodies: Total ED1, tissue resident ED2 and freshly homed ED1-ED2) over the whole of the liver parenchyma as well as hepatic tumour load was determined by local stereology (immuno-fluorescence / confocal laser scanning microscopy).

RESULTS: TABLE Post-operative hepatic macrophage density was significantly higher after He-LS followed by LT and by CO₂-LS. Accordingly, hepatic tumor load was significantly lowest after He-LS and highest in CO₂-LS (Mann-Whitney).

	7d		14d		28d	
	ED1	ED2	ED1-ED2	ED1	ED2	ED1-ED2
LS-CO ₂	17.4*	13.9*	4.6	18.9*	13.4*	6.4
LS-He	37.4*	33.4*	5.1	38.9*	38.9*	9.0
LT	26.0	21.3	4.7	30.4	25.7	8.7

*Results given as median (SD) (p<0.05 compared to LT (Mann-Whitney))

CONCLUSION: This study demonstrates a decreased cellular anti-tumoral immunological defence after CO₂-LS and higher post-operative hepatic tumor-load after colorectal tumorell injection into the portal vein compared to more protective LT and He-LS. Whether these findings are of clinical relevance needs further investigation.

Basic Science (cellular bio, physiology)—P140

BIPOLAR SEALING DECREASES MESENTERIC TENSION DURING BOWEL TRANSECTION WHEN COMPARED TO STAPLED DIVISION: CLINICAL EVIDENCE AND LABORATORY SUPPORT IN A PORCINE MODEL, Roberto J Manson MD, Eric J DeMaria MD, Ross L McMahon MD, Aurora D Pryor MD, Department of Surgery, Duke University Medical Center, Durham, NC 27710

INTRODUCTION: Mesenteric division may be required to create a tension free anastomosis, but the ideal technique has not been defined. In our patients undergoing Roux-en-Y gastric bypass (RYGB), mesenteric division technique was changed from laparoscopic stapler (LS) to bipolar sealing (BS, LigaSure, Valleylab Inc) for cost reasons. We sought to objectively assess whether or not the mesenteric division method influenced the mobilization length of the roux limb. An animal model was developed to test this hypothesis and clinical complications related to roux limb tension (bleeding, leak, stricture) were analyzed in a population of RYGB pts.

METHODS: 1) Bowel and mesenteric divisions were performed alternating LS and BS on the mesentery in a porcine model. Six pigs received 8 mesenteric divisions each. One half

Newton of force was applied for one minute. The distance between the divided limbs of bowel was measured with a caliper. 2) To assess the clinical impact with RYGB patients extraluminal bleeding, leak rate, and post-operative strictures were analyzed in laparoscopic RYGB pts before and after incorporation of BS in our practice. Pts analyzed for post-operative stricture had at least one year follow-up.

RESULTS: 1) In the porcine model, the length of mesenteric stretch averaged 92.7 mm with LS (68.9 - 121.3) and 104.2 mm with BS (82.1 - 158.7). When compared with a student's paired t-test, mesenteric division with the BS device led to greater enteric limb reach (p = 0.004). 2) In the lap RYGB pts, 160 pts with LS division were included, all of whom were at least 1 year post-op. A total of 792 patients with BS were analyzed for leak or bleeding. Of these, 479 patients were over one year post-op and were included for stricture analysis. 3/160 (1.9%) LS pts had bleeding compared to 20/792 BS pts (2.5%, NS). There was 1 gastrojejunal leak with LS (0.6%) versus 10 (1.26%) with BS (NS). Stricture rate was significantly different in the groups with 7 strictures with LS (4.37%) and 1 stricture with BS (0.2%, p=0.001).

CONCLUSIONS: Bipolar sealing for mesenteric division is superior to stapler for optimizing enteric limb length at constant tension in a laboratory model. Clinical evidence supports this hypothesis in pts undergoing RYGB surgery by a decrease in complications which can arise from roux limb tension.

Basic Science (cellular bio, physiology)—P141

MICROARRAY ANALYSIS OF THE MOLECULAR EFFECTS OF OPEN AND LAPAROSCOPIC SURGERY ON MURINE SPLENIC T CELLS IN AN ONCOLOGIC MODEL, Patricia Sylla MD, Richard L Whelan MD, Columbia Presbyterian Hospital

INTRODUCTION: Surgical trauma has potent effects on immune function with broad clinical implications. We previously showed in a murine model that abdominal surgery results in changes in splenic T cell gene expression, some of which are specific to open or closed methods. In this study, it was hypothesized that splenic T cell gene expression would also be selectively modulated following laparoscopic and open surgery in the setting of an established malignancy.

METHODS: Eighty-one 8 week-old male C3H/HeJ mice received intradermal inoculation with 1.5x10⁵ MC2 tumor cells and 5 mice served as controls. After 3 weeks, animals with tumors (n=5/group) underwent anesthesia alone (AC), sham laparotomy (Lap), or CO₂ pneumoperitoneum (CO₂) and were sacrificed 12 or 24 hours later. RNA was isolated from purified splenic T cells, pooled, and then hybridized to Affymetrix oligonucleotide microarrays. For each experiment, gene expression was compared to that of non-tumor bearing controls, and cluster analysis was used to identify groups of genes with similar expression patterns across treatment groups.

RESULTS: When the 6 groups (AC, Lap, CO₂ at 2 timepoints) were considered together, a total of 567 genes demonstrated altered expression (1.5 fold change or greater) in at least 1 group. Cluster analysis identified 21 computationally distinct gene expression patterns. This approach identified gene groups that were universally induced or repressed after tumor inoculation and also identified genes that were uniquely altered after either Lap or CO₂.

CONCLUSIONS: CO₂ and Lap have specific effects on splenic T cell gene expression in an oncologic model. The clinical implications of these transient gene expression changes are not clear presently. A deeper understanding of these changes and their impact on immune function may have clinical relevance in patients with cancer who require surgery.

Colorectal/Intestinal Surgery—P142

INDICATIONS FOR COLONOSCOPY IN PATIENTS UNDER AGE 50, Azadeh Azarbayejani BS, Richard L Whelan MD, Daniel L Feingold MD, Kathryn Baxter MS, Tracey D Arnell MD, Division of General Surgery, Section Colorectal, New York-Presbyterian Hospital, Columbia Campus

INTRODUCTION: Screening colonoscopy is currently recommended at age 50 in average risk patients, with limited data available for younger age groups. The study aim was to



POSTER ABSTRACTS

review the indications for and findings of colonoscopy in patients under the age of 50. The presence of findings proximal to the splenic flexure was evaluated to determine an age at which colonoscopy rather than flexible sigmoidoscopy should be performed.

METHODS: A retrospective chart review of all patients under age 50 who had first colonoscopy at a single hospital between 1999 and 2005 was performed. Patients with a history of inflammatory bowel diseases, polyposis syndromes, other primary cancers, and prior colon resections were excluded. **RESULTS:** 270 patients had full colonoscopy, mean age 41.2 (age range 23-49). 48 patients (17.8%) were under age 35. A family history of colon cancer was present in 48 patients (17.8%). Indications for colonoscopy were bleeding (50.0%), abdominal pain (16.7%), constipation (8.5%), change in bowel habits (7.8%), perianal disease (5.2%), diverticulitis (4.1%), anemia (2.2%), and other (3.0%); with 47 patients (19%) having multiple indications. 170 patients (63.0%) had normal colon exams with 45 (16.7%) having benign perianal disease. 56 patients (20.7%) were found to have 73 polyps; 25 hyperplastic polyps and 48 neoplastic lesions. The neoplastic lesions were found in 40 patients (14.8%); consisting of 30 tubular adenomas, 5 tubulovillous adenomas, and 13 cancers (4.8% of all patients). Positive findings proximal to the splenic flexure were found in 25 patients (9.3%); consisting of 8 hyperplastic polyps in 6 patients and 25 neoplastic lesions in 19 patients, 2 of which were cancers. Only one patient under age 35 had a proximal positive neoplastic finding, a cancer. This patient presented with weight loss, anemia, melena, and retroperitoneal mass on imaging. No other patients under age 35 had positive neoplastic findings. Of all patients with positive neoplastic findings 60% presented with bleeding and 12.4% had a positive family history. **CONCLUSIONS:** Patients under age 50 presenting with symptoms have a considerable risk of positive neoplastic findings. Since a significant number of these lesions may be located proximally, full colonoscopy should be considered. Flexible sigmoidoscopy alone may be sufficient in most presenting patients younger than 35, without a significant family history, as the risk for proximal neoplastic lesions in this group is low.

Colorectal/Intestinal Surgery-P143

ARE ANTHROPOMETRIC MEASUREMENT PREOPERATIVE PREDICTORS OF OPERATIVE DIFFICULTY AND CONVERSION NEED DURING LAPAROSCOPIC APPROACH TO RECTAL DISEASES?. PRELIMINARY RESULTS OF A SERIE OF 38

PATIENTS, Carmen Balague PhD, Eduardo M Targarona PhD, Sandra Vela MD, Juan Carlos Pernas MD, Juan Monill PhD, Albert Pey MD, Silvia Rofin MD, Carmen Martinez MD, Jordi Garriga PhD, Manel Trias PhD, Service of Digestive Surgery. *Service of Radiology. Hospital Sant Pau. Univ of Barcelona. Spain.

In rectal cancer (RC), the pneumoperitoneum hasn't the same influence as in the abdominal cavity in order to permit the lap surg (LS). Other factors as pelvic characteristics and tumor size can determine the technical difficulty of LS. Objectives: To identify the anthropometric and pathologic features with predictive value of technical difficulty or conversion to open surgery during LS of RC. Material and methods: prospective study of patients diagnosed of RC and submitted to LS in our department. Radiological study by Abdominal CTScan with CT Siemens SOMATON plus 4. Axial scans since iliac crests to ischiatic tuberosities, 5 mm wide. Multiplanar reconstruction in a SIEMENS Magic View 1000 workstation measuring the axis: -promontorium-retropubic, -subsacral-retropubic, -lateral (axial oblique), -maximum and minimal lateral and ant-post pelvic diameter in tumoral location, craneo-caudal, lateral and ant-posterior tumor diameter, and craneo-caudal, lateral and ant-post prostatic diameter in men. (In a second step a 3D reconstruction will be performed with a DICOM file obtained during CT scan in order to evaluate the predictive value of volumetric measurements). Univariate (and Multivariate) analysis is performed. Predictive variables: age, sex, BMI, previous abdominal surgery, prostatic and tumoral volume, tumoral location, the different pelvic axis (referred previously), neoadjuvant radioquimiotherapy, type of surgery and TNM. Dependent vari-

ables: op time, technical difficulty (4 degrees), perop blood loss, Perop complications (dicotomic variable), conversion rate, morbidity (dicotomic variable) and hospital stay. Results: Jan/04-August/05. 38 patients (12 w and 26 m) with a mean age of 72 +/- 8 years have been included. Mean tumor and prosthetic volume is 52 +/- 31 cc and 42 +/- 19 cc. Op time was 190 +/- 31 min. with a conversion rate of 8% (3 patients). In univariate analysis (still not enough patients for multivariate one) we observed correlation with statistical significance between the min. ant-post pelvic axis at tumor location and the Subsacral-retropubic axis with the degree of difficulty and the op time, and also between the promontorium-retropubic axis and the degree of difficulty. Conclusion: Some pelvic parameters can act as predictors of operative difficulty. A-P axis seem to be more determinant than lateral axis. Still necessary to enlarge the number of patients.

Colorectal/Intestinal Surgery-P144

THE ROLE OF LAPAROSCOPIC-ASSISTED, HAND-ASSISTED/HYBRID, AND OPEN METHODS FOR DIVERTICULITIS, Emre Balik MD, Victor Moon MD, Avi Belizon MD, Daniel Feingold MD, Tracy Arnell MD, Kenneth A Forde MD, Vesna Cekic RN, Patrick Horst BS, Tanya Arazani BS, Richard Whelan MD, Columbia University Medical Center, NY, NY, USA

INTRO: Although minimally invasive colectomy for diverticulitis has become the gold standard it is not feasible in all patients and, in some series a high conversion rate has been noted. Some experts embrace either a hand-assisted or a laparoscopic method for elective cases. The colorectal service at our institution uses laparoscopic-assisted (Lap), hand-assisted/hybrid (H/H) methods, and open (OS) methods on a selective basis. The purpose of this retrospective review was to determine: how often each of these 3 methods was used, the characteristics of each sub population, the operation performed, and the short term results. Is there a pattern and rationale discernible as to the selection of the surgical method?

METHODS: The hospital and office data bases/charts of patients who underwent diverticular resection from January 2000 to August 2005 were reviewed. The presence of simple and complex disease, the operation performed, complications, and short term outcome were assessed. The hand-assisted and hybrid (laparoscopic mobilization, devascularization followed by inferior laparotomy to complete the case) methods were grouped together.

RESULTS: During this period 195 patients underwent colectomy: Lap, 109, H/H, 36 (20 Hand, 16 Hybrid), and OS, 50. There were 11 emergencies (5% of total); 9 (81%) were done via OS methods (Lap 1, H/H 1). The percentage of patients in each group whose final diagnosis included either a fistula (bladder, vagina, or skin) or associated abscess was: Lap, 26%; H/H, 75%; and OS, 72%. The vast majority had an anastomosis constructed (Lap 99%, H/H 94%, OS 88%) and proximal diversion was established in: Lap, 7%; H/H, 23%; OS, 27%. The Lap group had significantly shorter or lower: incision size (Lap 5.9cm, H/H 10.9cm, OS 21.3cm), estimated blood loss (Lap 354cc, H/H 605cc, OS 722cc) and postoperative stay (5.6 days vs 8.3 days vs 12 days). The length of resected colon was similar for the 3 groups. There was no significant difference in the rate of leaks (Lap 1%, H/H 0%, OS 6%) or wound infection (Lap 9%, H/H 20%, OS 20%).

CONCLUSION: The choice of surgical methods was largely based on severity of disease. H/H or OS approach patients were more likely to have complex disease, be diverted proximally, have a greater blood loss, and a longer LOS. Most emergencies were done with OS methods. The choice of methods did not affect length of bowel resected or the leak rate. A rational approach to diverticular disease includes all three methods.

Colorectal/Intestinal Surgery-P145

DOES INCISION SIZE PREDICT LAPAROSCOPIC COLECTOMY OUTCOMES?, Emre Balik MD, Victor Moon MD, Avi Belizon MD, Daniel Feingold MD, Tracy Arnell MD, Kenneth A Forde MD, Vesna Cekic RN, Patrick Horst BS, Tanya Arazani BS, Richard Whelan MD, Columbia University Medical Center, NY, NY, USA



INTRO: ?Conversion? to open methods is necessary in some undergoing laparoscopic-assisted colectomy (LC). Conversion rates range from 5 to 26%. In most series, conversion is associated with higher complication rates. There is no consensus about what constitutes a conversion and, thus, it is difficult to compare series. This study?s purpose was to determine whether conversion as defined by incision length alone is useful in predicting the outcome of patients undergoing LC. Although this is an arbitrary method it can be easily applied and, if widely utilized, would permit straight forward comparison between series.

METHODS: A retrospective review of patients that underwent LC (no hand assist or hybrid procedures) between 1992-2005 at a single hospital was carried out. Data concerning demographics, indication, type of operation, largest incision length, complications, and length of stay (LOS) were collected. A ?conversion? was defined as any case in which an incision larger than 7 cm was made.

RESULTS: A total of 637 (M 320:F 317) patients underwent LC. The indications for surgery were: cancer 301 (47%), benign neoplasm 174 (27.3%), diverticular disease 106 (16.6%), and other indications 56 (8.8%). There were a total of 131 conversions (20.6%) as defined by the above criteria. The converted group (CG) and non-converted group (NCG) were compared in terms of median incision length (12 vs. 5cm, respectively, $p<0.001$), median blood loss (500 versus 250cc, $p<0.001$), and median LOS (7 versus 5 days, $p<0.001$). There were 7 (5%) anastomotic leaks in the CG, compared with 7 leaks (1%) in the NCG (p value <0.01), 11 (8%) wound infections in the CG compared with 12 (2%) in the NCG (p value <0.003) and 21 patients (16%) in the CG had prolonged ileus versus 45 (9%) in the NCG (p value <0.01). There was one post-operative death in each group.

CONCLUSION: The greater than 7cm incision length conversion criteria identified 2 significantly different groups. ?Conversion? was associated with significantly higher morbidity and greater length of stay when compared to completed LC cases. The use of a strict length criteria is arbitrary and may not be ideal for high BMI patients and those with bulky pathology. However, until a better, more comprehensive, conversion criteria is devised, the use of a strict incision length criteria to define conversions is recommended.

Colorectal/Intestinal Surgery-P146

ENDOSCOPIC RESTORATION OF INTESTINAL CONTINUITY AFTER HARTMANN'S PROCEDURE., SERGIO J BARDARO MD, MICHEL GAGNER MD, KAZUKI UEDA MD, KE GONG MD, ALFONS POMP MD, Division of Laparoscopic Surgery. New York Presbyterian Hospital ? Weill Medical College. Cornell University. United States of America.

Introduction: After a Hartmann's procedure a second intervention is needed for intestinal continuity. An endoscopic technique was developed for those patients with high surgical risk avoiding a permanent colostomy and enhancing their quality of life.

Material and Methods: We performed an endoscopic reversal colostomy after performing a Hartmann's procedure in four human fresh cadavers. After a standard Hartmann's procedure, we attached the rectal stump to the elbow of the colostomy marked with a radiopaque steel ring. The colostomy is set as low as we can in the anterior abdominal wall. We closed the infraumbilical medial incision with a running suture. Under fluoroscopic guidance we introduced a circular endoscopic stapler through the anus. After arriving to the steel marker and under direct vision we progress the trocar of the stapler where we attached the anvil. We then closed the stapler and fired it. The endoscopic stapler is retrieved and a colonoscopy is performed to inspect the anastomosis. Then the colostomy is dissected and mobilized to close it with a linear stapler. We controlled our procedure reopening the abdomen for anastomosis inspection, with 100% of success.

Conclusion: We consider feasible this endoscopic procedure to restore intestinal continuity after a Hartmann's procedure.

Colorectal/Intestinal Surgery-P147

DOES INCISION LENGTH TO BMI RATIO BETTER PREDICT CLINICAL OUTCOMES IN HIGH BMI PTS AFTER LAP-ASSISTED COLECTOMY? - A NOVEL DEFINITION OF CONVERSION.,

Avraham Belizon MD, Patrick K Horst BA, Emre Balik MD, Victor Moon MD, Vesna Cacic RN, Tanya Azarani, Daniel Feingold MD, Tracy Arnell MD, Richard L Whelan MD, Columbia University Medical Center, New York NY USA

What constitutes a conversion for laparoscopic-assisted colectomy (LC) is unclear. Where cited, the most commonly used criteria is incision length (IL). To better compare abdominal wall trauma among patients(pts) of varying body habitus the influence of BMI should be considered to avoid misclassification of high BMI pts who require larger incisions for extraction. This study?s purpose was to determine if the IL/BMI ratio more accurately predicts clinical LC outcome in high BMI pts when compared to IL criteria alone.

Methods: A retrospective review of 216 LC pts, in whom BMI data was available, who had LC between 2003 and 2005, was carried out. Two conversion criteria were assessed; IL alone and the IL/BMI score (IL/BMI X 100). Conversion was defined as IL greater than 7 cm or by an IL/BMI score greater than 30. The mean IL, length of stay (LOS), major morbidity, and overall morbidity was determined.

Results: Using the 7 cm IL criteria, 62 pts (29%) were converted and 71% completed; the average LOS was 9.3 and 5.9 days ($p<0.0001$), the rate of major morbidity was 15.2% and 6.3% ($p=0.0014$), and the overall morbidity was 45.8% and 16.6% ($p<0.0001$), respectively. When the IL/BMI criteria was applied, a total of 19% of the pts were considered converted and 81% completed; the average LOS was 10.3 and 6.1 days ($p<0.0001$); the rate of major morbidity was 17.1% and 6.9% ($p=0.0021$) while the overall morbidity was 53.7% and 17.7% ($p<0.0001$), respectively. Eighteen pts judged to be converted by the IL method (29% of all IL conversions) were considered completed via the IL/BMI criteria (mean BMI 31); their average LOS (7.5), major (11.1%) and overall morbidity (27.8%) rates were not significantly different from the results of ?completed? pts (incision <7 cm). Nine of the 18 had a BMI greater than 30 (mean BMI = 40.5) and mean incision size of 9cm. For this high BMI group, the rate of major morbidity (0) and the overall morbidity (22.2%) were significantly lower than the results of the IL converted group ($p<0.0001$), however, no LOS difference was noted. **Conclusion:** Using this IL/BMI criteria, 1/3 of IL conversions were considered completed. Their outcome results were more similar to the IL completed group(<7 cm) than to the converted pts(>7 cm); half had a very high BMI and big incision yet had low morbidity rates. A standardized conversion criteria that considers BMI and IL more fairly assesses high BMI pts who, using strict IL criteria, are viewed as converted.

Colorectal/Intestinal Surgery-P148

LAPAROSCOPIC REPAIR IS AN ATTRACTIVE OPTION IN IATROGENIC COLONIC PERFORATION, Joshua I Bleier, MD, Victor Moon* MD, Daniel Feingold* MD, Richard L Whelan* MD, Tracy Arnell* MD, Toyooki Sonoda, MD, Jeffrey W Milsom, MD, Sang W Lee, MD, New York Presbyterian Hospital. Columbia campus*, Weill-Cornell campus., NY, NY

Introduction: Iatrogenic perforation (perf) during colonoscopy is a rare, but serious complication. The standard approach to these injuries is an open repair (OP). We hypothesize that laparoscopic primary repair (LAP) may result in improved outcomes. The purpose of this study is to compare outcomes of patients (pts) who underwent either OP or LAP for iatrogenic colonic perf.

Methods: We reviewed our prospectively collected pt database from 2001 to 2005. We compared post-operative outcomes of pts who either underwent OP or LAP primary repair after iatrogenic perf of the colon.

Results: The OP and LAP groups had similar demographics in regards to age and sex. All pts had perf at the sigmoid colon except for one LAP pt who had cecal perf. All pts but one LAP pt (paracentesis) had colonoscopic injuries. All perms were due to mechanical trauma not related to polypectomies.



POSTER ABSTRACTS

(median range)	LAP (N = 10)	OP (N = 5)	p values
Incision (mm)*	12, 10-60	120, 120-240	0.001
LOS (days)*	5, 2-8	9, 5-14	0.01
Complication**	1/10	4/5	0.02
OR time (min)*	100, 60-140	90,40-130	NS
EBL (ml)*	30, 0-200	50, 50-100	NS

*Mann-Whitney U; ** Fisher's exact

Conclusion: Laparoscopic repair resulted in shorter LOS, shorter incision length, and lower complication. LAP is a promising treatment for iatrogenic colonic perf.

Colorectal/Intestinal Surgery-P149

LAPAROSCOPIC COLON RESECTION FOR CANCER IN THE ELDERLY. STRICT AVOIDANCE OF COMPLICATIONS WARRANTS GOOD RESULTS., Alexandre Bouchard MD, Jean-Pierre Gagné MD, Roger C Grégoire MD, Centre Hospitalier Universitaire de Québec, Québec, Canada

Objective: The purpose of this study was to compare the outcome of laparoscopic colon resection (LCR) for cancer between patients above and below 70 years of age.

Methods: This is a retrospective study of consecutive LCR for cancer done by a single surgeon at one academic health sciences center over a decade. In the absence of any contraindication related to the tumor itself, all patients were offered a laparoscopic resection. Charts and billing data were reviewed. Data extracted included demographics, American Society of Anesthesiology (ASA) classification, complications and 30-day mortality. The patients were divided in two: Group A, Above 70 years-old and Group B, Below 70 years-old.

Results: Over a twelve-year period (1993-2005), 165 cases, divided equally between the two groups, were done. Median age was 77 (70-92) for Group A and 63 (45-69) for Group B. ASA Classes 1, 2 and 3 were respectively divided as follows: Group A, 6%, 69%, 23%; Group B, 31%, 60%, 6%. The complication rate for the whole group was 31.5% (Group A: 46%, Group B: 17%). Median hospital stay was 7 days for Group A and 4 days for Group B. For uncomplicated cases, the median hospital stay was similar (4 days) in both groups. However, in the occurrence of any complication, it increased to 13 days in Group A and to 6 days in Group B. There were 3 post-operative deaths in Group A and 1 in Group B.

Conclusion: Our study suggests that the complication rate of LCR for cancer is higher in the elderly. But, in the absence of any complication, outcomes of LCR for cancer in this subset of patients might be similar to those of younger patients. This finding should prompt surgeons to apply extra caution regarding the operative and hospital courses of elderly patients undergoing LCR. This might also suggest that aged patients are not ideal candidates for surgeons into their learning curve of LCR.

Colorectal/Intestinal Surgery-P150

LAPAROSCOPIC COLON RESECTION FOR CANCER. A SINGLE COLORECTAL SURGEON INITIAL EXPERIENCE., Alexandre Bouchard MD, Jean-Pierre Gagné MD, Roger C Grégoire MD, Centre Hospitalier Universitaire de Québec, Québec, Canada

Objective: The purpose of this study was to review the very initial experience of a colorectal surgeon with laparoscopic colon resection (LCR) for cancer.

Methods: This is a retrospective study of consecutive LCR for cancer done by a single colorectal surgeon at one academic health sciences center over a decade. Charts and billing data were reviewed. Data extracted included demographics, American Society of Anesthesiology (ASA) classification, Body Mass Index (BMI), types of procedures, conversions, complications, operative room data, AJCC staging, resection margins, 30-day mortality, hospital stay and survival.

Results: Over a twelve-year period (1993-2005), 165 cases (53% female) were done. There were 63 right colon resections, 84 left colon resections, 17 abdominoperineal resections (APR) and 1 total colectomy. Median age was 70. ASA classification was as follows: Class 1: 19%; Class 2: 64%; Class 3: 15%. Mean BMI was 26 (17-42). Conversion and complication rates were 11.5% and 31.5% respectively. Median operative time was 195 minutes (90-360) while median blood loss was 100 cc. AJCC

staging was as follows: Stage 0 : 0.6%; Stage I: 37.6%; Stage II: 30.3%; Stage IV: 10.3%. All resection margins were clear with a median distal length of 9 cm, excluding APR's and the total colectomy. Thirty-day mortality was 2.4%. Median hospital stay was 5 days (2-86). Median follow-up was 2.6 years (0-11.5). There were 10 cancer-related deaths in Stage I, II and III patients. There was one trocar-site recurrence.

Conclusion: Outcomes of LCR for cancer performed by a colorectal surgeon without any prior laparoscopic training are similar to results reported by centers dedicated to laparoscopic surgery.

Colorectal/Intestinal Surgery-P151

LAPAROSCOPIC VS. OPEN RESECTION WITH RECTOPEXY FOR RECTAL PROLAPSE, B J Champagne MD, G Orangio MD, W Ambroze MD, M Schertzer MD, D Armstrong MD, D Choat MD, GEORGIA COLORECTAL SURGICAL ASSOCIATES

PURPOSE: Laparoscopically-assisted resection with rectopexy is an effective treatment for rectal prolapse. Prior studies comparing laparoscopic procedures with open resection and posterior rectopexy (ORR) are scarce and have been limited in sample size and included a variety of technical approaches in the open repair group. The purpose of this study was to evaluate the effectiveness of laparoscopic resection with posterior rectopexy (LRR) for rectal prolapse compared to ORR.

METHODS: Between June 2001 and June 2005 the study included 31 patients who underwent LRR and 55 patients who underwent ORR for rectal prolapse. Patients who underwent Ripstein or Altmeier repairs and those who had rectopexy without resection were excluded from the study. A retrospective chart review was performed on both groups.

RESULTS: There was no significant difference between the groups in age, sex, ASA class, number of previous abdominal operations, prior repairs for prolapse, and recurrence after surgery. The mean difference in length of stay was statistically significant ($p < 0.001$) and was 4.3 days in the laparoscopic group and 6.4 days in the open group. Complications requiring re-operation including ventral hernia, small bowel obstruction, and recurrent prolapse were more common in the open group (21%), compared to the laparoscopic group (6%; $p = 0.043$).

CONCLUSIONS: Laparoscopic resection with rectopexy for rectal prolapse can be performed with morbidity and recurrence rates comparable to open procedures. In addition we found a statistically significant advantage in terms of shorter length of hospital stay and decreased need for reoperation in the laparoscopic group.

Colorectal/Intestinal Surgery-P152

DOES MESENTERIC DIVISION WITH ULTRASONIC ENERGY SOURCE PROVIDE BETTER SMALL BOWEL MOBILITY?

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Objective: To compare mobility of the small bowel after mesenteric division using an endoscopic stapler or ultrasonic device.

Methods and Procedures: Adult pig small bowel was isolated and 6 cm length of mesentery perpendicular to the bowel was marked, and divided using either linear stapler or harmonic stapler. Traction was applied using a spring scale to stretch the mesentery with a 0.5 pound force. The length of the mesentery was then remeasured from the inner edge of bowel. This process was repeated alternately using an Endocutter (Ethicon) and Harmonic Ace (Ethicon, Cincinnati, OH)

Results: To attain significance by t-test analysis 14 measurements were needed for 80% power. A significant difference of 0.8 cm ($\alpha = 0.05$, one-tailed) in the mean length of mesentery is necessary for comparing the two methods. After mesenteric division using the endoscopic stapler ($n = 15$) and the Harmonic Ace ($n = 15$), the lengths ranged from 6 - 9 cm, (Mean + SD; 7.57+0.75) and from 6.5 - 9 cm (7.73+0.84 cm) respectively. This was not statistically significant ($p = 0.57$).



POSTER ABSTRACTS

Mesenteric lengths (Stapler vs Ultrasonic energy)

Division by	Range (cm)	Mean	+ SD
Stapler	6 - 9	7.57	0.75
Ultrasonic	6.5 - 9	7.73	0.84

Conclusion: Staples theoretically compress and tether the mesenteric edge and prevent full mobility of bowel edge and add cost. We did not find a statistically significant decrease in the length of mesentery after division by Harmonic Ace. This suggests that the ultrasonic devices may be used in mesenteric division in place of linear staplers without increasing tension at the anastomosis

Colorectal/Intestinal Surgery-P153

NEW TECHNIQUE OF END COLOSTOMY CREATION FOR LAPAROSCOPIC APR, Chou-Chen M Chen MD, Jeo-Bin M Chen MD, Taichung Veterans General Hospital

Laparoscopic Miles' procedure is the main procedure for low rectal cancer.

We design left lower port site position for permanent end colostomy after abdominal and perineal phase operation and remove main tumor. Close the peritoneum of LLQ port, and digital dilatation of lateral space between peritoneum and anterior fascia sheath. After closure of LLQ port, re-insufflated the air through umbilical port, and dissect the inferior lateral part of peritoneum intraabdominally. The proximal colon was draw away from abdominal by retroperitoneal way. We established the way to avoid paraostomy hernia and fit the traditional method. No any complication and morbidity was noted. **Conclusion:** it is feasible for retroperitoneal end colostomy in laparoscopic APR.

Colorectal/Intestinal Surgery-P154

LAPAROSCOPIC RESECTION OF COLONIC CROHN'S DISEASE: IS IT WORTH THE EFFORT?, Kathryn M Chu MD, Peter W Marcello MD, Lahey Clinic

While numerous studies have reported the potential benefits of laparoscopic resection for terminal ileal Crohn's disease and also colectomy in ulcerative colitis, little is known about the feasibility and outcomes of laparoscopic resection of colonic Crohn's disease. This is the first study to report the results of laparoscopic resection of isolated Crohn's colitis. A sequential series of patients (pts) with Crohn's colitis undergoing laparoscopic segmental colectomy, total colectomy, or proctocolectomy were identified from a prospective registry of laparoscopic colorectal procedures. Median (range) values are reported. There were 17 patients with the following indications: steroid dependency/failure medical therapy (6), acute colitis (5), colonic stricture (5), and dysplasia (1). Procedures included total colectomy in 11, segmental colectomy in 4, proctocolectomy in 2. Primary anastomosis was performed in 5 (29%). Conversion was required in one patient (6%) due to a contained abscess. A hand assisted technique was used in 7 (41%) patients. Of the 5 patients with anastomoses, none have required permanent diversion with 27 (range 10-47) months follow-up. As with laparoscopic surgery for ulcerative colitis and terminal ileal Crohn's disease, laparoscopic resection of colonic Crohn's disease is feasible, with a low rate of conversion in experienced hands, and favorable short-term outcomes. Laparoscopic resection of colonic Crohn's is worth the effort. Surgeons experienced with ileocecal resection for Crohn's should also consider a laparoscopic approach to colonic Crohn's disease.

	Median	Range
BMI (kg/m ²)	25	(19-31)
OP (min)	240	(115-376)
Flatus (days)	2	(1-9)
LOS (days)	6	(2-18)
Morbidity	35%	
OP-operative time; LOS-length of stay		

Colorectal/Intestinal Surgery-P155

IMPACT OF A NEW TECHNOLOGY, HAND-ASSISTED LAPAROSCOPIC SURGERY (HALS) IN A SPECIALTY COLORECTAL SURGICAL PRACTICE AT A SINGLE INSTITUTION, Robert R

Cima MD, Imran Hassan MD, David W Larson MD, Eric J Dozois MD, John H Pemberton MD, Mayo Clinic, Rochester

INTRODUCTION: Our aim was to evaluate the impact on the introduction of a new technology, hand-access laparoscopic (HALS) devices on a specialty colorectal practice at a single high volume institution.

METHODS: A prospectively maintained database of all laparoscopic colorectal operations performed in a practice of board-certified colorectal surgeons was analyzed for the years 2002 and 2004. During 2003, one surgeon left, two were added, and HALS was first introduced into the practice.

RESULT: In 2002, 121 laparoscopic-assisted (LA) procedures were performed by 5 of 7 surgeons, no HALS procedures were performed. BMI was 24.11 ± 4.71 with a 5% conversion rate. In 2004, 270 laparoscopic procedures were performed (174 LA, 116 HALS) by seven of eight surgeons. BMI in each technique increased significantly 26.02 ± 4.90 and 26.40 ± 5.30 (P<0.05 compared to 2002) with a conversion rate of 9% and 7% respectively. Between 2002 and 2004, the total number of laparoscopic colorectal procedures grew by 123%, however, LA procedures increased by only 22%, while HALS procedures increased by 78%.

CONCLUSION: The introduction of HALS to a specialty colorectal practice increased the number of laparoscopic colorectal procedures by expanding both the number of new and established surgeons performing the operations. This technique, which simplifies laparoscopic colectomy, may increase acceptance of laparoscopic colectomy in the larger surgical community.

Colorectal/Intestinal Surgery-P156

PROSPECTIVE EVALUATION OF QUALITY OF LIFE OF PATIENTS WITH RECTAL CANCER AFTER LAPAROSCOPIC TOTAL MESORECTAL EXCISION, RH den Boer, MD, SO

Breukink MD, HJ van der Zaag-Loonen PhD, E Bouma MD, JPEN Pierie PhD, C Hoff MD, T Wiggers PhD, WJHJ Meijerink PhD, University Medical Centre Groningen, Medical Centre Leeuwarden

OBJECTIVE: In various studies type of surgery, age and gender had different impact on quality of life (QoL) of patients with rectal cancer. However, little is known about how the QoL of patients with rectal cancer changes after laparoscopic Total Mesorectal Excision (LTME). The aim of the present study was to investigate how the QoL of patients with rectal cancer is affected after LTME.

METHODS AND PROCEDURE: The Medical Outcomes Study Short Form 36 (SF-36), and the European Organization for the Research and Treatment of Cancer (EORTC) QLQ-C30 (generic) and QLQ-CR38 (colorectal specific) questionnaires were administered to patients before LTME, on discharge home and at 3, 6, 12 months postoperatively. Patients were treated by laparoscopic low anterior resection (LAR) or laparoscopic abdominoperineal resection (APR).

Non-parametric statistics were used to compare groups and questionnaire score over time.

RESULTS: Fifty-one patients with a mean age of 64 years participated in this study, of which 29 were male and 22 female. Thirty-eight patients received a LAR and 13 an APR. No significant differences in preoperative score and one year postoperatively were observed for all scales of SF-36, and EORTC QLQ-C30.

On the EORTC CR-38, at one year postoperatively, patients reported improvement in their perspective of the future (49 vs 69, p=0.49) as well as a decrease in weight loss (14 vs 1, p=0.15). A trend toward less defecation problems was observed (31 vs 21, p=0.54). However, sexual functioning decreased significantly (67 vs 39, p=0.10). From the third month until one year postoperatively, patients who underwent LAR reported significantly better scores on the EORTC QLQ-CR38 for sexual function and body image than patients who underwent an APR.

CONCLUSION: One year after LTME for rectal cancer, patients exhibited improvement in some QoL outcomes compared with



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the preoperative situation, including perspective of the future, despite a decrease in sexual function. Patients with laparoscopic APR experienced more impaired sexuality and had a worse body image postoperatively compared with patients who underwent laparoscopic LAR.

Colorectal/Intestinal Surgery–P157

AN APPROACH TO CRYPTOGENIC SMALL BOWEL BLEEDING COMBINING VIDEO-CAPSULE ENDOSCOPY AND LAPAROSCOPY, Yair Edden MD, Anthony J Vine MD, Mark A Reiner MD, Blair S Lewis MD, Brian L Katz MD, Mount Sinai medical center new York, NY

Five percent of gastrointestinal bleeding arises from the small bowel. The localization of the bleeding source has been revolutionized with the introduction of video-capsule endoscopy. The surgical management of these patients was traditionally by exploratory laparotomy combined with complete intra-operative full enteroscopy.

We report a series of 21 consecutive patients managed by operative laparoscopy combined with limited enteroscopy guided by the pre-operative video capsule-endoscopy. This approach assists the surgeon in localizing the source of bleeding and hence allows limited length of bowel to be resected and limited the laparotomy to an extraction incision only.

The pathological findings included one small bowel ulcer, 14 arterio-venous malformations, and miscellaneous other pathologies.

There was one major perioperative complication requiring laparotomy for anastomotic dehiscence and one patient rebled 10 months after surgery.

Colorectal/Intestinal Surgery–P158

WHAT CAN HAND ASSISTED LAPAROSCOPY (HALS) OFFER TO EXPERIENCED LAPAROSCOPIC SURGEONS, Alvaro I Garcia MD, Andrea Ferrara MD, Michelle Murday MD, Joseph Gallagher MD, Samuel Dejeus MD, Paul Williamson MD, Eduardo Krajewski MD, Colon and Rectal Clinic of Orlando

Hand Assisted Laparoscopic Surgery (HALS) may facilitate the performance of technically challenging colorectal procedures because allows tactile sensation and restore the proprioception of the surgeon. After more than ten years of experience in laparoscopic colorectal surgery a prospective trial of HALS was begun. Methods: We performed a prospective study of all consecutive procedures from May 2002 to August 2005 performed for colorectal benign and malignant pathologies.

Results: 100 hand assisted cases and 86 laparoscopic cases were included. There was no difference in patient diseases and demographics although more cases for diverticulitis were performed in the HALS group 28 versus 20. There was slight difference in OR time favoring HALS 197 min (103-379) when compared to Laparoscopic 200 min (101-418) with $p=0.7$, but when compared by site of surgery HASL was statistically significantly better than laparoscopic for total colectomy and sigmoid resection. For HALS Total colectomy average time was 298 min (277-342) versus laparoscopic 418 min (380-418) $p=0.0005$. For HALS sigmoid colectomy 195 min (108-265) versus laparoscopic sigmoid colectomy 230 min (145-348) $p=0.009$. The conversion rate was 1% (1/100) for HALS and 8% (7/86) $p=0.4$. Length of stay for HALS was 5.94 day vs laparoscopic 4.76 days. Return of bowel function was in HALS 3.4 (3-46) days versus 2.6 days (3-20) $p 0.01$, Narcotic usage was 104 mg in average for HALS versus 78 mg in Laparoscopic cases with $p 0.01$. Complications were similar in both groups (HALS 26%, Laparoscopic 21%).

Conclusions: in the hands of experienced laparoscopic surgeons we have found that more complex cases can be done using HALS when compared to conventional laparoscopy. HALS results in a decrease in operative time in Sigmoid colon resections and Total colectomy when compared to conventional laparoscopy. HALS has comparable complications and clinical outcomes to conventional laparoscopic surgery.

Colorectal/Intestinal Surgery–P159

STAPLED HEMORRHOIDECTOMY: OUTCOMES OF THE FIRST 100 PATIENTS, Alvaro Garcia MD, M Murday MD, M Gallo MD, MA Parker MD, J Gallagher MD, a Ferrara, P Williamson MD, S Dejeus MD, Colon and Rectal Clinic of Orlando

Stapled hemorrhoidectomy has been associated with less pain and faster recovery than conventional hemorrhoidectomy, however the procedure has been associated with severe complications. In addition, previous reports have suggested routine histopathologic evaluation of open hemorrhoidectomy specimen is expensive and is low yield for significant findings. This study was conducted to assess the safety of and postoperative result of this new surgical technique. Methods :

Medical records of all the patients treated with circumferential mucosectomy were obtained . Presenting symptoms. Initial physical exam, Comorbidities, indications for the surgery, postoperative pathology and complications and need for additional procedures were assessed. Results: 100 patients underwent PPH for grade 3 hemorrhoids, mixed hemorrhoids and mucosal prolapse. 35 patients developed a postoperative complication with a total of 42 complications and a need for 15 further procedures. Acute complications defined as occurring in the first 48 hours occurred in 8% of the patients. Early complications, defined as occurring during the first week of the procedure occurred in 12 % of the patients, an additional 22% of the patient developed late complications. Of these 22 patients, 10 patients had additional 11 procedures performed within the following year. 5 patients were identified with unsuspected pathology including Schistosoma japonicum, severe squamous dysplasia, carcinoid tumor and 2 polyps. Conclusion: PPH is safe but complex anorectal procedure with expected morbidity. Late complications comprise 22% of our total complications with 11% requiring second procedure. Routine pathological analysis of the stapled hemorrhoidectomy specimens revealed 5% incidence of unsuspected pathology requiring close follow up or further medical intervention. Based on these result we recommend that PPH should be done by a surgeon experienced in the recognition and management of anorectal complications. Also recommend the routine pathologic examination of the stapled hemorrhoidectomy specimens.

Colorectal/Intestinal Surgery–P160

A COST ANALYSIS OF A CASE MATCHED SERIES OF LAPAROSCOPIC VS OPEN COLORECTAL PROCEDURES IN OCTAGENARIANS, Jonathan C Gipson MD, David C Larson MD, Robert R Cima MD, Eric J Dozois MD, Heidi Nelson MD, John H Pemberton MD, Division of Colorectal Surgery, Mayo Clinic, Mayo Medical School Foundation, Rochester MN

Introduction: The increased cost associated with laparoscopic procedures in the elderly is often cited as outweighing any potential clinical benefits of this technique. Our aim was to evaluate the cost of laparoscopic colorectal procedures in patients over the age of 80.

Methods: Consecutive patients over 80 years old were identified from a prospective colorectal specific laparoscopic database collected during 1992-2004. Patients were case matched to open controls by age, type of operation and date of operation. Financial data was evaluated through an institutional financial system and all costs are reported in 2005 constant US dollars. Results are reported on an intent to treat basis.

Results: 63 Lap patients (38 women, 25 men) were case matched to 63 open controls. Median age was 84 years for both groups (lap-range 80-97). The conversion rate was 21% (n=13). Total overall cost of the lap group was significantly less than the open group (median cost \$15,971 vs \$17,537 respectively, $p=0.001$). Medicare part A costs were also less for the lap group than the open group (median cost \$12,993 vs \$14,885 respectively, $p=0.001$). Medicare part B cost was similar between the lap group and the open group (median cost \$2,687 versus \$2,732 respectively, $p=0.039$). The overall median savings in the lap group was \$1,566 per patient and the projected savings for the 63 patients is \$98, 658.

Conclusion: The use of laparoscopic surgical techniques by colorectal surgeons in the elderly appears to actually decrease the cost of providing surgical care for elderly patients.



Colorectal/Intestinal Surgery-P161

LAPAROSCOPIC COLECTOMY IS ASSOCIATED WITH LESS POSTOPERATIVE GASTROINTESTINAL DYSFUNCTION, Eyal Hashavia MD, Danny Rosin MD, Yaron Munz MD, Moshe Shabtai MD, Amram Ayalon MD, Limor Dinur MSc, Oded Zmora BA, Department of Surgery and Transplantation, Sheba Medical Center, Tel Hashomer, Israel

Objective: Major abdominal surgery is associated with early postoperative gastrointestinal dysfunction, which may lead to abdominal distention and vomiting, requiring nasogastric (NGT) tube insertion. The aim of this study was to compare the rate of early postoperative NGT insertion following open and laparoscopic colorectal surgery.

Methods: A retrospective chart review of patients who underwent colorectal surgery in whom NGT was removed upon completion of surgery was performed, to identify those who required re-insertion of the tube on the early post operative course. Re-insertion rate in patients who had laparoscopic surgery was compared to the open group.

Results: There were 103 patients in the open group and 227 in the laparoscopic one, of which 42 were converted to open surgery.

Reinsertion of NGT was required in 18.4% of patients in the open group, compared to 8.6% in patients in whom the procedure was completed by laparoscopy ($p=0.02$). Conversion to open surgery resulted in reinsertion rate of 17%.

Conclusion: laparoscopic colorectal surgery is associated with less postoperative gastrointestinal dysfunction, resulting in significantly lower rate of NGT reinsertion.

Colorectal/Intestinal Surgery-P162

LAPAROSCOPIC SURGERY FOR COMPLICATED AND UNCOMPLICATED DIVERTICULAR DISEASE: IMPACT ON CONVERSION RATES AND PATIENT OUTCOMES., Imran Hassan MD, Robert R Cima MD, David W Larson MD, Eric J Dozois MD, Megan M O'Byrne MS, Dirk R Larson MD, Division of Colon and Rectal Surgery, Mayo Clinic, Rochester, MN

INTRODUCTION: The aim of this analysis was to determine the impact of complicated and uncomplicated diverticulitis on conversion rates and complications in patients (pts.) undergoing laparoscopic surgery (LS) for diverticular disease (DD).

PATIENTS AND METHODS: Between 1993 and 2004, 125 pts. underwent LS (91 laparoscopic-assisted (LA) and 34 hand-assisted (HA) for DD (79 uncomplicated and 46 complicated). Cases not completed laparoscopically were considered converted. Complicated diverticulitis was defined as DD associated with an abscess, fistula, bleeding or stricture. Patient age, gender, BMI (body mass index), ASA (American Society of Anesthesiologists) score, presence of medical comorbidities, previous abdominal surgery, type of LS (LA vs. HA) and diverticular disease (complicated vs. uncomplicated) were analyzed using univariate and multivariable logistic regression.

RESULTS: Mean age was 59 years with 67(54%) men and a mean follow-up of 24 months. The conversion rate was 20% (25 pts). Factors associated with conversion in a univariate analysis included previous abdominal surgery (30% vs 9%, $P=0.004$), complicated diverticulitis (30% vs 14%, $P=0.026$) and LA (24% vs 9%, $P=0.056$). These 3 variables were jointly significant in a multivariable model (Odds Ratio of 4.5, 3.4 and 4.7 respectively). Early complications (<30 days from surgery) occurred in 29% of pts. Twenty-four long-term complications (> 30 days from surgery) occurred in 23 pts. and the 1 and 3-year cumulative probabilities of these complications were 16% and 32% respectively. Early and long-term complications were not significantly higher among pts. requiring conversion (36% vs. 27%, $P=0.40$ and 41% vs. 30%, $P=0.45$) or among pts. with complicated diverticulitis (39% vs. 24%, $P=0.11$ and 37% vs. 29%, $P=0.67$).

CONCLUSIONS: LS for complicated diverticulitis is associated with a higher conversion rate. Patient outcomes are not adversely impacted by LS for complicated diverticulitis or LS requiring conversion to an open procedure.

Colorectal/Intestinal Surgery-P163

IDENTIFICATION OF MISSING INTRAUTERINE DEVICE BY DIAGNOSTIC LAPAROSCOPY, Bryan S Helsel MD, Renee Thai MD, Holly Olson MD, Jerry Izu MD, Mathew H Chung MD, Stanley M Zagorski MD, Department of Surgery and Obstetrics and Gynecology, Tripler Army Medical Center, Honolulu, Hawaii

BACKGROUND: Intrauterine device (IUD) is a safe and effective form of contraception. Although rare, uterine perforation by an IUD can result in serious morbidity and mortality. We report a case in which laparoscopy was utilized to locate a missing IUD, facilitate its removal, and allow the patient to continue her pregnancy with no morbidity.

CASE REPORT: An asymptomatic 25 year-old woman presented to her primary care physician for evaluation of missed menses. Eight months earlier, she had undergone an unremarkable, postpartum IUD placement. A urine pregnancy test was positive followed by a serum quantitative value of 790mIU/mL. Physical examination revealed a missing IUD string and an unremarkable pelvic examination with a retroverted uterus. Transvaginal ultrasound demonstrated a possible small gestational sac with double-ring sign and absence of IUD. Transabdominal ultrasound revealed a hyperechoic linear opacity posterior to the uterus. A KUB showed an IUD at the level of the sacroiliac joint. She was asymptomatic and without clinical evidence of peritoneal signs or sepsis. Laparoscopic exploration revealed the IUD to be embedded in the small bowel along the right pelvic sidewall. A small laparotomy was performed in order to remove the IUD from within the small bowel. She was discharged on post-operative day five without complications

DISCUSSION: Patients with IUD perforation may present with a wide variety of symptoms depending on the migration of the device. If the perforation is a chronic process, the patient may be asymptomatic or only have vague complaints. Laparoscopy can be extremely valuable in the diagnosis and facilitate removal with minimal access.

Colorectal/Intestinal Surgery-P164

MULTIMODAL APPROACH FOR SAFE ANASTOMOSIS DURING LAPAROSCOPIC LOW ANTERIOR RESECTION FOR RECTAL CANCER, Hitoshi Idani MD, Masanobu Maruyama MD, Masahiko Muro MD, Takashi Ishikawa MD, Tatsuaki Ishii MD, Shinya Asami MD, Shinichiro Kubo MD, Hiroki Nojima MD, Shinichiro Watanabe MD, Hitoshi Kin MD, Department of Surgery, Fukuyama City Hospital

Background: It is very important but difficult to occlude, irrigate and divide the distal rectum with a safe tumor margin during laparoscopic low anterior resection (Lap LAR) for rectal cancer. The aim of this study was to evaluate the safety and the efficacy of our newly established multimodal approach for anastomosis during Lap LAR.

Methods and Procedures: Between November 1996 and June 2005, 48 patients with rectal cancer underwent laparoscopic low anterior resection in our hospital. We chose one of four techniques for each anastomotic procedure. In every case, the anastomosis was performed with double stapling technique (DST). When the tumor located at the upper rectum, the distal rectum was occluded with intracorporeal ligation or a detachable clamp and divided with endlinear stapler. When there wasn't space or view enough for those procedures, the operation was done with minilaparotomy (7-10cm). When the tumor located at the lower rectum and detected laparoscopically, the distal rectum was occluded with a stapler before the anastomosis with DST (Triple stapling technique, TST). When the tumor located at the lower rectum and TST could not be performed or the tumor could not be detected, the proximal rectum was divided with a stapler and prolapsed through the anus, then the distal rectum was irrigated and divided with a safe margin under direct vision (Prolapsing technique). Diverting ileostomy (DI) was added to patients with more than 3 risk factors of leak.

Results: Anastomosis during Lap LAR was performed with Minilaparotomy, ligation/detachable clamp, TST and prolapsing technique in 11, 4/4, 12 and 1 patients, respectively. DST without irrigation was performed in 16 patients with early rec-



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tal cancer. DI was performed in 3 patients, which was closed 3 months after the initial surgery. Mean operative time was 197 min. The start of liquid food was 2.5 postoperative day (POD). There was no mortality. Leak occurred in two patients (4.2%) who had more than 3 risk factors of leak. But the leak did not occur in the recent 16 consecutive patients after the completely establishment of our multimodal approach. During a median follow up period of 48 months, there have been no anastomotic recurrence and no cancer related death. 45 patients are no evidence of recurrence so far.

Conclusions: Our multimodal approach is very safe and effective for performing anastomosis during Lap LAR for rectal cancer and can standardize its procedure.

Colorectal/Intestinal Surgery-P165

AQUAVAN® INJECTION FOR SEDATION IN PATIENTS UNDERGOING ELECTIVE COLONOSCOPY: RESULTS OF A PHASE 2 DOSE-RANGING STUDY, James B. Jones, MD, Michael L

Weinstein MD, Jim Hinson, Jr. MD, Chao Wang PhD, Ekaterina Gibiansky PhD, Lawrence Cohen MD, Metropolitan Gastroenterology Group; Unicorn Pharma Consulting; Guilford Pharmaceuticals Inc.; New York Gastroenterology Associates, New York

Introduction: This phase 2 study was designed to determine the optimal dose regimen of AQUAVAN® Injection (fospropofol disodium, AQUAVAN), a new aqueous prodrug of propofol for the induction of moderate sedation in patients undergoing elective colonoscopy.

Methods and Procedures: Randomized, open-label, multicenter, 2-part, adaptive dose-ranging study. ASA I/II patients without evidence of airway compromise undergoing routine colonoscopy were eligible. Part 1a: matrix-adaptive randomization to evaluate 3 pretreatment doses (0.5, 1.0, 1.5 µg/kg) of fentanyl followed by 7.5, 10.0, or 12.5 mg/kg bolus doses of AQUAVAN. Part 1b: weight-based, fixed-dose regimen of AQUAVAN (range 630-980 mg) plus fentanyl (range 50-100 µg) using 4 weight and 2 age categories. Clinical assessments of sedation using the Modified OAA/S scale with range of 2-4 considered optimal.

Results: One hundred patients were randomized in Part 1a and 64 in Part 1b. The median times from initial AQUAVAN bolus to sedation (Modified OAA/S ≤ 4) were 2 and 2 min respectively, for Parts 1a and 1b. Most patients (75% and 89%, respectively) required only one dose of AQUAVAN to achieve adequate sedation, and 62% in both groups required no supplemental doses of AQUAVAN to maintain sedation. The median times to fully alert, fully recovered, and ready for discharge were 11, 20, and 37 min, respectively, in Part 1a and 12, 20, and 36.5, respectively, in Part 1b. Motor skills and cognitive function returned to baseline at 8-12 and 30 min respectively. Sedation was rated as ?just right? by 95% of all patients, and >90% of physicians stated the regimens produced adequate sedation. The most frequently reported adverse event was mild to moderate paresthesia. One patient experienced a serious adverse event, a 3-min episode of apnea, which resolved with manual ventilation; however, no patient required intubation and there were no hospitalizations or deaths.

Conclusions: AQUAVAN, administered either on a per-kg or a weight-based, fixed-dose regimen, combined with fentanyl, appears safe and effective for sedation during colonoscopy. Sedation associated with use of AQUAVAN is characterized by rapid onset and fast recovery.

Colorectal/Intestinal Surgery-P166

LAPAROSCOPIC RECTAL RESECTION WITH PREOPERATIVE RADIOTHERAPY, Akiyoshi Kanazawa MD, Shinichi Sugimoto MD, Hiroshi Takeda MD, Hajime Hikino MD, Atsuo Tokuka MD, Nobuhiro Osaki MD, Dept. Surgery, ?@Shimane Prefectural Central Hospital

[Background] Combination therapy of total mesorectal excision and a short-term regimen of high dose preoperative radiotherapy is one of standard method for advanced rectal cancer in open surgery. On the other hand, very few case of preoperative radiation therapy with laparoscopic resection was reported. In this paper, we reported the preliminary trial of laparoscopic total mesorectal excision with preoperative radiation for advanced rectal cancer.

[METHOD] Between July 2002 and August 2004, 63 cases laparoscopic resection for rectal cancer was performed by a well-trained surgeon. We applied preoperative radiation therapy with laparoscopic total mesorectal excision for 11 cases lower rectal cancer with mp or deeper invasion of main tumor. 5Gy X 5days (total 25 Gy) applied to patients 3 weeks before radical operation.

[RESULTS] All cases in the non-radiotherapy group had anastomosis after resection. 5 cases of abdominoperineal resection, 4 of low anterior resection and 2 of Hartmann operation were performed after radiotherapy. 55 percent of patients have CR or PR in preoperative CT study and 64 percent of patients have pathological changes. Average operation time of radiotherapy group and non-radiotherapy group were 357±47 minutes and 233.2±88.6 minutes (p<0.05), respectively. The overall postoperative morbidity was 27 percent in the radiotherapy group and 6 percent in the non-radiotherapy group. No anastomotic leakage was observed in both groups. There was no postoperative mortality in all cases.

[CONCLUSION] This study shows preoperative radiotherapy leads to prolong the operation time. However, laparoscopic total mesorectal excision with a short-term regimen of high dose preoperative radiotherapy is safe procedure in terms of postoperative outcome. This should be one of suitable strategy for advanced rectal cancer.

Colorectal/Intestinal Surgery-P167

LAPAROSCOPIC COLECTOMY FOR MALIGNANT DISEASE IN OBESE VS NON-OBESE PATIENTS, S Karmali MD, H Sebahang MD, C Gill Pottruff BS, M Anvari PhD, Departments of Surgery, McMaster University and University of Calgary

Introduction: The efficacy of laparoscopic colectomy for malignant disease in obese subjects is not known. The objective of our study was to compare the technical aspects, operative outcomes and oncologic proficiency of laparoscopic colectomy for malignant disease in obese versus non obese patients.

Methods: From January 1999 to August 2004, 20 laparoscopic colectomy patients with BMI ≥30 (8M:12F, mean age 67.20±2.61 yrs, mean BMI 32.95±0.66) underwent laparoscopic colectomy for malignant disease. This cohort was matched by procedure performed, disease stage, age and sex to 20 patients (7M:13F, mean age 70.05±2.06 yrs, mean BMI 25.25±0.57) from a pool of 72 patients with BMI<30 who underwent surgery in the same time period, by an blinded independent observer.

Results: 1 patient in the BMI≥30 was converted due to extensive adhesions and portal hypertension. There was 1 perioperative death in the BMI<30 group. There were no significant differences between the two groups with respect to any of the short-term outcomes and or in disease-free or overall survival between the two groups.

	BMI≥30 (n=20)	BMI<30 (n=20)	p value
OR Time (min)	140.05±11.64	128.20±8.31	0.3109
Complications	5/20 (25%)	6/20(30%)	0.7233
LOS (days)	5.95±1.02	5.95±0.85	1.0
Recurrence	2/20 (10%)	2/20 (10%)	1.0
3 Yr Survival	17/20 (85%)	18/20 (90%)	0.6326

mean±se

Conclusion: These results suggest that laparoscopic colectomy for malignant disease can be performed safely with similar outcomes and oncologic proficiency in obese compared with non-obese patients.

Colorectal/Intestinal Surgery-P168

LAPAROSCOPY FOR ACUTE ADHESIVE SMALL BOWEL OBSTRUCTION: IS LAPAROSCOPIC ASSISTED SURGERY

?BETTER? THAN CONVERTED?, Marat Khaikin MD, Nathan Schneiderei MD, Susan Cera MD, Eric Weiss MD, Dana Sands MD, Juan Noguerras MD, Steven Wexner MD, Colorectal Surgery, Cleveland Clinic Florida

Introduction: The aim of this study was to assess laparoscopic management of acute adhesive small bowel obstruction (SBO) and compare benefit from different laparoscopic techniques.

Methods: Retrospective review was performed to identify



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patients who had laparoscopy for acute SBO due to adhesions. Demographic and clinical characteristics, surgical details, and postoperative course data were reviewed.

Results: Over 6 years, 27 patients had laparoscopy for acute adhesive SBO (12 male, 15 female; mean age 55.6 years). Procedure was laparoscopically completed in 14 patients (51.9%), and in 9 (33.3%) conversion was required. 4 patients (14.8%) required a small target incision for segmental resection. No anastomotic leaks, missed injuries, or intraabdominal abscesses were recorded; there was no operative mortality. There were no significant differences between converted and laparoscopic assisted groups regarding length of stay (p=0.88), operative time (p=0.64), and bowel function (p=0.79). There were differences when comparing converted surgery to laparoscopy alone group in length of hospital stay (p=0.0002) and bowel function (p=0.0007).

Conclusion: Laparoscopy alone for acute adhesive SBO is feasible and this technique offers the advantages of a shorter hospital stay, faster return to full activity, and decreased morbidity. Laparoscopic assisted surgery is associated with an increased risk of postoperative complications, and this surgery does not differ from converted to open surgery in patient outcome.

	Laparoscopy	Lap Assisted	Converted
n	14	4	9
Oper time (m)	73	97.5	85
Hosp stay (d)	3	8	9
BM (d)	3	4	5
Complic (%)	7	25	33

Colorectal/Intestinal Surgery-P169

PROSPECTIVE STUDY OF SELF ADMINISTERED ENEMA FOR LEFT COLONOSCOPY., Iqbal Z Khan, Afaq Z Khan MD, S A Khan, A H Medani, O Elzamzami, D Buckley, Department of Surgery, Midland Regional Hospital, Mullingar, Co. Westmeath, Republic of Ireland

This is a prospective study comparing home enemas vs hospital administered enemas in 63 patients. Instructions were given either on outpatient visit or at home over the telephone. Group 1 patients were given written and verbal instructions at outpatient visit. Group 2 patients were contacted by telephone; phosphate enema was posted to them with written instructions. All patients were given a questionnaire on their satisfaction. Adequacy of preparation was graded by the endoscopist, blinded to the preparation method, on a scale of 0-10. Group 1 (20 patients). 14 (70%) agreed. 6 (30%) refused and another 2 (10%) were unable to self administer. Group 2 (22 patients). 9 (41%) agreed, 3 (13.6%) were excluded due to inability and 10 (45.45%) were reluctant. Group 3 (21 patients) reluctant or unable to administer home preparation were given the enema by the nursing staff. Bowel preparation was better in Group 1 & 2. There was higher acceptance rate when the procedure was explained in person. Satisfaction in both groups was similar.

	Group 1	Group 2	Group 3
Mean Score 0-10	9	9.2	8.6
Inadequate Prep	12%	14%	27%
Patient accepta	70%	41%	N/A
Patient satisfa	80%	84%	N/A

Home administration had a high degree of patient satisfaction. Majority of patient administered the enema satisfactorily, with good results. There was a reduced nursing workload, with a improved throughput in the endoscopy suite. We now routinely offer this preparation at the time of outpatient consultation in our unit.

Colorectal/Intestinal Surgery-P170

LAPAROSCOPIC D3 LYMPH NODE DISSECTION WITH PRESERVATION OF THE SUPERIOR RECTAL ARTERY FOR THE TREATMENT OF PROXIMAL SIGMOID AND DESCENDING COLON CANCER, Michiya Kobayashi MD, Ken Okamoto MD, Tsutomu Namikawa MD, Takehiro Okabayashi MD, Keijiro Araki, Department of Tumor Surgery, Kochi Medical School

Background: We demonstrate laparoscopic lymph node dis-

section around the inferior mesenteric artery (IMA) for advanced descending and proximal sigmoid colon cancer. This method preserves the superior rectal artery (SRA) to maintain the blood supply to the distal sigmoid colon.

Methods: Five cases were included from November 2004 to March 2005. For D3 lymph node dissection, the mesosigmoid incision was made until just before the root of the IMA, which was exposed with ultrasonic cutting and a coagulating surgical device to avoid bleeding. The arterial wall was then exposed with spatula type electric cautery down to the left colic artery (LCA). At least 2.0 cm of the LCA was exposed. The LCA was then clipped and cut at its root preserving the SRA. The first sigmoidal artery arising from the LCA was also clipped and cut. The inferior mesenteric vein was divided at the caudal side of the LCA and prior to joining to the splenic vein. The anastomosis was hand sewn by mini-laparotomy.

Results: All 5 cases underwent lymph node dissection laparoscopically. The mean time for lymph node dissection was 48 minutes. One case showed ileus 14 days after the operation, and this was improved by conservative therapy. There were no cases of complications originating from the lymph node dissection.

Conclusions: Although long-term outcomes should be investigated, our results indicate that this is a safe and applicable method.

Colorectal/Intestinal Surgery-P171

LAPAROSCOPIC SURGERY FOR SYNCHRONOUS COLORECTAL CANCER-SHORT TERM OUTCOME-, Yoon Suk Lee MD,

Yoon Jung Heo MD, In Kyu Lee MD, Jin Jo Kim MD, Hyun Min Cho MD, Keun Ho Lee MD, Se Jung Oh MD, Seung Man Park MD, Seung Taek Oh MD, Jun Gi Kim MD, Young Ha Kim MD, The catholic Unoversity of Korea

Introduction) After result of COST study was published, indications of laparoscopic colorectal surgery is widening lately, but laparoscopic surgery for synchronous colorectal cancer is still controversial.

Methods and procedures) From January, 2001 to September, 2005, authors experienced 19 cases of combined synchronous tumor with colorectal cancer which was treated by laparoscopic procedure, among them 7 cases were malignant synchronous tumor with colorectal cancers. We retrospectively review the medical records of patients.

Results) There are 5 male and 2 female. The mean age was 64.4 years old (49~87). 4 cases were colon cancer with early gastric cancer, 1 case was colon cancer with renal cell carcinoma, 1 case was rectal cancer with early gastric cancer, and 1 case was rectal cancer with colon cancer. 6 of them were resected successfully by laparoscopic procedure and one case was converted to open surgery because of T4 lesion of T-colon cancer. Mean operating time was 446.4 minutes. Stage I colorectal cancer was 2 cases, stage II colorectal cancer was 1 case, and the others were stage III colorectal cancer. Mean number of harvested lymph nodes is 24(9-38). Mean hospital day was 16.3 days. There were no morbidity and no mortality. Mean follow up day is 11 months (2-30 months)

Conclusion) We believe that laparoscopic surgery for synchronous colorectal cancer is technically feasible and safe procedure with reasonable short term outcome. After long term follow up, we think, oncologic safety can be demonstrated too.

Colorectal/Intestinal Surgery-P172

LAPAROSCOPIC TOTAL COLECTOMY WIHT ILEORECTAL ANASTOMOSIS., Francisco López-Köstner MD, Alejandro Zárate MD, George Pinedo MD, Felipe Bellolio MD, Maria Molina MD, Gonzalo Soto MD, Nathalia Badilla MS, Department of Digestive Surgery. Hospital Clínico Pontificia Universidad Católica de Chile. Santiago Chile.

The aim of the study is analyze the results of a prospective protocol of laparoscopic total colectomy (LTC).

Method: Prospective, descriptive study. The period of study includes all patients who underwent a LTC. (March 2002 to June 2005).

Results: During this period, 196 colorectal laparoscopic surgeries were performed, 17 of them were LTC. The mean age of the patients was 35.3 years old (r: 8-52), corresponding 82.3%



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of them to female gender. The indication for surgery was ulcerative colitis in 3 (17.6) cases, colonic inertia in 8 (47%), familial adenomatous polyposis in 5 (29.4%) and HNPCC in 1 (6%) patient. The average operative time was 281 minutes (r: 180-400) and two (11.1%) patients were converted to open surgery. The mean time of passing flatus and reinstate liquid diet was of 2 and 3 days respectively. Post operative complications occurred in 3 (16.6%) patients: hematoma of suprapubic minilap, prolonged ileus and portal vein thrombosis which was the only re-operated patient. The mean post operative stay was 6.5 days. There was no mortality. After a mean follow-up time of 22 months, 100% of the patients presented adequate continence with Wexner scores under 3, 81% presented less than 6 defecations per day, and most of them did not use antidiarrhetic medication. Ninety per cent of patient would recommend their surgery to others with similar pathology.

Conclusion: The development of LTC within a protocol allows a safe procedure with comparable results to open surgery

Colorectal/Intestinal Surgery-P173

LAPAROSCOPIC SIGMOID COLECTOMY: ANALYSIS OF 107 CONSECUTIVE CASES., Francisco López-Köstner MD, Felipe Bellolio MD, George Pinedo MD, Maria Elena Molina MD, Gonzalo Soto MD, Department of Digestive Surgery, Hospital Clínico Pontificia Universidad Católica de Chile, Santiago, Chile

BACKGROUND: The laparoscopic treatment for colonic diseases has turned to be a real alternative to laparotomy, with similar morbidity, less analgesic need and better cosmetic results. The most frequent surgery is the sigmoid colectomy (SC), mostly because of diverticular disease. The aim of this study is to analyze our experience with laparoscopic sigmoid colectomy following a prospective protocol. **METHODS AND PROCEDURES:** As a part of a protocol of laparoscopic colorectal surgery at our institution, 107 patients underwent SC between September 1999 and July 2005. A five trocar technique was used and the specimen was extracted through a suprapubic incision. We analyze the patient's characteristics, diagnosis, operative management and postoperative evolution.

RESULTS: The series is composed by 56 men and 51 women with a mean age of 57 years old. Preoperative diagnosis was: diverticular disease in 76 cases (71%), colon cancer in 28 (26%), villous adenoma in 2 (2%) and sigmoid volvulus in 1 (1%). The mean operative time was 222 min. Most of patients had high ligation of the IMA, and splenic flexure dissection. Conversion rate was 4.5% (5 patients) due to: difficult splenic flexure (2), intraoperative anastomosis leak during pneumatic test (1), locally advanced cancer (1) and easy bleeding (1). The median postoperative stay was 4 days. The mean Visual Analogue Score for each day was: day 1, 3.4; day 3, 1.7.

Twelve patients (11%) had postoperative complications: anastomotic stenosis (2); suprapubic seroma(1) and hematoma (2) (unique reoperation); wound infection (2); upper respiratory tract infection (2); anastomotic bleeding managed endoscopically (1) and others (2). No operative mortality was seen.

CONCLUSION: This study confirms that the laparoscopic SC is a safety procedure with low morbidity rate. This approach should be considered as the gold standard treatment for sigmoid resection.

Colorectal/Intestinal Surgery-P174

COMPARATIVE STUDY BETWEEN LAPAROSCOPIC AND OPEN ELECTIVE SURGERY FOR COLORECTAL CANCER., Alejandro Zárate MD, Francisco López-Köstner MD, George Pinedo MD, Álvaro Zuñiga MD, Gonzalo Soto MD, Maria Molina MD, Fernanda Ayala MS, Stefanie Mundnich MS, Department of Digestive Surgery, Hospital Clínico Pontificia Universidad Católica de Chile. Santiago Chile.

The aim of this study is to compare early results of patients who underwent elective surgery for colorectal cancer (CRC).

Method: Prospective, comparative design. A protocol of laparoscopic colorectal surgery was initiated in 1998, we included patients that we have operated on for CRC. This group was match to the laparotomy group, in the same period of time. Demographic, clinics, surgery and postoperative variables was registry and compared. The continuous and categor-

ical variables were analyzed with t Students and Chi-square test respectively, considering statistically significant a p value < 0.05. Results are analyzed with intention to treat

Results: Forty nine patients were operated on by laparoscopic access (LC) and 49 by open surgery (OC). Both groups (LC v/s OC) were statistically comparable in gender (38% females each group), age (63 v/s 65 years), type of surgery performed (12 RC, 2 TC, 3 LC, 4 APR, 6 LAR, 1 LAIER, 21 sigmoid resections) and ASA (p > 0.5). The mean operative time was longer in LC group (222 v/s 175 min; p<0.05). Conversion rate was 8.1%. The analgesia requirements for PCA and i.v NSAID was shorter in LC group (1.1 v/s 2.4 days p<0.01 and 2.5 v/s 4.8 days, p<0.01). The mean time to passing flatus and the time to reinstate oral feeding were both shorter for LC group (2 v/s 4 days, p<0.01; and 2.5 v/s 5 days p<0.01, respectively). The mean post operative stay was shorter for LC group (5 v/s 8 days, p<0.01). The morbidity rate was statistically similar (LC v/s OC: 20% v/s 18,3%; p>0.05). Lymph nodes resected and length of surgical specimens were similar for both groups (26.3 v/s 25.9 lymphatic nodes, p>0.05 and 29.1 v/s 28.5 cm, p>0.05). The total costs of sigmoid resections was similar for both groups (p>0.05)

Conclusion: The development of laparoscopic surgery for colorectal cancer within a protocol, allows comparable surgical outcomes, morbidity and costs with the open surgery.

Colorectal/Intestinal Surgery-P175

LAPAROSCOPIC SURGERY FOR DIVERTICULAR DISEASE., Francisco López-Köstner MD, Alejandro Zárate MD, George Pinedo MD, Maria Molina MD, Nathalia Badilla MS, Department of Digestive Surgery, Hospital Clínico Pontificia Universidad Católica de Chile. Santiago Chile.

The aim of this study was to analyze the results of patients operated on by laparoscopic access, for diverticular disease of the colon (DD).

Method: Prospective, descriptive study. Patients operated on between January of 1999 and May of 2005 were included. Surgery indications were recurrent diverticulitis, the persistence of the symptoms and/or an anatomic deformation after a first crisis, and the complicated diverticulitis (Hinchey 1-2) that did not respond to medical treatment. The laparoscopic technique included the use of 5 trocars and specimen removal by suprapubic minilap.

Results: Sixty four patients were operated on by DD, the average age was 53.7 years old (r: 33-82), 50% of the patients corresponding to female gender. A 59.6% of the patients had a previous abdominal surgery. The average operative time was 223 minutes (r: 140-300). Two patients were converted to open surgery (3.1%). One or more postoperative complications were observed in 8 patients (12.5%), one of which had to be re-operated. Only 2 patients presented a wound infection (3%). The intravenous analgesia was used in an average of 2.6 days. The mean time of passing flatus and reinstate liquid diet was of 1.7 and 2.3 days respectively. The mean post operative stay after surgery was 4 days. There was no operative mortality. After a mean follow-up time of 27 months only one patient (1.5%) has developed a new episode of acute diverticulitis, which responded well to medical treatment. None of the patients have developed a small bowel obstruction.

Conclusion: Laparoscopic surgery is a safe therapeutic alternative for the treatment of diverticular disease of the colon.

Colorectal/Intestinal Surgery-P176

INCIDENCE OF IATROGENIC SPLENECTOMY DURING OPEN AND LAPAROSCOPIC COLON RESECTION, Marcus M Malek MD, Edward H Chin MD, Adam L Sandler BA, Celia M Divino MD, Lester B Katz MD, Mount Sinai Medical Center, New York, NY, USA

Iatrogenic splenic injury requiring splenectomy is a well-recognized and potentially serious complication of colectomy. Emergent splenectomy can result in significant morbidity and even mortality from bleeding and post-splenectomy sepsis. Laparoscopic colectomy offers decreased pain, faster recovery, and improved visual exposure in difficult areas of the abdomen. We compared the incidence of iatrogenic splenectomy in laparoscopic colectomy with that of open colectomy over a ten year period at Mount Sinai Medical Center. A retro-



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spective chart review of all patients undergoing colon resection at Mount Sinai Medical Center during the last ten years was performed. Both elective and emergent colectomies were analyzed. Indications for surgery included both benign and malignant disease. As a result of our review, we found twelve cases of iatrogenic splenectomy occurring during open colon resection and none during laparoscopic colon resection. This study suggest another potentially unrecognized benefit of laparoscopic colectomy.

Colorectal/Intestinal Surgery-P177

LAPAROSCOPIC COLON SURGERY FOR THE GENERAL SURGEON, Sandip T Maru MD, Adam Silverman MD, Adan Kopelman MD, Leon Dick MD, Monmouth Medical Center, Newark Beth Israel Medical Center

As laparoscopic surgery gains in popularity, the demand on general surgeons to do more advanced laparoscopic cases has increased. Laparoscopic colon surgery is one such example. Reported benefits of using laparoscopic-assisted surgery compared with conventional surgery for colorectal disease include less pain, quicker return of GI tract function, shorter hospital stay, fewer wound complications, quicker recovery, and less need for immunosuppression. The May 14 issue of *The Lancet* reports there is no difference in outcome between laparoscopic and open resection for colon cancer, according to the results of a randomized, multicenter study. The editors even suggest that laparoscopic surgery may be the new gold standard for colon cancer treatment. This, along with patient demand, is pushing general surgeons to do more advanced laparoscopic cases. The authors of this poster will demonstrate our techniques of laparoscopic colon surgery that can be mastered by general surgeons whom do not have formal laparoscopic training. We hope this will help general surgeons advance to laparoscopic colon surgery; the future standard of care.

Colorectal/Intestinal Surgery-P178

KAYEXALATE CRYSTALS CAUSING COLONIC ISCHEMIA, Sandip T Maru MD, Adam Silverman MD, Adam Kopelman MD, Robert Goldenkranz MD, Monmouth Medical Center, Newark Beth Israel Medical Center

There are many etiologies of ischemic colitis ranging from shock, medications, vascular compromise or obstruction. We review a rare cause of intestinal necrosis caused by Kayexalate with sorbitol. This is a case report of an obese sixty-five year old hemodialysis dependent male with complaints of abdominal pain. He had intermittent complaints of mild right upper quadrant pain with occasional bouts of constipation. Upon initial evaluation our suspicion was acute cholecystitis, however, ultrasound examination proved to be normal. Further evaluation with colonoscopy demonstrated areas of focal ischemia at the hepatic flexure. The patient underwent a successful extended right hemicolectomy and upon histological examination kayexalate crystals were found to be the cause of his ischemic colitis. Intestinal necrosis caused by Kayexalate in sorbitol is a rare complication. It was first described by Lillimoe et al. in 1987 who reported gastrointestinal bleeding in five uremic patients after receiving Kayexalate in sorbitol enemas. Kayexalate can cause constipation and bowel obstruction due to fecal impaction as the resin binds to luminal calcium. Thus, Kayexalate is given with sorbitol which is a hypertonic solution and acts a laxative. Uremic, especially post renal transplant patients and neonates are susceptible to bleeding due to ischemic necrosis of the intestine and high mortality. Clinicians must be aware of the Kayexalates in sorbitol being a rare cause of necrosis.

Colorectal/Intestinal Surgery-P179

LAPAROSCOPIC COLON RESECTION FOR ENDOSCOPICALLY UNRESECTABLE COLON POLYP: RESULTS OF MULTI-INSTITUTIONAL EXPERIENCE, James T McCormick DO, William Harb MD, Thomas E Read MD, Harry T Papaconstantinou MD, Clifford L Simmang MD, Sharon G Gregorczyk MD, Philip F Caushaj MD, Temple University School of Medicine Clinical Campus at the Western Pennsylvania Hospital, University of Texas Southwestern Medical Center, Presbyterian Hospital of Dallas

Background: A Colon polyp that cannot be excised safely and completely colonoscopically is an indication for colon resection. This is a review of our experience with partial colectomy when performed for endoscopically unresectable colon polyps. **Methods:** A prospectively collected multi-institutional database was queried extracting information on those patients whose indication for surgery was endoscopically unresectable polyps. Specific attention was given to operative approach, pre- and postoperative pathology, anesthesia time and complications. **Results:** Twenty-six colectomies performed over a 5-month period patients had the indication of endoscopically unresectable polyp. Preoperative biopsies were obtained and benign in all cases. Partial colectomies were performed as if the diagnosis were cancer. There were 4 open right colectomies, 21 laparoscopic right colectomies, and 1 laparoscopic sigmoid colectomy. One laparoscopic colectomy was converted to open due to poor localization of the lesion. There was one major complication (pulmonary embolism) in the same patient. Average anesthesia time was 158 minutes (range 65-265). Average length of stay was 5 days (range 3-14). Final pathology demonstrated T1NO adenocarcinoma in two cases and four cases of adenoma harboring high-grade dysplasia. The remaining 20 specimens were benign adenomas. In all cases the polyp was successfully removed in the specimen with negative margins.

Conclusions: Endoscopically unresectable colon polyps can safely and effectively be addressed by laparoscopic partial colectomy. Preoperative biopsy can miss adenoma harboring carcinoma in this subset of patients therefore resection should be done as if for cancer. Adequate localization of the polyp endoscopically is critical to the success of the laparoscopic approach.

Colorectal/Intestinal Surgery-P180

TREATMENT OF ADULT INTESTINAL MALROTATION BY LAPAROSCOPIC LADD PROCEDURE: A CASE REPORT, Christopher H Moon MD, Ross D Segan MD, Ian H Freeman MD, Department of Surgery, Tripler Army Medical Center, Tripler, HI 96859

Intestinal malrotation in an adult is rare. It may manifest acutely with obstructive symptoms, but most often patients complain of vague abdominal pain. Treatment entails performing a Ladd procedure. If symptomatic, most authorities advocate operative treatment due to the risk of midgut volvulus or obstruction. We report a case of a 30 year old female who presented with chronic nausea, bloating, and abdominal pain since childhood. One month prior, her pains increased in severity and frequency. CT scan demonstrated a whirling pattern of mesentery and bowel about the superior mesenteric artery (SMA) with the superior mesenteric vein (SMV) anterior and to the left. An upper GI series with small bowel follow through showed an abnormal duodenal-jejunal junction with most of small bowel in the left lower quadrant. These findings were consistent with intestinal malrotation. A laparoscopic Ladd procedure was performed. 3 ports were used: a 10mm infraumbilical port, and two 5 mm ports at the midclavicular line slightly superior to the level of the umbilicus. With the harmonic scalpel Ladd's band was divided. The duodenum was mobilized. The small bowel mesentery was broadened by lysing adhesions near the SMA and dividing the anterior leaflet. The mesentery was detorsed and small bowel was placed in the right abdomen. The large bowel was placed in the left abdomen. An appendectomy was performed. The patient tolerated the procedure well and was discharged home five days later. We conclude that the Ladd procedure can be performed laparoscopically, thus accruing all the inherent benefits of a minimally invasive procedure.

Colorectal/Intestinal Surgery-P181

LAPAROSCOPIC ADHESIOLYSIS; LESSONS FROM A NEGATIVE RANDOMISED TRIAL OF SURFACTANT SPRAY, LESLIE NATHANSON MD, GEORGE FIELDING MD, NICK O'ROURKE MD, IAN MARTIN MD, ROYAL BRISBANE AND WESLEY HOSPITALS

Elective Laparoscopic peritoneal adhesiolysis in a group of symptomatic patients was performed. Random allocation (19



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patients in each group) to receive Pumactant powder (240mg) sprayed on the raw peritoneal surface or placebo then was followed by repeat laparoscopic adhesiolysis at 3 months. The extent of adhesions was monitored by videotaping each laparoscopic procedure. The primary endpoint was an ordinal scale which was derived for the total adhesion score from the number and grade of adhesions. In the primary efficacy analysis of total adhesion scores for the modified intention to treat population, no difference between treatment groups was found at laparoscopy 2, after adjusting for the effect of laparoscopy 1 scores, $p = 0.57$. The adjusted mean total adhesion score (95% CI) at laparoscopy 2 was 4.94 (3.66, 6.23) in the placebo group and 5.45 (4.17, 6.74) in the Pumactant group, with the difference (95% CI) in the adjusted means (placebo minus Pumactant) being -0.51 (-2.33, 1.31). The adjusted maximum total adhesion score (95% CI) at laparoscopy 2 was 5.09 (3.75, 6.43) in the placebo group and 5.52 (4.14, 6.90) in the Pumactant group, with the difference (95% CI) in the adjusted means being -0.43 (-2.36, 1.50), $p = 0.65$. Adhesions were categorised into definite (at least one adhesion reported by both assessors), uncertain (at least one adhesion reported by only one assessor) and none. All but one patient (>94%) in each treatment group had definite adhesions at the second laparoscopy. For the small bowel, 10 (47.6%) patients in the Pumactant group and 9 (47.4%) in placebo had definite adhesions at laparoscopy 2. The maximum adhesion grade appeared to be similar in the two treatment groups at each laparoscopy, as was the change from baseline. The median (range) change from baseline (laparoscopy 2 minus laparoscopy 1) was 0.0 (-1.5, 1.0) in the Pumactant group and 0.0 (-1.5, 0.5) in placebo.

Conclusion: This study definitively demonstrated a reduction in reformation of adhesions but no added benefit from 240mg Pumactant powder.

Colorectal/Intestinal Surgery—P182

A NEW STRATEGY FOR LOWER ADVANCED RECTAL CANCER: PREOPERATIVE CHEMORADIATION FOLLOWED BY LAPAROSCOPY-ASSISTED SURGERY, masanori nishioka MD, nobuhiro kurita MD, hidenori miyamoto, takashi iwata MD, mitsuo shimada MD, Department of Digestive and Pediatric Surgery, The University of Tokushima Graduate School

Objective: Preoperative chemoradiation therapy (CRT) for advanced rectal cancer reduces local recurrence. On the other hand, laparoscopy assisted surgery was accepted as minimally invasive surgery for rectal cancer. Laparoscopy assisted low anterior resection and abdominoperineal resection with preoperative CRT for lower advanced rectal cancer will preserve quality of life. The aim of this study was to evaluate laparoscopy assisted surgery with preoperative CRT for advanced rectal cancer.

Methods: This study included 6 consecutive patients who performed operation for rectal cancer after preoperative CRT. Surgical procedures, tumor stages, operation time, intraoperative blood loss, complications and local recurrence were examined.

Results: Surgical procedures were 3 laparoscopy assisted low anterior resection and 3 abdominoperineal resection without lateral lymph node dissection. CRT did not influence operations. No patients converted open surgery. Tumor stages were as follows : T2,N0,M0=1, T3,N0,M0=3 and T3,N1,M0=2. Median operation time was 592 min and median intraoperative blood loss was 563 ml. Complication was 4 wound infection. Median follow-up was 8 months and recurrence occurred in one patient and was distant and not local.

Conclusions: Laparoscopy - assisted surgery combined with preoperative CRT is suggested to be a new strategy for lower advanced rectal cancer.

Colorectal/Intestinal Surgery—P183

EARLY EXPERIENCE WITH SEGMENTAL LAPAROSCOPIC SMALL INTESTINAL RESECTION, Juan M Perrone MD, Richard A Pierce MD, Valerie J Halpin MD, Christopher Eagon MD, William G Hawkins MD, Michael Brunt MD, Margaret M Frisella RN, Brent D Matthews MD, Department of Surgery, Washington University, St. Louis, Missouri

Introduction: The purpose of this study is to evaluate our experience with segmental laparoscopic small intestine resection.

Methods: The medical records of all patients undergoing laparoscopic small intestine resection from August 1998 to July 2005 were reviewed. Patients with inflammatory bowel disease or those undergoing laparoscopic ileocelectomy were excluded. Data are given as mean \pm SD. Statistical differences (p value < 0.05) were measured using a two-tailed t-test.

Results: Laparoscopic segmental small intestine resection was performed in 26 patients (M:F; 15:11) with a mean age of 50.9 years (range, 19-87). Indications for small intestine resection were metastatic melanoma (1), neurofibroma (1), hemangioma (1), carcinoid (1), Schwannoma (1), ulcer/stricture (3), adenocarcinoma/polyp (3), diverticulum (5), post-transplant lymphoproliferative disorder (PTLD)/lymphoma (4), and GI stromal tumor (6). Laparoscopic intracorporeal anastomosis was performed in 19 patients. The mean operative time was 113 min \pm 35 and mean blood loss was 43 ml \pm 28. The mean postoperative LOS was 5.9 days \pm 3.9. There were no intraoperative complications. Eight patients experienced postoperative complications including wound infection (1), pneumonia (1), UTI (1) and ileus (2). Open reoperation was performed in 3 patients for an anastomotic leak on POD #4, a small bowel obstruction on POD #7 and an anastomotic recurrence 9 months postoperative in a patient with PTLD. There was no 30-day mortality. There were no statistical differences in mean blood loss, operative time, LOS or complication rate between laparoscopic intracorporeal and extracorporeal resection and anastomosis although postoperative LOS was longer in the laparoscopic extracorporeal resection and anastomosis group (5 days vs. 7.3 days; $p = 0.09$).

Conclusions: Laparoscopic segmental resection is feasible in patients with a variety of pathologic lesions. Further studies are needed to assess outcomes compared to open resection.

Colorectal/Intestinal Surgery—P184

OUTCOME OF ROBOTIC AND LAPAROSCOPIC-ASSISTED TOTAL MESORECTAL EXCISION, Alessio Pigazzi MD, JD Ellenhorn MD, IB Paz MD, City of Hope National Cancer Center, Duarte, CA

Introduction: Robotic operating systems are best suited for surgery in small operating fields or if great precision in the dissection is required. This study describes our experience with robotic-assisted total mesorectal excision for rectal cancer and compares it with conventional laparoscopic-assisted surgery.

Methods: From September 2004, all patients with primary, non metastatic mid and low rectal cancer in our institution were assigned to undergo either robotic or laparoscopic-assisted proctectomy with total mesorectal excision. Clinical and pathologic data from these patients were entered in a prospective database.

Results: Nine patients underwent laparoscopic and 11 underwent robotic-assisted operations in a one-year period. There was one conversion to open surgery in the laparoscopic group. Mean number of lymph nodes resected was 16 in the robotic and 15.6 in the laparoscopic group. No significant differences were observed in blood loss, operative time, length of stay, and margins (Table). The incidence of complications was similar in the two groups. There were no mortalities. The subjective operative experience for the surgeon was deemed superior during robotic operations

	Laparoscopy	Robotic	P-value
Distal margin	4.6 cm	4.4 cm	NS
OR Time	4.5 hrs	5.4	NS
Blood loss	270 ml	155ml	NS
Hospital stay	4.4 d	4.7d	NS

Conclusions: Robotic and laparoscopic-assisted total mesorectal excision are safe and feasible and have similar postoperative outcomes and oncologic results. Because of greater comfort for the surgeon, robotic surgery may have a unique niche in the minimally invasive treatment of rectal cancer.



Colorectal/Intestinal Surgery—P185

LAPAROSCOPIC MANAGEMENT OF POST-COLONOSCOPY APPENDICITIS, Roozbeh Rassadi MD, David E Stein MD, Division of Colorectal Surgery, Drexel University College of Medicine

Introduction: Appendicitis has been reported as a rare complication of colonoscopy. Post-colonoscopy appendicitis can be a diagnostic dilemma leading to a delay in the diagnosis and treatment of this disease. Laparoscopy has not been advocated as a diagnostic or therapeutic modality in this situation. We report the use of laparoscopy to treat post-colonoscopy appendicitis.

Case Report: A 62 year old female underwent a normal screening colonoscopy. She presented to the emergency room 24 hours later with complaints of diffuse abdominal pain. She had a fever of 100.2F and an elevated white blood cell count to 15,000. Upon examination she had diffuse abdominal tenderness without peritoneal signs. The remainder of her exam was normal. Computed tomography of the abdomen and pelvis showed an inflamed appendix with small amount of free air surrounding cecum. The patient underwent a diagnostic laparoscopy and was found to have acute appendicitis with no perforation in the cecum. A laparoscopic appendectomy was performed without complication and the patient was discharged home the following day. Pathology was consistent with acute appendicitis.

Conclusion. Although colonic perforation and post-polypectomy bleeding are well established complications of colonoscopy, colonoscopically induced appendicitis has been reported in the literature. A laparoscopic approach to post-colonoscopy appendicitis is ideal as it may eliminate delays in the diagnosis and treatment of this rare complication of colonoscopy.

Colorectal/Intestinal Surgery—P186

LAPAROSCOPICALLY-ASSISTED SEGMENTAL BOWEL RESECTION FOR ENDOMETRIOSIS, J P Regan MD, L G Henry MD, G M Janik MD, C H Koh MD, Columbia-St. Mary's and Milwaukee Institute of Minimally Invasive Surgery

Introduction: Laparoscopically-assisted bowel resection for endometriosis has been reported in several small series. Methods: We completed a retrospective chart review of patients who underwent laparoscopically-assisted segmental bowel resection during the course of ablative surgery for pelvic endometriosis.

Results: Between 1993 and 2005, 39 patients underwent laparoscopic exploration and resection of endometriosis that included segmental bowel resection. Mean age was 35.7 and all patients had undergone prior abdominal surgery. Segmental resections included sigmoid (19), rectal (16), small bowel (2), sigmoid + small bowel (1), and ileocolic (1). Mean operative time was 329 minutes and mean EBL was 225 cc. One patient (2.6%) required conversion to open secondary to dense adhesions in the pelvis. Mean length of stay was 4.3 days. The complication rate was 25.6%, and included urinary retention (3), trocar hernia (3), rectovaginal fistula requiring diverting colostomy (2), C.dif. infection (1), urinary tract infection (1), and pelvic abscess requiring percutaneous drainage (1).

Conclusions: Laparoscopically-assisted segmental bowel resection is safe and reproducible as part of a multi-disciplinary approach to radical excision of endometrial implants. This technique allows for the benefits of the minimally invasive approach, but requires the coordination of laparoscopic specialists in general surgery and gynecology.

Colorectal/Intestinal Surgery—P187

LAPAROSCOPIC COLECTOMY FOR COLONIC POLYPS, Avi Reshef MD, Oded Zmora MD, David Neufeld MD, Danny Rosin MD, Barak Benjamin MD, Ehud Klein MD, Amram Ayalon MD, Baruch Shpitz MD, Departments of Surgery, Sheba Medical Center, Tel Hashomer and Meir Medical Center, Kfar-Saba, Israel.

Objective: Benign colonic polyps not manageable by colonoscopy, or those with superficial carcinoma, require surgical treatment. Traditionally, formal colectomy with clearance of the lymphatic basin is performed. The aim of this study is to

review our experience with the laparoscopic approach for colonic polyps and assess the necessity for radical excision.

Methods: A retrospective chart review of patients who underwent laparoscopic colectomy for colonic polyps was performed. Initial colonoscopic biopsies were compared to the pathology report of the resected specimen.

Results: 49 patients (32 males, 27 females, mean age - 66) underwent laparoscopic colectomy for colonic polyps. Indication for surgery was presumably benign polyp in 38 patients. Superficial carcinoma in polyp was colonoscopically diagnosed in 11 patients. In 7 patients (out of 38) presumably benign lesion harbored cancer diagnosed in the colectomy specimen. None of the 18 patients who eventually had cancer however had any positive lymph nodes.

Conclusions: Although fifth of the presumably benign polyps harbored cancer, none had positive lymph nodes. These preliminary results may question the need for radical lymph node clearance in these patients.

Colorectal/Intestinal Surgery—P188

LAPAROSCOPIC COLORECTAL SURGERY: GOLD STANDARD IN AN ERA OF OCTOGENARIANS?, Dan Ruiz MD, David Vivas MD, Susan Cera MD, Dana Sands MD, Eric Weiss MD, Juan Noguerras MD, Steven Wexner MD, Colorectal Surgery, Cleveland Clinic Florida

Introduction: The aim of this study was to compare patients 75 years of age or older to younger patients undergoing laparoscopic colorectal surgery.

Methods: Data of all patients who underwent laparoscopic surgery between January 1996 and December 2004 were reviewed. Patients were divided into 2 groups: < 75 (Group I) and > 75 (Group II) years of age, and compared; comparisons were also made for prior surgery vs no prior surgery and converted vs non-converted, within each group.

Results: 609 patients had a laparoscopic procedure and included 498 patients in Group I [mean age, 52 (15-74) years] and 111 in Group II [mean age 80.65 (75-89) years]. Time to regular diet, regular bowel movements, and length of hospital stay were all significantly increased in Group II. Overall conversion was not statistically significantly different between Group I 91 (18%) vs Group II 22 (19%); similarly, there were no differences between patients who had prior surgery vs those who did not, within each group. Intraoperative complications were 25(5%) vs 7(6%); p=NS, overall postoperative complications were 75(15%) vs 7(6%); p=0.002, major postoperative complications were 25(5%) vs 10(9%); p=NS, resumption of diet (days) was 4.15 ± 2.56 vs 4.8 ± 3.04; p=0.02, return of bowel movements (days) was 4.04 ± 1.97 vs 4.56 ± 2.16; p=0.013, hospital stay (days) was 6.21 ± 4.47 vs 7.37 ± 4.52; p=0.014 and operative time (min) was 171.33 ± 71.80 vs 156.45 ± 65.07; p=0.044, for Groups I and II, respectively. Laparoscopic non-converted patients in Group II had a longer hospital stay [5.94 ± 3.8 days vs 7.26 ± 4.8 days, respectively; p=0.017], whereas patients in Group I had a longer operative time [161.41 ± 62 min vs 145.44 ± 67.75 min; p=0.0002]. When comparing non converted to converted patients within each group, both had significantly high major complications (Group I: 16 vs 9, respectively; Group II: 10 vs 0, respectively; p<0.001). The length of surgery for non converted patients who had major postoperative complications were not statistically different between the two groups [Group I 151+62 min vs Group II 172+72 min, respectively; p=NS].

Conclusion: Laparoscopic surgery is feasible for elderly patients. Overall, intraoperative and major postoperative complications and conversion rate in older patients are comparable to younger patients. Major complications are significantly higher in the non converted laparoscopic group, however this does not correlate with length of surgery.

Colorectal/Intestinal Surgery—P189

MINIMALLY INVASIVE APPROACH FOR MANAGEMENT OF SMALL BOWEL PERFORATION FROM TOOTHPICK INGESTION, Alan A Saber MD, Michael J Boros MD, Ollie Jackson MD, Michael K McLeod MD, Michigan State University - Kalamazoo Center for Medical Studies

Introduction: Foreign body ingestion with subsequent bowel perforation can be a potentially fatal event. Traditional surgery



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mandates exploratory laparotomy with possible bowel resection or repair. We herein present the first reported case within the United States of laparoscopic diagnosis and repair of a small bowel perforation due to foreign body ingestion.

Methods and Procedures: A 17 year old male presented with Rt.LQ pain, white blood cell count of 13,000. CT scan revealed fluid collection containing air adjacent to the terminal ileum. The patient was taken to the OR for diagnostic laparoscopy, laparoscope exploration revealed a toothpick perforating the terminal ileum. The foreign body was removed. The perforation was repaired with intracorporal sutures. The patient had an uneventful post-operative course and was discharged four days after the procedure.

Conclusion: Laparoscopy is a safe and effective minimally invasive modality to both diagnose and treat small bowel injuries.

Colorectal/Intestinal Surgery-P190

SMALL BOWEL OBSTRUCTION AFTER OPEN AND LAPAROSCOPIC COLORECTAL SURGERY, N Safieddine MD, J

Mamazza MD, E C Poulin MD, M Burnstein MD, C Fernandez MSc, C M Schlachta MD, Department of Surgery, St. Michael's Hospital, Toronto, Canada

Introduction: The objective of this review was to determine whether the incidence of postoperative adhesive small bowel obstruction (SBO) is decreased in the first year after laparoscopic, as compared to open, colorectal surgery.

Methods: This was a retrospective cohort study of 205 adult patients undergoing elective open or laparoscopic bowel resections as a first abdominal surgery in one hospital between January 2000 and June 2003. All patients had a minimum of one year follow up. The definition of SBO was standardized. Statistical analysis was performed with chi-square or Fisher's exact test with a 0.05 level of significance.

Results: Of 205 cases, 116 were open (O) and 89 were laparoscopic (L). These included: 105 segmental colectomies (SC) (53 L, 50 O), 50 low anterior resections (LAR) (22 L, 38 O), 5 proctocolectomies (PC) (1 L, 4 O), 7 abdominoperineal resections (APR) (5 L, 2 O), and 38 total colectomies (TC) (8 L, 30 O). Of these, 138 were for cancer (69 L and 69 O), 55 for inflammatory bowel disease (IBD) (13 L and 42 O), and 9 for diverticulitis (6 L, 3 O). The overall rate of SBO in the first year following surgery was 6.3%. There were 3 cases of SBO in the laparoscopic group and 10 in the open group giving a trend toward fewer cases of SBO with laparoscopy (3.4% vs. 8.6%, p=0.126). Considering only patients having rectal resections including LAR, APR, and PC, the incidence of SBO was significantly lower in the laparoscopic group (0% vs. 18%, p=0.034). In contrast, the occurrence of SBO was not different between groups (L vs. O) for patients having extensive resections (22% vs. 15%, p=0.587) or surgery for cancer (0% vs. 4.3%, p=0.244) or IBD (15% vs. 20%, p=0.913). Reoperation was required in two patients, both having had original open surgery.

Conclusion: This data demonstrates a trend toward lower incidence of SBO in patients having laparoscopic as compared to open colorectal resections. This reduction arises from patients having rectal resections where the incidence of SBO is significantly lower in the laparoscopic group. More study on the potential advantages of laparoscopy in pelvic and rectal surgery is warranted.

Colorectal/Intestinal Surgery-P191

SHORT-TERM OUTCOME OF EXTENDED LAPAROSCOPIC ASSISTED COLECTOMY, Jenny R Speranza MD, Michael D

Hellinger MD, Laurence R Sands MD, Floriano Marchetti MD, University of Miami

PURPOSE: While current data on laparoscopic segmental colectomy reveals multiple benefits, the data for subtotal and total colectomy has been much less encouraging. The aim of this study is to review our results of extended laparoscopic assisted colectomy (ELC).

METHODS: We collected information from a prospective database on 32 patients undergoing ELC from 11/95 to 11/04.

Follow up ranged from 2 months to 9 years. There were 20 patients with a mean age of 44.6 years. 5 cases were performed via a hand assisted technique, 3 IRA, 1 ISA, and 1 IPAA.

RESULTS: The overall conversion rate was 6%, representing 2 in the IRA group. A solid diet was begun at a mean of 3.8 days

in the ISA group, 5.1 days in the IRA group, and 7.4 days in the IPAA group. The mean length of stay was 4 days in the ISA group, 6.6 days in the IRA group, and 8.7 days in the IPAA group. 5 patients (15.6%) developed a postoperative ileus. The overall complication rate was 31% (10 patients).

Complications rates were not significantly different amongst the 3 groups. However, absence of complications resulted in a shorter hospital stay in both the IRA (4.7 v. 8.5 days) and the IPAA (8 v. 9.2 days) patients. Finally of probably greatest significance is that not a single patient suffered a bowel obstruction during the follow up period.

CONCLUSIONS: Laparoscopic assisted extended colectomy in our hands is a relatively safe procedure with a low conversion rate and a complication and ileus rate similar to that of the published literature for open surgery. Of particular note is the low rate of wound infection and bowel obstruction. Finally, our data do reveal that LOS is related to the extent of surgery and the presence of complications. We intend to show data comparing these results with our patients who have undergone similar open procedures during the same time frame.

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LAPAROSCOPIC COLECTOMY IN THE FIRST YEAR OF PRACTICE, David E Stein MD, Michael J Page MD, Anthony J

Senagore MD, Drexel University College of Medicine; Iowa Clinic; Medical University of Ohio

Purpose: Laparoscopic colectomies account for a small percentage of all colon resections performed. These procedures are technically demanding and require advanced laparoscopic skill sets. We hypothesized that graduates from colorectal surgery fellowship programs which teach laparoscopic colectomy would perform a majority of their procedures laparoscopically.

Methods: A retrospective review of all laparoscopic colon cases performed during the first year of practice by two colorectal surgery fellowship graduates was performed (DES, MJP). Analysis was by intent to treat. Elective partial colectomies, diverting stomas and reversal of Hartmann's procedures were included for analysis. Exclusion criteria were emergent cases, low anterior resections, APRs and total proctocolectomies. Demographics, surgical indications, type of surgery and conversion rates were recorded.

Results: 149 cases meeting criteria were performed in the first year of practice. The patients were 47% male with a mean age of 64 years. 89 laparoscopic cases were performed (60%) with 14 conversions (16%). The virgin abdomen conversion rate (VACR) was 5%. 16 of the laparoscopic cases were diverting stomas (14 colostomies/ 2 ileostomies) as compared to 2 in the open group (colostomies). Indications for colectomy are listed below. Indications for fecal diversion included cancer (10), infection (3), incontinence (3), decubiti (2) and chronic obstruction.

Indications	Open	Laparoscopic
Cancer	40 (67%)	32 (44%)
Polyps	8 (13%)	15 (21%)
Diverticulitis	6 (10%)	14 (19%)
Hartmann's Rev	0	6 (8%)
IBD/Misc	6 (10%)	6 (8%)

Conclusions: 1) Laparoscopic colectomy is performed more often than open colectomy by graduates of colorectal surgery fellowship programs. 2) The learning curve for these surgeons may be shorter due to technical skills learned during their advanced training. 3) Further analysis of the laparoscopic colectomy practice trends in young surgeons is required.

Colorectal/Intestinal Surgery-P193

LAPAROSCOPIC ROUX-EN-Y FEEDING JEJUNOJEJUNOSTOMY FOR ADULT ENTERAL ACCESS., Craig S Swafford MD,

Greg Mancini MD, Matthew Mancini MD, Department of General Surgery, University of Tennessee Medical Center, Knoxville, TN.

Objective: We present a laparoscopic technique that is suitable for adults with neurologic impairment namely Roux-en-y feeding jejunostomy. Enteral access options in patients with severe



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neurological deficits are many each fraught with their own complications. Gastric feeding tubes are associated with high morbidity and mortality from aspiration but are convenient in regards to maintenance and exchange. Feeding jejunostomy of the Witzel or loop type reduces aspiration risk but can have additional complications and difficulty replacing if accidentally removed. The roux-en-y feeding tube allows placement of a ballooned catheter that is easier to maintain and replace.

Case Report: We present a 24-year-old with cerebral palsy and gastroparesis referred for enteral access. Standard infraumbilical laparoscopy insertion with 10 mm port in left lateral and 5 mm right lateral was accomplished. Thirty cm distal to ligament of Treitz the jejunum was transected. We extended the mesenteric window using a 45 GIA stapler down through the mesentery to mobilize our defunctionalized jejunal limb. At this point, the jejuno-jejunostomy was created 45 cm distally using the GIA 45 stapler. The defunctionalized jejunal limb was brought up to the anterior abdominal wall and secured with T-bars trans-abdominally. This allowed us to place a percutaneous ballooned feeding tube at the limb end. Key portions of the procedure are demonstrated with both still and selected images from video photography.

Conclusion: Laparoscopy continues to offer more surgical options for patients. Though this type of procedure has been described in pediatric literature we believe there are many more indications for the same procedure in the adult population who necessitate enteral access secondary to neurological deficit and gastric dysfunction.

Colorectal/Intestinal Surgery-P194

MINIMALLY INVASIVE APPROACHES TO COLORECTAL CANCER, Jun-ichi Tanaka MD, Fumio Ishida MD, Shungo Endo MD, Shin-ei Kudo MD, Showa University Northern Yokohama Hospital

We report minimally invasive approaches to colorectal cancer (CRC) using both endoluminal treatments and laparoscopic surgery. According to our clinicopathological analysis of 23,204 patients with CRC, no lymph node metastasis was found in early stage of CRC with cancer penetration up to one third of submucosal layer, meanwhile lymph node metastasis was observed in 37 out of 341 (10.9%) with penetration beyond the one third of submucosal (sm) layer in early stage of CRC. While endoluminal treatments such as endoscopic polypectomy (EP), mucosal resection (EMR) or submucosal dissection (ESD) can be applied to early stage of CRC without lymph node metastasis, surgical resection is needed for CRC patients with possible lymph node metastasis. Forty patients out of 509 who underwent endoluminal treatment were added surgical resection due to sm massive infiltration and 5 patients out of 40 (12.5%) suffered from lymph node metastasis histologically. We have experienced 311 patients who underwent laparoscopic colorectal resection (LAC) out of 507 patients with advanced CRC for the last 4 years. LAC for advanced CRC was comparable to open surgery in terms of operation time and morbidity. Our strategy of endoluminal treatments in combination with LAC as minimally invasive approach can be clinically feasible.

Colorectal/Intestinal Surgery-P195

ENDOSCOPIC POSTERIOR MESORECTAL RESECTION: A NEW APPROACH TO TREATMENT OF T1-CARCINOMAS OF THE LOWER THIRD OF THE RECTUM, Iganio Tarantino MD, Beat P Mülle-Stich MD, Michael Zünd MD, Jochen Lange MD, Andreas Zerz MD, Departement of Surgery, Kantonsspital St. Gallen, St. Gallen Switzerland

Background: Transanal excision (TE) of T1 carcinomas of the lower third of the rectum (T1-clr) has become an established procedure although a not negligible risk of loco-regional recurrence has been reported. This potentially increased risk is tolerated due to the known high morbidity and mortality rates after transabdominal rectal resection. Dorsoposterior extraperitoneal pelviscopy makes it possible to remove the relevant lymphatic field of the lower third of the rectum from perineal, in the sense of a rectum-sparing endoscopic posterior mesorectal resection (EPMR).

Methods: A TE was performed in patients with a tumour of the lower third of the rectum endosonographically confined to the

mucosa or submucosa and no evidence of malignant lymph nodes. After completion of the usual staging we offered patients with histological confirmation of a T1-clr, as an alternative to simple clinical controls every three month, an EPMR. This second intervention was performed four to six weeks after the TE.

Results: We operated on thirteen patients with T1-clr by TE in combination with EPMR as a two stage procedure. It was possible to perform a complete excision of the primary and to resect the posterior part of the mesorectum in all cases. There was no intraoperative bleeding and the operating time ranged from 45 to 125 minutes. In two cases an intraoperative rectal perforation occurred with no postoperative relevance. Postoperative morbidity consisted of two transient neurological complications and a pulmonary embolism. There was no perioperative mortality. Histological analysis revealed a median of 8 (range, 4-20) lymph nodes within the resected part of the mesorectum. Two patients diagnosed with lymph node metastases received an adjuvant radiochemotherapy. After a median follow-up of 48 (range, 4-78) months there was no evidence for loco-regional recurrence. In one patient with negative lymph nodes but vessel infiltration liver metastasis was detected 8 month postoperatively.

Conclusion: In conclusion the EPMR is a safe and effective option in treatment of T1-clr after TE. It has to be considered whether EPMR in combination with TE allows for local radicality and an adequate tumor staging in T1-clr, in terms of a better directed therapy planning compared to TE alone.

Colorectal/Intestinal Surgery-P196

COMPARISON OF LAPAROSCOPIC VERSUS OPEN ILEOCAECAL RESECTION FOR CROHN'S DISEASE - A META-ANALYSIS, Henry S Tilney MRCS, Vasilis A Constantinides MBBS, Alexander G Heriot MD, Marios Nicolaou MRCS, Thanos Athanasios PhD, Paul Ziprin MD, Ara W Darzi MD, Paris P Tekkis MD, Department of Surgical Oncology and Technology, Imperial College London, UK

Objective: The role of laparoscopic surgery for patients with ileocaecal Crohn's disease is a contentious issue. The aim of the present meta-analysis was to compare open resection with laparoscopic assisted resection for ileocaecal Crohn's disease. **Methods:** A literature search of the Medline, Ovid, Embase and Cochrane databases was performed to identify comparative studies reporting outcomes on both laparoscopic and open ileocaecal resection. Meta-analytical techniques were applied to identify differences in outcomes between the two groups. Sensitivity analysis was undertaken to evaluate the study heterogeneity.

Results: Of 20 studies identified by literature review 15 satisfied the criteria for inclusion. These included outcomes on 783 patients, 338 (43.2%) of whom had undergone laparoscopic resection, with an overall conversion rate to open surgery of 6.8%. Operative time was significantly longer in the laparoscopic group by 29.6 minutes (p=0.002), though blood loss between the two groups and complications were similar. In terms of post-operative recovery, laparoscopic patients had a significantly reduced time for recovery of their enteric function, and a reduced length of hospital stay by 2.7 days (p<0.001).

Conclusions: In selected patients with non-complicated ileocaecal Crohn's disease, laparoscopic resection offered substantial advantages in terms of more rapid resolution of post-operative ileus and a shortened length of hospital stay. There was no increase in complications compared to open surgery.

Colorectal/Intestinal Surgery-P197

COMPARISON OF SHORT-TERM OUTCOMES OF LAPAROSCOPIC VERSUS OPEN APPROACHES TO ILEAL POUCH SURGERY, Henry S Tilney[1] MRCS, Richard E Lovegrove[1] MRCS, Alexander G Heriot[1] MD, Sanjay Purkayastha[1] MRCS, Vasilis A Constantinides[1] MBBS, Ara W Darzi[1] MD, Victor W Fazio[2] MD, R John Nicholls[3] MD, Paris P Tekkis[1,2] BA, [1] Department of Surgical Oncology & Technology, Imperial College London, UK; [2] Department of Colorectal Surgery, Cleveland Clinic Foundation, Ohio, USA; [3] Department of Surgery, St Mark's Hospital, Harrow, UK

Objectives: The present meta-analysis aims to compare short-



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term outcomes between patients undergoing laparoscopic and open restorative proctocolectomy (RPC).

Method: A literature search of Medline, Ovid, Embase and Cochrane databases was performed to identify studies published between 1990 and 2005, comparing laparoscopic (LRPC) and open (ORPC) restorative proctocolectomy. A random effect meta-analytical technique was used and sensitivity analysis performed on studies published since the beginning of 2001, higher quality papers and those reporting on more than 30 patients.

Results: A total of nine studies satisfied the selection criteria, which included outcomes on 277 patients, 142 (51.3%) of whom had undergone laparoscopic resection, with an overall conversion rate to open surgery of 0.7% (range 0-11.8%). Operative time was significantly longer in the laparoscopic group by 93.1 minutes ($p < 0.001$) and throughout the subgroup analysis, but this finding was associated with significant heterogeneity. Operative blood loss was less in the laparoscopic group by 84.1 millilitres, and in studies published since 2001 by 81.8 millilitres. There was no significant difference in postoperative adverse events between the groups. A statistically significant reduction in length of post-operative stay was observed for laparoscopic patients in high quality studies and those reporting on more than 30 patients by 1.1 days ($p = 0.02$ in both subgroups) and studies published in or since 2001 by 3.0 days ($p = 0.004$) but not overall.

Conclusion: Laparoscopic ileal pouch surgery was associated with longer operative time, lower blood loss, shorter length of hospital stay and similar short-term adverse events compared with open surgery. Comparative data on quality of life, bowel function and long-term outcomes are currently insufficient, therefore the potential advantage of laparoscopic ileal pouch surgery remains to be established.

Colorectal/Intestinal Surgery-P198

RELIABLE TRANSECTION AND ANASTOMOSIS IN THE LAPAROSCOPE-ASSISTED LOWER ANTERIOR RESECTION FOR RECTAL CANCER, Fumihiro Uchikoshi MD, Shigeyuki Ueshima MD, Shin Mizutani MD, Katsuhide Yoshidome MD, Tsukasa Oyama MD, Masayuki Tori MD, Kazuya Hiraoka MD, Yuko Yamagami MD, Hidekazu Takahashi MD, Koichiro Sueyoshi MD, Masaki Taira MD, Masaaki Nakahara MD, Department of Surgery, Osaka Police Hospital

[Background] One of the challenging scenes in the laparoscope-assisted surgery for rectal cancer might be transection and anastomosis at the lower rectum in narrow pelvic cavity. Transection using endoscopic staplers (ex. Endo-GIA or Endocutter) might be popular in most institutions. In this study, we applied staplers designed for open surgery to perform more secure rectal transection in the laparoscopic surgery.

[Operative procedure] Lap disk (120mmx100mm, Hakko, Inc. Tokyo Japan), abdominal wall sealing device developed for hand-assisted laparoscopic surgery, was attached to 5 cm pfannenstiell incision after the completion of TME procedure and division of the mesorectum. TX30G stapler (Ethicon, Inc.) was inserted through Lap disk, and first stapling was done at the distal side of the tumor. Rectum was irrigated with povidone iodine saline solution from the anus. The second stapling was done with adequate margin from the tumor, and then rectum was transected with scissors between these staple lines. The anastomosis was performed using 31 or 33 mm-sized circular stapler with DST fashion. All procedures could be done under the magnified view of the laparoscope maintaining pneumoperitoneum.

[Results] In consecutive 30 cases, one case was converted to open due to device failure. We encountered no anastomotic leakage and wound infection. Newly developed CONTOUR curved cutter (Ethicon, Inc.) might not be suitable for this procedure because on the insertion of device, 8 cm incision was required and CO₂ gas leakage occurs between the shaft and Lap disk iris valve.

[Conclusion] This technique could provide secure transection and anastomosis in the laparoscope-assisted surgery for lower rectal cancer.

Colorectal/Intestinal Surgery-P199

CONVERSION RATES FOLLOWING LAPAROSCOPIC COLORECTAL SURGERY. A 13 YEARS EXPERIENCE, David Vivas MD, Dan Ruiz MD, Alon Pikarsky MD, Eric G Weiss MD, Juan J Nogueiras MD, Dana R Sands MD, Susan Cera MD, Steven D Wexner MD, Colorectal Surgery, Cleveland Clinic Florida

Introduction: The aim of this study was to assess the characteristics of conversion following segmental colon resections during a 13-year period.

Method: All consecutive patients who underwent laparoscopic segmental resections between January 1992 and December 2004 were assessed. Patients in whom the procedure was converted to laparotomy were identified. Parameters reviewed included age, gender, diagnosis, procedure performed, operative time, intraoperative and postoperative complications, indications for conversion and length of hospital stay. Patients were divided into three groups: Group I patients operated upon between January 1992 and December 1995, Group II patients between January 1996 and December 1999, and Group III patients from January 2000 to December 2004.

Results: Between January 1992 and December 2004, 700 patients underwent laparoscopic colorectal surgery from which 516 underwent segmental colon resections (73.9%). Group I included 90 patients [mean age 58 (range 16-87) years], Group II included 135 patients [mean age 65 (range 21-89) years] and Group III included 291 patients [mean age 59 (range 18-93) years]. There were 16 patients (17.7%) in Group I, 23 patients (17.0%) in Group II, and 67 patients (22.9%) in Group III who underwent a conversion to laparotomy, with a statistically significant difference in gender among the three groups ($p = 0.02$). Similarly, there was a significant difference among the three groups relative to previous history of laparotomy ($p < 0.005$). No difference was observed among groups in terms of conversion rate, age, or surgical indications. Reasons for conversion in these groups included severe adhesions, bleeding, unclear anatomy, specimen size, and unidentified urether with a significant increase in patients who were converted due to severe adhesions in the latter group ($p = 0.01$). Mean operative time was 191, 243 and 211 minutes in Groups I, II and III, respectively ($p = NS$). Length of hospitalization was longer in Group I (10.6 days), compared to Groups II and III (7.2 days) ($p = 0.005$). There were fewer postoperative complications in Group III ($p = 0.03$); there was no mortality in this series. **Conclusion:** The feasibility of laparoscopic colorectal segmental resections has been well established. Following an initial learning curve, a plateau was reached and with a large volume of cases, the conversion rates and indication for conversion remained stable while hospital stay and post operative morbidity decreased.

Colorectal/Intestinal Surgery-P200

OUTCOMES OF STAPLED HAEMORRHOIDECTOMY COMPARED WITH CONVENTIONAL HAEMORRHOIDECTOMY, Jota Watanabe MD, Hideo Watanabe MD, Kinya Matsumoto MD, Tsuyoshi Toyota MD, Manabu Watanabe MD, Fumiki Kushiha MD, Nobuaki Kobayashi MD, 1)First Department of Surgery, Ehime University School of Medicine, 2) Division of Surgery, Watanabe Hospital

INTRODUCTION: The aim of this study was to compare functional and symptomatic outcomes of stapled haemorrhoidectomy with conventional haemorrhoidectomy.

METHODS: Two hundred eight patients with Grade III and IV hemorrhoidal disease were assigned to two groups, stapled haemorrhoidectomy group ($n = 100$) and conventional hemorrhoidectomy group ($n = 108$). After a median of 16 (range 12 to 24) months, patients were administered a standardized questionnaire. Patient satisfaction, the presence or absence of hemorrhoidal specific symptoms, including prolapse, pain, bleeding, incontinence, analgesic use were evaluated.

RESULTS: Episodes of bleeding were reported by seven patients in stapled haemorrhoidectomy group while 20 patients in conventional haemorrhoidectomy group reported episodes of bleeding ($p = 0.03$). Pain was still present occasionally in nine patients in stapled haemorrhoidectomy group and in 24 in conventional haemorrhoidectomy group ($p = 0.04$).

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There no significant differences between two groups in terms of patient satisfaction, prolapse, incontinence in long-term follow up.

CONCLUSION: Stapled haemorrhoidectomy is equally successful with conventional haemorrhoidectomy in functional outcome. However, additional follow up from larger studies is needed to further assess the stapled haemorrhoidectomy.

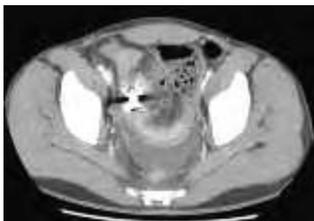
Colorectal/Intestinal Surgery–P201

CAPSULE ENDOSCOPY IN SMALL BOWEL CROHN'S DISEASE: A NOTE OF CAUTION, Amanda J Wheeler MD, Sherry M Wren MD, John Morton MD, Mark Welton MD, Andrew Shelton MD, Department of Surgery, Stanford University School of Medicine and Palo Alto Veterans Health Care System

Capsule endoscopy has allowed access to one of the most challenging areas in GI endoscopy; evaluation of the small bowel. Despite the tremendous advance that capsule endoscopy provides in the imaging of the small intestine, our case series suggest that the capsule be utilized judiciously as its diameter of 11mm can lead to obstruction of otherwise mild or asymptomatic strictures associated with small bowel Crohn's disease.

Prior to this new endeavor, endoscopic examination was limited by its significant length and distance from accessible orifices. It has been suggested that capsule endoscopy may allow early diagnosis of isolated, mid-small bowel Crohn's disease. Unfortunately, it is limited by providing only diagnostic information without any therapeutic capabilities. As peristalsis propels the capsule through the intestine it provides image accrual and transmission at a frequency of 2 frames per second until the battery expires. Adverse outcomes include failure of the capsule to progress through the bowel. We report several cases where capsule endoscopy was used in patients with known or suspected Crohn's disease in which complications directly related to the use of the capsule required surgical treatment. Below is a CT image from one of our cases demonstrating an embedded capsule with inflammation, free fluid and free air.

Although capsule endoscopy has great diagnostic capabilities, we discuss the implications of its use in patients with known or suspected strictures associated with Crohn's disease.



Colorectal/Intestinal Surgery–P202

LAPAROSCOPIC VS OPEN COLORECTAL CANCER RESECTION USING SAME CLINICAL PATH, Shigeki Yamaguchi PhD, Hirofumi Morita MD, Masayuki Ishii MD, Shuji Saito MD, Atsuyuki Maeda MD, Katsuhiko Uesaka PhD, Shizuoka Cancer Center

[Purpose] Using same clinical path (plan of postoperative course), laparoscopic (Lap) and open (Open) colorectal cancer resection were assessed.

[Patients & Method] Consecutive one hundred forty-eight colon and upper rectal cancer patients were included for this study from August 2004 to June 2005. Actual number of Lap was 86, and that of Open was 62. Indication of Lap was stage I and II, stage III indicated Open resection. According to our clinical path, soft diet should be started on Day3, discharge date should be Day7.

[Results] Mean age was Lap:64.5, Open:65.9, Male/Female was Lap:62/24, Open:35/27, Cancer location?iColon/Rectum?j was Lap:66/20, Open:48/14, cStage?iI/II/III?jwas Lap:28/58/0, Open:4/22/36, Mean operating time was Lap:207min.?iColon192, Rectum 260?j, Open:175?iColon170, Rectum191?j, Blood loss count was Lap:45g?iColon42,Rectum56?j, Open:182g?iColon 163, Rectum 250?j. Median diet start was Day3 in both Lap and Open,

Median /mean discharge date was Lap:7 /8.5, Open:9 /12.8. Factors of late discharge were Open Male: 15.3Days, Lap Rectum: 12.4, Open Rectum: 15.2, Open Long Op: 14.5, Open much Blood Loss: 17.4. Postoperative complications were Lap: 12.3??, Open: 29.0??. Details were in turn of Lap: Open, intestinal obstruction 2.3??: 6.5??. Anastomotic leak 4.7??: 8.0??. wound infection 2.3??:8.0%, etc.

[Conclusion] Laparoscopic resection resulted in good outcome of discharge. Frequency of postoperative complication may cause this outcome.

Complications of Surgery–P203

DIAGNOSTIC DILEMMA, OF INTERNAL HERNIATION AFTER POST OPERATIVE GASTRIC BYPASS PATIENTS FOLLOWING RETRO COLIC ANASTOMOSIS. DOES RADIOLOGICAL EXAMINATIONS HELP,OR IS IT DIAGNOSTIC LAPAROSCOPY?, Syed I Ahmed MD, Jon Thompson MD, Dmitry Oleynikov MD, Corrigan Mc Bride MD, Brookdale University Medical Center, University of Nebraska Medical Center

Background With the retro colic Roux-en-Y Gastric Bypass (GBP), there is the potential for internal herniation of the small bowel through the potential mesenteric defects. This is more pronounced especially in patients with excessive weight loss. The presentation included ?crampy? peri-umbilical pain, with infrequent nausea and vomiting. We discovered that there are subtle abnormalities on Computerized Tomography (CT) that are not very helpful. Instead diagnostic laparoscopy proved as a potent diagnostic tool.

Method The prospectively collected bariatric surgery database was examined for all cases with surgical exploration for possible internal hernia. It included review of records of 15 patients from 1992 till 2005 for initial operative details, presenting symptoms, current radiographic studies and operative findings.

Results These patients had presenting symptoms included nausea/vomiting 5 (33.33%), crampy abdominal pain 10 (66.66%) especially after meals. Their radiological evaluation was keenly observed together with their symptomatology. Upon radiological evaluation these patients were found to have some subtle findings. These findings included inconclusive focal small bowel dilation, mid abdominal small bowel dilation on abdominal X-ray. Computerized axial tomography finding were multiple small bowel dilation with no transition points. All of these patients underwent diagnostic laparoscopy to rule out internal hernia. 14(93.3%) had internal herniation. In 1, no anatomical pathology was discovered. These patients did well post operatively and were discharged on postoperative day 1.

Conclusion Diagnostic laparoscopy is a very important means for diagnosis and early management internal hernias when radiological findings are subtle or inconclusive.

Complications of Surgery–P204

GI RECOVERY AFTER BOWEL RESECTION (BR): LITERATURE REVIEW OF LAPAROSCOPIC (L) VS OPEN (O) BR AND COMPARISON WITH ALVIMOPAN (ALV) PHASE III RESULTS, C Delaney MD, A Senagore MD, R Prasad, J Fort MD, W Du PhD, L Techner MD, Div of Colorectal Surg, U Hosp Clev, Clev, OH, US; Med U of OH, Toledo, OH, US; Adolor Corp, Exton, PA, US

Intro: ALV significantly reduced time to GI recovery after BR by O laparotomy in randomized, controlled studies. A review was performed to compare GI recovery and hospital length of stay (LOS) from the pooled ALV phase III BR population with published literature for O and LBR. Methods:A MEDLINE database search was performed from 1995-present using these terms: LBR; laparoscopically assisted bowel surgery; L colectomy; bowel surgery L; intestinal resection L. Descriptive statistics related to outcomes were pooled whenever possible.

Summary data was compared with pooled analysis of BR patients from 3 ALV trials. Results:Summary data were limited to 28 studies from 2000-2005. 11 studies (n=1545) were conducted ex-US, and 17 studies (n=2950) were completed in the US. 93% of studies were conducted at single centers, 36% were randomized, and 64% were retrospective.



	LBR	OBR
All studies		
Time to first BM, mean days (n)	4.0 (n = 208)	4.7 (n = 253)
LOS, mean days (n)	5.9 (n = 7,130)	9.7 (n = 963)
US studies		
Time to first BM, mean days (n)	3.5 (n = 42)	6.0 (n = 42)
LOS, mean days (n)	4.6 (n = 788)	7.3 (n = 570)
Readmission rate, % (n)	9.3 (n = 1156)	8.0 (n = 981)
POI rate, % (n)	2.0 (n = 701)	8.2 (n = 981)
Non-US studies		
Time to first BM, mean days (n)	4.5 (n = 166)	4.9 (n = 211)
LOS, mean days (n)	7.9 (n = 364)	10.7 (n = 384)
Alvimopan 12 mg trials		
Time to first BM, mean days (n)	-	3.6 (n = 397)
LOS, mean days (n)	-	5.4 (n = 397)
Readmission rate, % (n)	-	7.7 (n = 413)
POI rate, % (n)	-	1.9 (n = 413)

Study endpoints from pooled analysis of ALV US trials are reported in Table 1, and are comparable with results in LBR. Conclusions: Mean LOS after BR varied from 5.9-9.7 days for all studies and was shorter in US studies compared with non-US studies. Mean time to first BM and LOS in ALV trials with OBR compared favorably with overall LBR results. Reductions in time to first BM and LOS can be achieved using various approaches including LBR and ALV treatment. Further studies investigating pharmacologic intervention in LBR are warranted.

Complications of Surgery-P205

MINIMALLY INVASIVE APPROACH TO IATROGENIC RETROPERITONEAL INJURIES: AVOIDING LAPAROTOMY, Ward J Dunnican MD, Michael G Doorly MS, Alfonso C Ciervo MD, Monmouth Medical Center

The management of iatrogenic retroperitoneal injuries during laparoscopic operations has historically focused on emergent laparotomy and exploration. Unfortunately, this leaves the patient with the morbidity of a large incision and all of the associated complications. These include, but are not limited to: hernia, increased postoperative pain, atelectasis, scarring, and wound infection.

We present a case of a young female who sustained a trocar injury to the retroperitoneum during an elective gynecologic laparoscopic operation.



The injury was managed using minimally invasive techniques, successfully avoiding the need for laparotomy. The focus of this article is to present an algorithm for retroperitoneal access injuries that may be used in such cases. When applicable, the need for emergent laparotomy may be avoided.

Complications of Surgery-P206

LATE MESH INFECTIONS FOLLOWING LAPAROSCOPIC VENTRAL HERNIA REPAIR, Melvin J Elieson MD, Karl A LeBlanc MD, Mark G Hausmann MD, Vernon K Rhynes MD, John M Whitaker MD, Maximo Deysine MD, Minimally Invasive Surgery Institute, Baton Rouge, Louisiana

Introduction: The risk factors and possible etiologies for late mesh infections following laparoscopic ventral hernia repairs (LVH) are explored.

Methods and Procedures: A single institution's series of 528 LVH repairs performed from April 17, 1992 until May 31, 2005 were retrospectively reviewed for cases of late mesh infection, greater than 3 months after operation.

Results: Three cases of late mesh infection were identified following LVH. All three patients were men with a mean age of 63.3 (range = 59 to 74). Their infections presented at an average of 12.3 months following LVH (range = 7 to 16). The patients underwent an average of 4 previous laparotomies (range = 2 to 7) prior to LVH repair including an average of 3 previous attempts at ventral hernia repair (range 1 to 7). All 3 LVH operations in this series were performed using ePTFE mesh and each had one or more meshes from previous opera-

tions left in place. Two of the patients cultured streptococcus species while one had no growth on his microbiology evaluation (although he was cultured after initiation of antibiotic therapy). Although each patient had numerous comorbidities at the time of operation, none were considered to be immunocompromising in nature.

Conclusions: Late mesh infections are a rare (0.57%) complication following LVH repair. They are frequently associated with retained mesh bringing into question the practice of leaving old mesh in place when operating on a recurrent ventral hernia. In consideration of the infecting agents in two of our patients, the use of prophylactic antibiotics whenever a patient with an ePTFE prosthesis undergoes dental procedures or other instrumentation may be of benefit.

Complications of Surgery-P207

THE USE OF AN ENDOBAG AND THE ACCIDENTAL INTRAOPERATIVE INJURY OF THE GALLBLADDER AS PROGNOSTIC FACTORS, Thorsten Goetze MD, Paolucci Vittorio PhD, Ketteler- Krankenhaus Department of Surgery

Introduction: The accidental intraoperative opening 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 tumor cells the use of an endo 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 endo bag have a prognostic advantage.

Material and method: To obtain data we are using the CAES/CAMIC- register of incidental gallbladder carcinoma. 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.

In a period of 3 months we are actualizing the data.

Results: 417 cases of incidental gallbladder carcinomas are registered.

220 were operated laparoscopically, 67(30,5%) of them get a relapse of the tumor.

99 patients were treated with the support of an endo bag, the rate of a relapse was 37,4% (n= 37).

121 of the laparoscopic group have been treated without an endo bag, the rate of a relapse was 24,8% (n= 30).

In 44 of 220 laparoscopic treated patients there was an intraoperative accidental opening of the organ, the rate of a relapse was 43% (n= 19).

In 28 of 44 cases an endo bag was used, the rate of a relapse was 46% (n= 13).

The other 17 of 44 patients who were operated without an endo bag have a rate of relapse of 35%(n=6).

The group without an intraoperative perforation (n= 176) have 27,3% (n=48) of tumor recurrence.

71 of this 176 were treated with the use of an endo bag, 22 (31%) of them had a tumor recurrence, the other 105 of the 176 patients treated without a bag had a recurrence rate of 23% (n= 24).

Discussion: In our register, the intraoperative perforation leads to a significant prognostic disadvantage (p=0.0463 Fisher's exact test).

The patients treated with an endo bag have a tendency of a higher rate of tumor recurrences (p= 0,055 Fisher's exact test). The endo bag seems not to have a protective effect.

Complications of Surgery-P208

INCIDENCE OF PULMONARY EMBOLISM AFTER LAPAROSCOPIC SURGERY - A MULTIPLE REGRESSION ANALYSIS OF 44,494 PATIENTS OF THE SALTS DATA BASE, Devdas T Inderbitzin MD, Isabelle Schmitt-Opitz MD, Urs Giger MD, Thomas Kocher MD, Lukas Kraehenbuehl MD, Hôpital Cantonal Fribourg, Fribourg, Switzerland / SALTS (Swiss Association of Laparoscopic and Thoracoscopic Surgery), Switzerland

Introduction: The aim of the current study was to analyse the incidence of post-operative pulmonary embolism following dif-



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ferent laparoscopic procedures in a nationwide prospective multi-centre study in Switzerland from 1995-2003. Material and **Methods:** Since 1989, SALTS has prospectively collected data from patients undergoing laparoscopic or thoracoscopic surgery at 114 surgical institutions in Switzerland, representing > 60% of laparoscopic procedures performed in Switzerland. DVT prophylaxis in Switzerland for laparoscopic surgery consists of sequential compression stockings and sc. low heparin. **Results:** For the time-period 1995-2003 almost 45,000 procedures (56% female, 44% male / mean age 51.4 years / 53% cholecystectomy, 18% hernia repair, 12% appendix, 5% colon, 6% oesophagus, 6% others) were evaluated and analysed. In 0.2% (n=86) of the whole patient group pulmonary embolism occurred. Univariate analysis showed significant risks for women, age, obesity, ASA classification, OR time, conversion and emergency operation. However, significant predictive factors in the multiple logistic regression analysis were sex (female), age, obesity, emergency procedure and OR time. **Conclusion:** The incidence of pulmonary embolism during laparoscopic surgery is low. Independent predictive factors are female, obesity, age, longstanding operation and emergency procedure. Conversion, the surgeon's experience as well as ASA classification were not significant predictors in the multiple regression analysis. Whether in these risk factors perioperative DVT prophylaxis has to be changed, needs further investigation.

Complications of Surgery-P209

A SURGEON AS 1ST ASST REDUCES THE INCIDENCE OF CBD INJURIES DURING LAP CHOLE, Matt B Martin MD, Kristen R Hardcastle MD, Central Carolina Surgery, PA; Moses Cone Health System

This review supports the hypothesis that a surgeon acting as first assistant during lap chole will reduce the incidence of significant CBD injuries. This is important at a time when payors seek to reduce payment for this member of the team and this can place the solo surgeon in a difficult situation when trying to recruit a surgeon to assist.

Central Carolina Surgery, PA is a single specialty general surgery group of 18 surgeons that have performed 5,431 lap choles since merging in October 1999. In those cases, 89.6% of the cases had surgeons as first assistants and 63.6% of the cases were performed with intraoperative cholangiography. Five cases of CBD injury that required bile duct enterostomy for reconstruction occurred during this period for an incidence of 0.0920%. When this same group learned lap chole in 1990 their published series (Surgical Endoscopy: (1993) 7: 300-303) of 762 cases had 98% of cases performed with a surgeon as first assistant and 0% CBD injuries. Only 27% of these cases had cholangiograms. This experience supports use of a surgeon as first assistant to lower the incidence of CBD injuries; remuneration for this member of the surgical team should be preserved.

Complications of Surgery-P210

FACTORS INCREASING MORBIDITY OF BARIATRIC SURGERY IN LOW VOLUME CENTERS ? LESSONS FROM OVER 24,000 PATIENTS., Michael Parker MD, Thomas Sullivan MD, John Pirello MD, Thomas Cerabona MD, Ashutosh Kaul MD, New York Medical College

Aim of this presentation is to define the causes of higher morbidity of Bariatric surgery in Low volume centers. 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 and institutions compared based on volume (high volume > 50 cases). 24,534 patients underwent bariatric surgery with volume jumping from 500 in 1991 to around 8000 in 2003. Average mortality in high volume centers was 0.3% compared to 1.1% in low volume centers. Patients had same mean age (40.3 years), same sex distribution (82% females) . There was a significantly increased incidence of Diabetes (high vs low;19% vs 17%)and hypertension (37.2% vs 32%) in high volume centers. No significant difference existed in incidence of Prior MI (0.6% vs 0.6%) or peripheral vascular disease (0.2% vs 0.1%).

	High	low	p-value
GI complication	8.1%	12.4%	<0.05
reintubation	1%	1.8%	<0.05
Blood transfusi	2%	2.4%	NS
Hemodialysis	0.1%	0.2%	NS
Mortality	0.3%	1.1%	<0.05

Increased incidence of postoperative GI and pulmonary complications in low volume centers should be of value to them. This provides a framework for them to concentrate on so as to improve their results. Factors that could be targeted include different selection criteria and emphasis on factors leading to postoperative GI complications. Further research will better define etiology of higher complication rates in low volume centers and tools to prevent them.

Complications of Surgery-P211

ROUX-EN-O GASTRIC BYPASS: DON'T LET THIS HAPPEN TO YOU, Vadim Sherman MD, Jeffrey Lord MD, Adrian G Dan MD, Bipan Chand MD, Philip R Schauer MD, Department of General Surgery, Minimally Invasive Surgery Center, Cleveland Clinic Foundation

Objective. We reviewed issues related to causation and patient outcomes associated with incorrect intestinal connection during gastric bypass (roux-en-O). This complication results from improper anastomosis of the bilio-pancreatic limb to the gastric pouch, with a misplaced jejunio-jejunostomy.

Methods. Four cases involving roux-en-O configuration that occurred at institutions not affiliated with the authors were evaluated. Contributory factors and outcomes were assessed.

Results. Patients' pre-operative BMIs ranged from 36.5 to 47. None of the patients had previous abdominal surgery. Two patients had an open gastric bypass and one had a laparoscopic gastric bypass. The fourth patient underwent a laparoscopic to open conversion, in which the jejunio-jejunostomy was created laparoscopically. Operative reports did not indicate any adverse events during the creation of the jejunio-jejunostomy. The site of jejunal division varied from 20 cm distal to the ligament of Treitz to 250 cm from the ileo-cecal valve. Surgeon experience ranged from novice (<10 laparoscopic gastric bypasses) to experienced (>5 years bariatric experience). One case was diagnosed intraoperatively (patient #1). The time of diagnosis in the remaining three patients was post-op day 2, 52, and 230 (patients #2, #3 and #4, respectively). Patients that experienced a delayed diagnosis underwent 2 abdominal CT scans, 2 endoscopies and 4 contrast studies each. These patients presented with protracted biliary emesis and a clinical picture of bowel obstruction. Regardless of the time to diagnosis, all patients required subsequent surgeries (n=10, 3, 1, and 3, respectively) and had multiple major complications (n=7, 4, 4, 3, respectively) with total length of stay equal to 97, 86, 49, and 125 days, respectively.

Conclusion. To our knowledge, this is the first reported series of incorrect anastomosis of bowel limbs during gastric bypass, an extremely serious complication. Technical maneuvers such as standardized roux limb lengths, marking of the roux limb and tracing bowel to the ligament of Treitz, are recommended to prevent this unusual, debilitating complication.

Complications of Surgery-P212

LEAKAGED BILE AND SPILLED GALLSTONES DURING CHOLECYSTECTOMY INCREASE ADHESION FORMATION, Ali Uzunkoy MD, Harran University School of Medicine

Aim: Bile leakage and spilling of gallstones may occur during laparoscopic cholecystectomy. We aimed in this study to investigate effects of leaked bile and spilled gallstones in abdominal cavity on adhesion formation.

Methods: Eighty rats divided into eight groups. Saline solutions were given intrabdominal cavity in first and fifth groups, bile were given in second and sixth groups, in third and seventh groups gallstones and in fourth and eight groups bile and gallstones were placed into abdominal cavity. The first four groups were sacrificed after four months and second four groups were sacrificed after eight months. The adhesions



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were evaluated and graded as 0 (no adhesion), 1 (spontaneously separating adhesions), 2 (adhesions separated by traction) and 3 (adhesions by separated by dissection). Student t test were used for statistical analysis.

Results: The median scores of adhesion formations were significantly higher in groups fourth and eight than control groups ($p < 0.05$).

Conclusion: These results suggest that dropped gallstones, especially spilled bile, may increase adhesion formation. Therefore, dropped gallstones are retrieved and spilled bile aspirated for prevention adhesion formations.

Complications of Surgery-P213

COMPLICATIONS OF LAPAROSCOPIC CHOLECYSTECTOMY TODAY? A REVIEW OF THE LITERATURE., MANMOHAN VARMA MS, PRIVATE - KANPUR, INDIA email: manmohanv@yahoo.com

OBJECTIVES: Laparoscopic cholecystectomy (LC) has emerged prominently in treatment of gallstone. Annually 770,000 procedures are performed in USA alone. Complications have also changed. Thus it is prudent to review the literature on these complications. **METHODS:** Medline & PubMed search was done for literature on the complications of LC till August 2005; its analysis is presented.

RESULTS: Bile duct injury (BDI) is the scourge of LC. Main cause is misperception & not lack of knowledge, skill or judgment. Misperception is so compelling that the problem is not recognized & is an inherent risk of LC. Only 25% BDI are found peroperatively. Its incidence is 0.5% to 1.4% (few 2.7%). It is more severe & life-threatening. Mortality & major morbidity after BDI were 12.1% & 30.3% respectively in a series of 13718 LCs. It has great impact on patient's physical & mental QOL. Some need liver transplant. Beyond the learning curve, rate of BDI is still stable with significant legal & financial implications. But BDI is lesser at many tertiary centers (0% in one). Nonbiliary damage is as frequent & devastating. Bleeding (mortality up to 0.2%) occurs from trocar sites or injury to aorta, right hepatic artery (in 32% of BDI) & right external iliac artery. Stone spillage is 5% - 40% with problems in 7.0% like infection, abscess, inflammation, adhesions, skin sinuses, bowel obstruction, pneumonia, cholelithoptysis, septicemia & middle colic vessel erosion. Added are bowel injuries (up to 0.87%); diaphragmatic injury; portal vein injury; pseudoaneurysm of right hepatic artery; ilio-iliac arteriovenous fistula; liver laceration; hemobilia; portal vein thrombosis; increased thromboembolism; large pneumothorax; huge surgical emphysema; clip migration led CBD stone; hernia through falci-form ligament defect with bowel obstruction; port site metastasis, TB & hernia. Pneumoperitoneum morbidity is up to 0.2%. Gas embolism is rare & can kill. Anesthetic hazards need specific care. Limited information on litigations after LC favor surgeons in only 17.3%.

CONCLUSION: Complications of LC make it maximally invasive with only superficial small scars. Gallstone, a very common benign disease, does not deserve risks of LC routinely. LC should be restricted to surgeons trained, experienced & working in tertiary hospitals. This would protect other surgeons from lawsuits & undue stress of avoidable competition in surgical practice. Costs of LC's complications to healthcare system would reduce too.

Complications of Surgery-P214

ACUTE DUODENAL ULCERATION FOLLOWING A LAPAROSCOPIC NISSEN FUNDOPLICATION. A CASE REPORT OF AN UNUSUAL COMPLICATION., Piotr Gorecki MD, George Wu MD, Vincent Notar-Francesco MD, Departments of Surgery and Gastroenterology, New York Methodist Hospital, Brooklyn, NY

Introduction: Laparoscopic Nissen fundoplication is a safe and well established treatment for severe gastroesophageal reflux disease (GERD). Postoperative gastrointestinal symptoms such as dysphagia, nausea, gas bloat, flatulence, postprandial fullness, early satiety and diarrhea are reported. No case of acute duodenal ulceration presenting as dysphagia and epigastric pain was reported.

Case report: A 58 year-old male presented for laparoscopic Nissen fundoplication. His symptoms included progressive

heartburn, acid reflux and regurgitation for over 6 years. His preoperative testing included endoscopic finding of esophagitis, positive 24 hour pH study, normal esophageal manometry and gastric emptying. He underwent an uneventful short and floppy laparoscopic Nissen fundoplication and was discharged home one day after the operation tolerating liquid diet. Two days later the patient was readmitted to the hospital with severe epigastric pain and dysphagia. The postoperative testing revealed no obstruction at the fundoplication site but a giant duodenal ulceration was noted. The treatment of duodenal ulceration with proton pump inhibitors (PPI's) resulted in resolution of symptoms of dysphagia and abdominal pain. **Discussion:** Although rare, the postoperative acute peptic ulceration following fundoplication may be considered as an underlying cause for postoperative dysphagia and pain especially in patients with a normal postoperative contrast esophagogram.

Education/Outcomes-P216

BROAD-BASED FELLOWSHIPS: A CORNERSTONE OF MIS EDUCATION AND DISSEMINATION, H Moloo MD, F Balaa MD, E.C. Poulin MD, H Stern MD, R Boushey MD, J Mamazza MD, The Ottawa Hospital

INTRODUCTION: This is a pilot study intended to: 1) assess the practice patterns of surgeons trained in a broad based minimally invasive surgery (MIS) fellowship and 2) access opinions regarding methods of dissemination of advanced laparoscopic skills.

METHODS: A survey was mailed to all fellows who completed a broad based (esophagus, foregut, colorectal, end organ, donor nephrectomy) MIS fellowship at one of the longest running programs in North America. A five point Likert scale was utilized for responses.

RESULTS: 85% of surgeons completed the survey. The mean age was 36.5 years, and 82% were male. 64% completed a clinical fellowship, 36% completed a combined clinical and research based fellowship. 73% are practicing in an academic setting, and 27% are pursuing a community based practice. Eighteen percent are involved with training fellows; none have initiated a fellowship program. Clinical duties are the most significant portion of practice in both academic (62%) and community (93%) settings. The median number of advanced MIS cases prior to fellowship training was 18 (range 0-49) vs. a median of 172 (range 89-328) during the fellowship. No individual felt prepared to do advanced laparoscopic procedures at the conclusion of their residency while 100% were comfortable post fellowship. All surgeons currently work in divisions which promote advanced laparoscopy; during residency surgeons felt their surgical divisions did not do this. With regards to skill acquisition, weekend courses and week long courses were perceived to be less effective as compared to proctorships. Although technical skills labs were viewed as a good method for learning basic skills, it was not viewed favorably for acquiring advanced skills. Formal fellowship training was unanimously viewed superior to all alternatives for the acquisition of advanced MIS skills.

CONCLUSIONS: The majority of fellowship trained MIS surgeons are practicing in an academic setting. The consensus of opinion was that Fellowship training was the most effective strategy for the acquisition of advanced MIS skills.

Education/Outcomes-P217

DEVELOPMENT OF STANDARDIZED CRITERIA FOR PREDICTING SUCCESSFUL OUTPATIENT LAPAROSCOPIC CHOLECYSTECTOMY, Prayag Barot MD, Gary Gecelter MD, North Shore / Long Island Jewish Medical Center, New Hyde Park, NY 11040

Introduction: Laparoscopic cholecystectomy (LC) has traditionally been performed in a hospital setting. However, as more surgeons and patients become increasingly familiar with the procedure, there has been a move to establish the LC as an outpatient procedure. Most institutions now perform the LC in the hospital as a "same-day-surgery" procedure, with the patient going home the same evening. If necessary, the patient can be admitted for overnight observation at the same facility as a "23-hour admission".

Hypothesis: It is our goal to develop a series of criteria to predict the feasibility of performing a truly "outpatient" LC at an



ambulatory care center, remote from a hospital facility. The cost benefits, as well as facility availability, is the impetus for us to perform LC at these ambulatory care facilities. However, it is critical to select the appropriate patient for this outpatient surgery, as need to be admitted overnight requires ambulance transportation to the hospital, which is neither cost-effective nor medically sound. A series of demographic, medical, and logistical criteria are evaluated to predict which patients can effectively undergo an outpatient LC. The goal is to identify which variables are predictive of a post-operative admission, and which factors have no bearing on the need to stay overnight.

Results: Initial studies have shown that four factors are most predictive of admission: (1) age over 50, (2) ASA grade III or IV, (3) afternoon start time, (4) procedure length over 90 minutes. We will also conduct a retrospective case analysis of recent cases at our institution which were conducted as "23-hour admissions" to identify which patients could have been discharged the same day, which would lead to overall cost savings for the hospital.

Conclusion: Armed with these results, our institution is about to implement a new protocol to begin LC at our newly built, remotely located, outpatient surgery facility.

Education/Outcomes-P218

INSTITUTIONAL LEARNING CURVES FOR LAPAROSCOPIC LIVE DONOR NEPHRECTOMY : A CUSUM ANALYSIS, Simon Bergman MD, Liane S Feldman MD, Maurice Anidjar MD, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal, Canada

Introduction: The introduction of laparoscopic live donor nephrectomy (LLDN) may be associated with a learning curve effect. The purpose of this study is to describe the institutional learning curve for LLDN in a low-volume center using the cumulative sum (CUSUM) method.

Methods: This is a single institution prospective study of consecutive recipients of LLDN between December 2000 and January 2005. The incidence of delayed graft function (defined as the need for dialysis in the first postoperative week) and ureteral complications (defined as a urinary leak or ureteral stricture) were recorded. The CUSUM method was used to analyze the learning curves for both outcomes. Based on published series from high-volume centers, the acceptable failure rate for both outcomes was set at 5% and the unacceptable failure rate was set at 10%. Probability of alpha and beta errors were set at 5% and 20%. The number of procedures performed until attainment of acceptable failure rates was calculated using standard CUSUM techniques.

Results: 6/70 patients (8.6%) developed delayed graft function due to technical issues with implantation (in 2), graft rejection (in 2), or probable harvest problems (in 2). 7/70 patients (10%) had a ureteral complication, on the basis of technical issues with implantation (in 4) or ureteral stricture (in 3). For delayed graft function, the CUSUM learning curve revealed an early failure rate higher than the preset acceptable failure rate until case 29, after which performance improved to the acceptable range. For ureteral complications, performance remained in the acceptable range throughout.

Conclusion: When compared to the performance standards of high-volume centers, our LLDN institutional learning curves demonstrate higher early failure rates with regards to delayed graft function, with improvement to standards of high volume centers seen after 30 cases. Ureteral complications were within the range of reported standards with no learning curve effect seen up to 70 cases.

Education/Outcomes-P219

INTEGRATING SIMULATION LAB TRAINING INTO A SURGICAL RESIDENCY PROGRAM: IS VOLUNTARY PARTICIPATION EFFECTIVE?, Lily Chang MD, James Petros MD, Donald Hess MD, Caroline Rotondi BA, Timothy Babineau MD, Boston Medical Center

Objective: Surgical training programs nationwide are struggling with the integration of simulation training into their curriculum given the constraints of the 80-hour work week. We examine the effectiveness of voluntary training in a simulation lab as part of the surgical curriculum.

Methods: The ProMIS simulator was introduced into the general surgery residency at Boston University Medical Center. All categorical residents (28) were required to attend a 2-hour training session and curriculum review. Non-categorical residents (23) were given the option to complete training. After the introductory session, time spent in the lab was encouraged, but voluntary. Use of the simulator was tracked for all residents. Participation in the simulation curriculum was defined as 3 or more uses of the simulator. After 3 months, all residents completed a survey regarding the simulation lab and their simulator usage.

Results: 26 (93%) categorical residents and 3 (6%) non-categorical residents completed the introductory simulator training session. Over a 3 month period, use of the simulator at least once was 31% among all eligible residents; 80% of PGY1, 40% of PGY2, 60% of PGY3, and 0% of PGY4 and PGY5. Four residents (14%) participated in the simulation curriculum. 71% of simulator usage was during working hours while 29% was completed post-call or off duty. Most residents agreed that the simulator was easy to use and improved their operative skills, but did not think it was a good substitute for actual operative experience. Reported reasons for not using the simulator included off-site rotation (44%), no time (30%), and no interest (11%).

Conclusions: Voluntary use of a surgical simulation lab leads to minimal participation in a training curriculum. Participation should be mandatory if it is to be an effective part of a residency curriculum.

Education/Outcomes-P220

SKILLS AND COMPETENCY ACQUISITION IN LAPAROSCOPIC VASCULAR ANASTOMOSIS IN-VITRO, Borys Darmas MD, Sajid Mahmud MD, A daSilva MD, Department of General Surgery, Wrexham Maelor Hospital, Wrexham, United Kingdom

Background: Over the last few years we have witnessed, in some centres throughout the world, a new minimally invasive repair of abdominal aortic aneurysm using laparoscopic methods.

Methods: A laparoscopic abdominal simulator was used to perform vascular anastomosis on a Dacron graft. The study assessed completeness and accuracy of the anastomosis? water tightness, length of the sutures and time to complete the anastomosis.

Results: In our series of 55 completed laparoscopic sutured anastomoses there was a steady reduction of time to complete anastomosis, from 63 to 35 min. The completeness of the anastomosis was associated with increasing accuracy and water tightness from 0 to 100%. To improve our technique further, we used two Coggia's sutures in the last 25 cases. Minimal lengths of these 2 sutures in our series were 11.0 and 15.5 cm respectively.

Conclusions: Our preliminary results show that with practice it is possible to reduce anastomotic time below 40 min and at the same time improve and maintain good accuracy. Initial poor performance in quality of the anastomosis was gradually overcome with increasing practice and change of suturing technique (Coggia's sutures). We suggest that the initial training for laparoscopic vascular anastomosis requires at least 30 to 40 complete and accurate (water tight) anastomoses to perform.

Education/Outcomes-P221

ESTIMATING RECOVERY ONE WEEK AFTER UNCOMPLICATED LAPAROSCOPIC CHOLECYSTECTOMY, Sebastian V Demyttenaere MD, Liane S Feldman MD, Nancy Mayo PhD, Donna D Stanbridge RN, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal, Canada

Introduction: A broader definition of surgical recovery, combining multiple outcomes including functional exercise capacity, health-related quality of life, activity level, and patient self-report, has recently emerged. The purpose of this study is to estimate to what extent patients have recovered one week after uncomplicated laparoscopic cholecystectomy (LC) using these outcomes.



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Methods: 28 patients (8M, 20F) undergoing LC at a single institution were evaluated prospectively. At baseline and at one week postoperatively, functional exercise capacity was measured using the six-minute walk test (6MWT), and health-related quality-of-life was assessed with the Short Form 36 (SF-36) and Gastrointestinal Quality of Life Index (GIQLI). Patients also completed a diary during their first 7 postoperative days evaluating defined activities, pain and fatigue. Data were analyzed with paired t-test and Wilcoxon signed rank test using SPSS 11, $p < 0.05$ significant.

Results: The population had median (IQR) age of 51 (32) years, BMI 26 (6) kg/m² and ASA 1 (1). The operative time was 64 (32) mins and 57% of patients were employed. Comparing baseline with one week after surgery, mean 6MWT distance (400 vs 382m, $p=0.27$), GIQLI (103 vs 101, $p=0.6$) and SF-36 Mental Component Summary Score (50 vs 50, $p=0.84$) were not different. However, the SF-36 Physical Component Summary Score (45 vs 40 $p=0.057$) was decreased due to a difference in the Role Physical (RP) domain (81 vs 73, $p=0.001$). Fatigue and pain scores returned to baseline on the 3rd ($p=0.17$) and 7th (0.49) postop days respectively. By 1 week after surgery, patients felt 85% recovered and 80% or more of patients were visiting friends, climbing stairs, running errands, and performing light housework. However, most patients were not yet driving or performing heavy housework, and only 36% of employed patients had returned to work.

Conclusion: On average, patients have returned to baseline functional exercise capacity and physical health one week after LC except in the RP domain of the SF-36. Most, however, have not yet returned to work. Assessment of submaximal exercise capacity is insufficient to fully characterize the recovery process following LC in otherwise healthy people. A comprehensive assessment needs to include the identification of the time to return to higher level activities.

Education/Outcomes-P222

ADVANCE LAPAROSCOPIC TRAINING- IS RESIDENCY ENOUGH?, Kenneth H Eckkheart III MD, TP Singh MD, Albany Medical Center

Background: The necessity of an advanced laparoscopic fellowship has been a topic of much debate. Despite the increasing number of advanced laparoscopic procedures, few residents entering general surgery practice perform advanced laparoscopy without further fellowship training. Albany Medical Center residents receive a three to four month advanced laparoscopic intensive mentorship as part of the core program. Will this strategy enable AMC to produce competent and secure advanced laparoscopic surgeons? This study examined the impact of this mentorship on postgraduate practice patterns with respect to advanced laparoscopic surgery. **Methods:** The criteria from the RRC via ResSOLution for General Surgery data collection system was used to determine the number and types of procedures that were considered either laparoscopic or advanced laparoscopic cases. All resident advanced laparoscopic cases were examined in the five year period before and then after initiation of the mentorship. These same residents were subsequently evaluated in terms of advanced laparoscopic case load in current practice after residency.

Results:

Total Cases	% Lap	% Adv Lap	% Fellowships
Prior to Mentorship	9469%	(85)3%	(25)30%
During Mentorship	99618%	(180)6%	(82)45%

Conclusion: Although the percentage of advanced laparoscopic cases performed by residents doubled with the introduction of the mentorship program, there was no increase in frequency of advanced laparoscopic cases performed post training. In fact, very few graduates perform these complex procedures without first completing a fellowship. Residency alone does not provide the adequate exposure that translates into competency and security in performing advanced laparoscopic procedures. Therefore, fellowships in advanced laparoscopic surgery are essential to meet the demands of this rapidly evolving profession.

Education/Outcomes-P223

MIS FELLOWSHIP IMPROVES RESIDENT LAPAROSCOPIC EXPERIENCE AND DOES NOT LESSEN OPERATIVE CASE-LOAD, J Ellsmere MD, M Edwards MD, R Grinbaum MD, V Sanchez MD, B Schneider, D Jones, Department of Surgery, Beth Israel Deaconess Medical Center, Boston MA

Objective: The creation of MIS fellowships can potentially detract from resident laparoscopic operative experience. This fear is often expressed in training programs among general surgery residents. The aim of our study was to determine if a formal MIS fellowship adversely effected training of general surgery residents.

Methods: Using the ACGME operative logs as well as the division of general surgery billing data, we retrospectively identified the number of laparoscopic cases that were performed by attendings and residents for a two year period prior to the establishment of an MIS fellowship (period A) and compared them to the subsequent two years (period B). We analyzed our data based on complexity of cases. Diagnostic laparoscopy, cholecystectomy, appendectomy were classified as basic laparoscopic cases. We also analyzed by the chief resident index laparoscopic cases, which included anti-reflux, splenectomy, colectomy, and inguinal hernia repair.

Results: Based on billing data, the number of laparoscopic procedures per year increased from 559 (period A) to 976 (period B). The number of advanced laparoscopic procedures per year increased from 99 (period A) to 480 (period B). The procedures that were introduced included laparoscopic roux-en-y gastric bypass, gastric banding, and esophagectomy, with most of the increase in cases attributable to bariatrics. The average number of laparoscopic anti-reflux, colectomy, and splenectomy cases (n=9) reported by chief residents has not changed. The average number of laparoscopic inguinal hernia repair has increased from 1 to 2.

Conclusions: Establishing a MIS fellowship was associated with a significant increase in the number of advanced laparoscopic procedures within the division of general surgery. The number of chief resident advanced laparoscopic cases has remained unchanged with the exception of laparoscopic inguinal hernia repair, which has doubled. This data should allay resident fears and solidify future MIS fellowships with general surgery residency programs.

Education/Outcomes-P224

COMPLEX LAPAROSCOPIC TASK PERFORMANCE ON TWO NEW COMPUTER-BASED SKILLS TRAINING DEVICES, Erika K Fellinger MD, Michael E Ganey MD, Anthony G Gallagher PhD, Daniel J Scott MD, Ron W Bush BS, Neal E Seymour MD, Department of Surgery, Baystate Medical Center, Springfield, MA

Introduction: New computer-based skills training devices can simulate and measure performance of complex surgical tasks. The aim of this study is to determine basic face and construct validity characteristics of two new devices configured for laparoscopic suturing and knot-tying tasks.

Methods: At the 2005 SAGES meeting, Learning Center attendees evaluated two computer-based skills training platforms: SurgicalSIM (SS), a virtual reality (VR) device (METI, Sarasota, FL; SimSurgery, Oslo, Norway) and ProMIS (PM), a computer-enhanced video trainer (Haptica, Ltd., Dublin, Ireland). Demographic and training data were collected from 73 subjects. All were asked to perform 2 iterations of laparoscopic suturing and intracorporeal knot-tying (10-minute time limit) on each device. A 6-question survey was used to define impressions of task realism, relevance, and execution using a 5-point Likert scale. Performance data (SS: time, path length, errors; PM: time, path length, smoothness) were collected on both devices and comparisons made between user-defined expert and nonexpert (intermediate and novice) groups (ANOVA and Mann Whitney U test).

Results: 46 subjects used SS and 56 used PM. Task completion rate was 80% for SS and 93% for PM. Experts performed better than nonexperts for all performance measures on SS (composite score 496 ± 41 vs 699 ± 60 , $p < 0.005$) and PM (974 ± 111 vs 1466 ± 89 , $p < 0.005$). Post-task survey scores for PM were sig-



nificantly higher for perceived realism (overall realism and thread behavior), reflection of clinical ability, and overall educational value. Perception of educational value was not significantly different between the devices among subjects with prior VR experience.

Conclusions: Using subject-defined expert and nonexpert groups, construct validity was demonstrated for all performance measures on both training devices. Surveyed face validity measures favored the non-VR device, but results also suggest that subjects with prior VR training experience are more apt to accept a new VR surgical training platform.

Education/Outcomes–P225

USE OF PAIN PUMP IN OUTPATIENT LAPAROSCOPIC CHOLECYSTECTOMY, Wesley P Francis MD, Andre R Nunn MD, Department of Surgery, Wayne State University School of Medicine, Detroit, Michigan.

Introduction: This study was designed to determine whether the use of a subcutaneous pain pump improved successful same day discharge after outpatient laparoscopic cholecystectomy.

Methods: We retrospectively reviewed all outpatient elective laparoscopic cholecystectomies performed by a single surgeon from 10/10/2003 to 9/10/2005. The early group of patients (group 1) had standard post-op analgesia and the latter group (group 2) also had use of the subcutaneous analgesic delivery system (On-Q Pain Buster produced by I-flow corporation). The pain buster delivers a local anesthetic via a small catheter placed in the subcutaneous tissue at the subxyphoid port site with the tip placed in the peritoneal cavity. The pump delivers a continuous dose of local anesthetic to the subcutaneous tissue and peritoneal cavity. The number of patients successfully discharged on the same day of surgery was determined. Chi-square test was used to compare the two groups.

Results: A total of 27 patients underwent elective outpatient laparoscopic cholecystectomy during the study period. In the initial group of patients (group 1) 5 of 14 (36%) were successfully discharged on the day of surgery. In the latter group (group 2) 11 of 13 (85%, $p = 0.028$) were successfully discharged. The two patient groups were similar in terms of age, M:F ratio and pre-op diagnosis.

Conclusion: The use of a pain pump in outpatient laparoscopic cholecystectomy significantly improved the likelihood of same day discharge. Improved immediate post op analgesia is likely the basis for the difference in outcome.

Education/Outcomes–P226

UNCERTAINTY IN ASSESSING RESIDENTS' PROCEDURAL COMPETENCE, Michael B Donnelly PhD, Donald Witzke PhD, James Hoskins BS, Joseph Iacono MD, Raymond Gagliardi MD, University of Kentucky

Objectives of the Study: The primary purpose of this study was to determine the degree to which expert surgeons agree in their judgment of the procedural competence of residents performing 3 part-task laparoscopic simulations. A method is described for dealing with situations in which surgeons disagree in their competence ratings of a resident's performance.

Methods & Procedures: Twenty-seven general surgery residents at varying PGY levels performed three part-task, laparoscopic simulations: appendectomy (LA), cholecystectomy (LC), and inguinal herniorrhaphy (LH). Five experienced laparoscopic surgeons judged subjects' competence on each procedure (competent, not competent). We determined the percent of cases in which pairs of judges agreed in the classification of the residents' performance. Finally, we present a descriptive method for deciding whether a resident's performance on each procedure should be classified as competent, non-competent, or uncertain.

Results: We determined the percent of classification agreement for all pairs of judges. The average agreement (across procedures) between judges was 75%. The agreement varied from a low of 52% to a high of 92%. We calculated a competence score for each resident for each procedure by summing the 5 competence ratings (0 or 1). For 5 judges, we set the following somewhat arbitrary rules: a) residents with competence scores of 0 or 1 as incompetent; b) residents with com-

petence scores of 2 or 3 as uncertain; and c) residents with competence scores of 4 or 5 as competent. Using these criteria on the LA: 48% were judged competent, 30% incompetent, and 22% uncertain. For the LC the following results were obtained: 67% competent, 22% incompetent, and 11% were uncertain; for the LH: 56% were judged competent, 18% incompetent and 26% uncertain.

Conclusions: We conclude: 1) There is significant disagreement among laparoscopic surgeons in identifying competent performance, 2) In those cases where there is more than one disagreement; the evidence is sufficiently ambiguous that no judgment should be made about the competence of the resident's performance.

Education/Outcomes–P227

EVALUATION OF RESIDENT LAPAROSCOPIC CHOLECYSTECTOMY PERFORMANCE USING GLOBAL OPERATIVE ASSESSMENT OF LAPAROSCOPIC SKILLS (GOALS), Andrew A Gumbs MD, Nancy J Hogle MS, Dennis L Fowler MD, Columbia College of Physicians and Surgeons

Background: The Global Operative Assessment of Laparoscopic Skills (GOALS), developed by Fried et al., has been shown to have construct validity in the assessment of surgical residents' laparoscopic skills in dissection of the gallbladder from the liver bed. We hypothesized that GOALS would have construct validity for the entire laparoscopic cholecystectomy procedure.

Methods: Using GOALS, Attending surgeons evaluated PGY 1 through PGY 5 surgical resident performance during laparoscopic cholecystectomy. Scores for the 5 domains (depth perception, bimanual dexterity, efficiency, tissue handling and overall competence) were recorded by computer. For analysis, residents were divided into 2 groups. The novice group ($n=16$) included PGY 1 through PGY 3; the experienced group ($n=10$) included PGY 4 and PGY 5. Biostatistical analysis was performed using single factor ANOVA and the paired T-test.

Results: In the domains of depth perception, bimanual dexterity and efficiency the experienced group scored higher than novices ($p < 0.04$). There was no difference between the groups for tissue handling and autonomy. When a mean of all 5 factors were evaluated the difference between the groups was ($p < 0.03$). Difficulty of operation was evaluated in 9 cases; no significant differences were noted.

Conclusions: GOALS is a valid objective assessment tool for evaluating residents' performance of the entire laparoscopic cholecystectomy procedure.

Education/Outcomes–P228

GLOBAL OPERATIVE ASSESSMENT OF LAPAROSCOPIC SKILLS (GOALS) IN THE EVALUATION OF RESIDENTS' PERFORMING LAPAROSCOPIC APPENDECTOMY, Andrew A Gumbs MD, Nancy J Hogle MS, Dennis L Fowler MD, Columbia College of Physicians and Surgeons

Background: The Global Operative Assessment of Laparoscopic Skills (GOALS) has construct validity in the assessment of surgical residents' performance of laparoscopic cholecystectomy. We used GOALS to evaluate novice and experienced surgical residents to determine whether GOALS would have construct validity in laparoscopic appendectomy.

Methods: PGY 2 through PGY 5 surgical residents were evaluated by the Attending surgeon at the end of a laparoscopic appendectomy. Using the GOALS scale developed by Fried et al., scores for depth perception, bimanual dexterity, efficiency, tissue handling and overall competence were recorded by computer. For analysis, residents were divided into novices (PGY 2 and PGY 3) and experienced (PGY 4 and PGY 5) groups. Biostatistical analysis was performed using single factor ANOVA and the paired T-test.

Results: 10 novices and 14 experienced residents were included in the analysis. The experienced group scored significantly higher for depth perception, bimanual dexterity and efficiency ($p < 0.05$). No difference was noted between the groups for tissue handling and autonomy. When a mean of all 5 factors was evaluated a statistically significant difference was noted ($p < 0.032$). Difficulty of operation was evaluated in only 10 cases, but no significant differences were noted.



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Conclusions: GOALS is a valid assessment tool for objectively evaluating the technical performance of surgery residents during laparoscopic appendectomy. This study combined with previous validation studies for laparoscopic cholecystectomy document that GOALS is an appropriate assessment tool to evaluate residents' performance during basic laparoscopic procedures.

Education/Outcomes-P229

RESIDENT TRAINING IN LAPAROSCOPIC PSYCHOMOTOR SKILLS : COMPARISON OF INDIVIDUAL AND INSTRUCTOR ANALYSIS, Fernando A Herrera MD, Joseph A Mareno MD, Alana Chock MD, David W Easter MD, Michelle K Savu MD, University of California, San Diego Medical Center, San Diego, CA.

Objective: The purpose of this study was to determine how residents perceive their laparoscopic psychomotor skills before and after a laparoscopic training session and to compare self-assessment to that of the instructors.

Methods: 11 senior surgical residents participated in a laparoscopic animal training course at an academic institution. Participants rated their laparoscopic abilities using a scale of 1-10 (1=worst, 10=best) prior to and at the completion. Skills evaluated included: overall laparoscopic skills, port placement, camera maneuvering, obtaining adequate view, ability to run bowel, 2 hand dissection, stapling bowel, and suturing. 3 attending surgeon instructors then rated each participant's psychomotor abilities. All surveys were tabulated and averaged. Differences between resident pre and post session scores were compared using Student's paired t-test analysis. Post test scores were then compared to instructor scores and analyzed. Individual tasks were also looked at for strongest and weakest perceived task.

Results: 10 of 11 participants were included in the study for completion of all surveys. 70% of the subjects felt their psychomotor skills had improved following a single formal laparoscopic training course, mean improvement $0.51 + 0.23$ (mean + s.e.; n= 10). The remaining 30% rated themselves as less skilled after the lab. The instructor evaluation was not statistically different from the resident's post self evaluation. Residents rated themselves strongest at camera abilities and weakest at suturing before, and after the course. while the instructors felt the resident's strongest skill was running bowel and weakest was camera maneuvering.

Conclusion: The majority of surgical residents felt that their laparoscopic psychomotor skills improved significantly after a single session in a laparoscopic training lab. The residents' self assessment agreed with the instructors'. Residents who had a decrease in their scores likely overestimated their pretest self perceived skills. We conclude that even minimal formal laparoscopic instruction outside of the operating room is beneficial to a resident's perceived skill level ($P=0.05$). It is, therefore, worthwhile for residency programs to institute formal training sessions during which residents practice laparoscopic skills under the instruction of an experienced laparoscopic surgeon.

Education/Outcomes-P230

RELIABLE ASSESSMENT OF LAPAROSCOPIC PERFORMANCE IN THE OPERATING ROOM USING VIDEOTAPES, Nancy J Hogle MS, Lily Chang MD, Mika Sinanan MD, Robert Bailey MD, Dennis L Fowler MD, 1Columbia College of Physicians and Surgeons, New York, NY, 2Boston Medical Center, Boston, MA, 3University of Washington, Seattle, WA 4Miami, FL

Background: Evaluation of operating room performance by videotape review is generally unreliable without the use of a validated assessment tool. GOALS (Global Operative Assessment of Laparoscopic Skills) has been used to objectively evaluate technical performance of surgery residents during laparoscopic cholecystectomy and laparoscopic appendectomy. We hypothesized that GOALS assessment of a videotape would reliably differentiate between an experienced (Expert) and an inexperienced (Novice) laparoscopic surgeon based upon video review of a laparoscopic cholecystectomy.

Methods: Ten board-certified surgeons actively engaged in the teaching and practice of laparoscopy assessed the operative

performance of laparoscopic cholecystectomy by one novice and one expert surgeon using GOALS to assess a videotape of the procedure. Scores for both the expert and the novice videotape reviews for the 5 domains (depth perception, bimanual dexterity, efficiency, tissue handling and overall competence) were recorded. Biostatistical analysis was performed using single factor ANOVA.

Results: In the domains of depth perception, bimanual dexterity, efficiency, and overall competence the expert scored higher than the novice. There was no difference between the two for tissue handling.

Domain	P-value
Depth Percept	0.0049
Bimanual Dexter	0.00054
Efficiency	0.0000901
Tissue Handle	0.072
Overall Compet	0.0098

Conclusions: GOALS is a valid objective assessment tool for evaluating technical performance of laparoscopic cholecystectomy using a videotape of the procedure. GOALS can reliably differentiate the surgical performance of an expert from a novice.

Education/Outcomes-P231

LESSONS LEARNT IN 783 CONSECUTIVE LAPAROSCOPIC GASTRIC BYPASS CASES WITHOUT GASTROJEJUNOSTOMY 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 783 laparoscopic gastric bypasses done without any leak from the gastro-jejunostomy.

This is a retrospective analysis of prospectively maintained data from a tertiary care center. Data was analyzed from 2001 till June 2005. Redo cases, sleeve gastrectomies, lap band placement and biliopancreatic diversions done were excluded. All cases were done by four bariatric surgeons and by fellow-ship trainees under their guidance.

Our technique in creation of the gastrojejunostomy is a four layered hand sutured (inner absorbable and outer non-absorbable sutures) gastrojejunostomy sized over an 18 French nasogastric tube. We bring our roux limb up in a retrocolic retrogastric route. The nasogastric tube is removed after intraoperative testing of the anastomosis using air injected technique.

783 cases were attempted laparoscopically in this period. We converted 3 cases from laparoscopic to open (2 due to extensive adhesions and one due to lack of space). 81 of these gastrojejunostomy were done with Da Vinci robotic assistance while the rest were done by hand sutured technique. BMI of patients ranged from 35 to 87 kg/m² and age from 16 to 75 years (mean 41 years). There were three mortalities in this period (one in patient with arrhythmias who threw an emboli to the small bowel, one with PE at about 27 days after surgery, and third with aspiration pneumonia at about 29 days). Our stricture rate is under 2% and were all corrected with endoscopic dilation. Marginal ulcer and wound infection rates are both under 1%. Average length of stay was 2.4 days.

This presentation will highlight salient features in creation of gastrojejunostomy so as to decrease complication rates and prevent leaks. Tips in construction of the pouch, factors to be considered when selecting site for creation of the enterotomies, methods to detect and prevent tension at the anastomosis will be discussed. Technical points in sutured anastomosis so as to minimize tissue trauma will also be shown.

Education/Outcomes-P232

ENDOSCOPIC SURGICAL SKILL QUALIFICATION SYSTEM IN JAPAN, Taizo Kimura MD, Tatsuo Yamakawa MD, Toshiyuki Mori MD, ESSQS Committee of the Japan Society of Endoscopic Surgery

In 2001, the Japan Society for Endoscopic Surgery (JSES) formed a committee to implement an Endoscopic Surgical Skill Qualification System (ESSQS). The first review of technical skills was performed in 2004 to qualify mentors for endo-



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scopic surgery. Assessment was performed by review of documents and a video examination. The document review included a recommendation by JSES councilors, a list of endoscopic operations performed, and other documents. Technical review was done by examining unedited videos of surgery, which included suturing and ligation. The judging committee consisted of 25 experienced endoscopic surgeons (Chairperson; Taizo Kimura) who were recommended by the JSES Board of Trustees. For the video examination, we prepared 7 common criteria to evaluate basic endoscopic techniques used in all procedures (60 points were allotted) and 7 organ-specific criteria to evaluate special endoscopic surgical techniques for each organ (40 points were allotted). A score of 70 points was designated as the passing mark. Initially, two judges reviewed the videos submitted. If there was disagreement, a final decision was made after consulting a third judge or all of the group. To assess inter-rater agreement between judges, Cohen's weighted kappa value was calculated. There were 422 applicants. Among them, 212 were successful, 32 failed to pass the assessment of documents, 177 failed to pass the video examination, and 1 withdrew his application. The highest success rate was 64.7% (110/170) for biliary tract surgery, followed by 50% (9/18) for spleen surgery, 50% (9/18) for endocrine/breast surgery, 45.7% (37/81) for gastric surgery, 36.9% (38/103) for colon surgery, and 28% (9/32) for esophageal surgery. Inter-rater agreement between the two initial judges was acceptable for the esophagus, stomach, colon, and spleen (the kappa value was 0.36, 0.37, 0.40, and 0.26, respectively), but poor for the biliary tract (kappa value = 0.18). The problems that arose included disagreement about assessment between the judges and marked differences in the success rate between surgery on various organs. Although the ESSQS has several problems, we believe that this system will not only contribute to establishing standard endoscopic surgical procedures but will also promote education and decrease complications.

Education/Outcomes-P233

DEMONSTRATION OF CONSTRUCT VALIDITY FOR A NEW VIRTUAL REALITY LAPAROSCOPIC SKILLS TRAINER, Neal E Seymour MD, Sean J Kwon MD, Thompson E Renee MD, David B Earle MD, Ron W Bush BS, Department of Surgery, Baystate Medical Center, Springfield, MA

Introduction: Surgical virtual reality (VR) training devices have become more capable performance measurement tools but require extensive validation to spur their use. The aim of the present study is to determine whether the performance measurement capabilities of a new laparoscopic VR trainer are construct valid.

Methods: 5 expert laparoscopic surgeons (>100 advanced procedures) and 8 junior surgical trainees performed 6 basic manipulative skills tasks on a SurgiSIM VR simulator (METI, Sarasota, FL; SimSurgery, Oslo, Norway) during a series of 1 hour training sessions. All subjects viewed standardized tutorials demonstrating optimal task performance prior to using the device. VR tasks consisted of abstract object manipulation (3 tasks), traction and dissection (1 task), and part-task laparoscopic cholecystectomy exercises (2 tasks) for which time, instrument tip path length, and cumulative errors were recorded. Mean performance characteristics were determined for the first 3 iterations of each task. Expert and novice performance was compared for each task (Mann-Whitney U test).

Results: Experts performed significantly better than novices on all tasks with 53 ± 5% smaller time, 50 ± 4% smaller path length, and 67 ± 6% smaller error scores averaged for the 6 tasks. Time and path length values were significantly less for experts on all individual tasks ($p < 0.05$) and error scores were significantly smaller for 5 of 6 tasks. Performance was observed to improve between the first and third iterations of all tasks for novice users. This improvement was significantly smaller for experts.

Conclusions: The SurgiSIM VR trainer can be used to discern predictable differences in performance based on user clinical experience. Construct validity was demonstrated for each of the measurement areas for all training tasks. Further work with this simulation device will focus on establishment of expert performance data to direct objective-based training.

Education/Outcomes-P234

OBJECTIVE ASSESSMENT OF GYNAECOLOGICAL LAPAROSCOPIC SKILLS USING A VIRTUAL REALITY SIMULATOR, Christian R Larsen MD, Teodor P Grantcharov PhD, Jette L Sorensen MD, Torur Dalsgaard PhD, Bent Ottesen MD, 1. Department of Gynaecology and Obstetrics, The Juliane Marie Centre, Copenhagen University Hospital Rigshospitalet, Denmark and 2) Department of Surgery, The Western Pennsylvania Hospital, Temple University Clinical Campus, Pittsburgh, PA, USA

Background: Safe training environment and unbiased quantitative assessment of technical skills are of crucial importance when learning a new surgical procedure. Virtual Reality (VR) simulators have the potential as both useful training- and assessment tools for basic and advanced surgical skills and procedures. The value of VR simulators in general surgery has been confirmed, however no reports exist in the literature investigating the application of VR in Minimally Invasive gynaecological training and assessment

Aim: To investigate the construct validity of the LapSim@Gyn VR simulator, and to determine the learning curves of gynaecologists with different levels of experience.

Material and methods: 30 gynaecological surgeons were allocated into three groups: novices (0 advanced laparoscopic procedures), intermediate level (>20 and <60 procedures) and experts (>100 procedures). All performed 10 sets of simulations consisting of three basic skill tasks and a task simulating ectopic pregnancy. The simulation sessions were carried out on three days within a two-weeks period. Assessment of technical skills was based on time, economy of movement- and error-parameters measured by the simulator.

Results: Data showed that expert gynaecologists performed significantly and consistently better than intermediate experienced and novice gynaecologists (Mann-Whitney's test, $p < 0.05$). Learning curves differed significantly between the groups (Friedman's test, $p < 0.05$), showing that experts start at a higher level and reach plateau in performance faster than the intermediates and novices.

Conclusion: The LapSimGyn VR simulator demonstrated construct validity, both on Basic Skills module and on the simulated ectopic pregnancy procedure, even if subjects are tested consecutively in the modules. Learning curves can be identified, but to reach maximum performance in the more complex tasks, 10 repetitions do not seem sufficient at the given task level and settings.

LapSimGyn is realistic, valid and feasible tool for training skills relevant for Minimally Invasive Gynecologic procedures.

Education/Outcomes-P235

NONSURGICAL SKILLS DO NOT PREDICT BASELINE SCORES IN INANIMATE BOX OR VIRTUAL REALITY TRAINERS, Atul K Madan MD, Constantine T Frantzides MD, David S Tichansky, Section of Minimally Invasive Surgery, Department of Surgery, University of Tennessee Health Science Center and Evanston Northwestern Healthcare-Northwestern University

Introduction: Laparoscopic basic skills are best trained in the non-clinical setting. Box trainers and virtual reality trainers have been shown to be useful in training laparoscopic skills. Certain nonsurgical skills may predict baseline skills in these trainers. The study tested the hypothesis that baseline scores could be predicted in inanimate box trainers and virtual reality trainers by nonsurgical skills.

Methods: Preclinical medical students only were included in the study. All students were given a survey ascertaining if they played computer games, typed, sew, played a musical instrument, and utilized chopsticks. Students utilized a box trainer (BT) and/or virtual reality trainer (VR). Non-parametric two-tailed Mann-Whitney tests were utilized to compare student that possessed certain nonsurgical skills versus those who did not.

Results: There were 18 students in the VR group and 33 students in the BT group. In the VR group, students who played computer games, typed, utilized chopsticks, and played a music instrument had better scores and less errors than those who did not but this did not reach statistical significance in any comparison ($p = NS$). In the BT group, none of the nonsur-



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gical skills predicted times or errors. Males performed better than females in the VR group ($p < 0.001$); but this gender discrepancy was not seen in the BT group.

Conclusions: Nonsurgical skills do not predict baseline scores in either trainer. The gender differences in VR training need to be further explored.

Education/Outcomes-P236

PREDICTORS OF LAPAROSCOPIC SKILL USING THE MIST-VR TRAINER, N Maloney MD, S H Shin MD, A M Page MD, K Swallen PhD, R C Britt MD, Eastern Virginia Medical School-Department of Surgery, Norfolk, VA, USA. 2. University of Wisconsin. Center for Demography and Ecology, Madison, WI, USA

Introduction: The paradigm of surgical education has shifted out of the operating room. Residents are now being taught basic surgical skills, particularly in the field of laparoscopy, using simulation. Our objective was to elucidate characteristics which predict success in laparoscopic simulation.

Methods: Medical students with no prior MIST-VR trainer experience were recruited to participate. Each student performed the traversal (T) and manipulate-diathermy (MD) tasks set to medium difficulty. A survey was completed by each student detailing their year in medical school, gender, interest in surgery and their hobbies, such as video game playing, knitting/sewing, sports with eye-hand coordination, and artistic ability. The data was analyzed using chi-square and Student's t-tests. A multivariate analysis was also performed.

Results: 88 students participated, 53 males and 36 females. The table shows the results of the univariate analysis of gender, interest in surgery (Surgery int) and video game playing for both the T and MD tasks. Additionally, significant predictors of a good score (a score less than the mean) were evaluated. For the T task, male gender ($p 0.01$) and video game playing ($p 0.009$) were statistically significant, with interest in surgery trending toward significance ($p 0.08$). For the MD task, there were no significant predictors of good performance. Knitting/sewing was a predictor of poor performance on T task ($p 0.002$). Artistic ability was a predictor of poor performance on MD task ($p 0.02$).

	Mean Score	P Value
T:Male/Female	204.1/254.7	0.002
T:Surgery int	218.4/237.6	0.13
T: Video game	195.7/257.1	0.0003
MD: Male/Female	245.8/280.6	0.03
MD: Video game	238.5/283.9	0.007

Task Performance and Characteristics

Conclusions: Male gender and video game playing are predictors of strong performance on the MIST VR Trainer. How these characteristics translate to actual laparoscopic ability will require further study.

Education/Outcomes-P237

VALIDATION OF THE PROMIS HYBRID SIMULATOR USING A STANDARD SET OF LAPAROSCOPIC TASKS, A L McCluney MD, L S Feldman MD, G M Fried, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University Health Centre, Montreal, QC, Canada

INTRODUCTION SAGES Fundamentals of Laparoscopic Surgery (FLS) tasks are validated measures of technical skills, however FLS scoring requires a trained proctor. The ProMIS simulator (Haptica; Dublin, IR) is a "hybrid" system with physical and virtual reality tasks. It has the flexibility to incorporate any physical task and score it with ProMIS metrics. Metrics are automated and report motion analysis data as instrument path length (PL) and instrument smoothness (IS). The purpose of this study was to test for construct and concurrent validity using FLS tasks in the ProMIS simulator.

METHODS 5 laparoscopic novices and 5 experts performed FLS tasks in both the standard FLS simulator box and the ProMIS simulator. Assessments were made based on FLS metrics, as well as PL and IS. Student's t-test was used to compare the mean (SD) of total scores for novices and experts. Pearson's correlations were calculated for standard FLS

scores in relation to ProMIS FLS scores, total PL, and total IS. Significance was defined as $p < 0.01$ (*).

RESULTS

Task/Score	Total FLS	ProMIS FLS	Total PL	Total IS
Novice	201 (71)	177 (10)	6256 (760)	3137 (403)
Expert	381 (22)	75 (11)	867 (343)	1326 (244)

Standard FLS scores correlated strongly with ProMIS FLS scores ($r=0.90$), total PL ($r=-0.83$), and total IS ($r=-0.78$) ($p < 0.01$).

CONCLUSIONS FLS tasks performed in ProMIS, when scored by either traditional FLS metrics or by intrinsic ProMIS metrics, discriminate effectively between novices and experts. Based on the observed correlations, ProMIS FLS scores, total PL, and total IS are excellent predictors of scores in the standard FLS simulator.

Education/Outcomes-P238

T-SQUARED: EVALUATION OF A NOVEL LAPAROSCOPIC INTRACORPOREAL KNOT TYING TEACHING TECHNIQUE, D A McClusky MD, C D Smith MD, Emory Endosurgery Unit, Department of Surgery, Emory University School of Medicine, Atlanta, GA.

BACKGROUND: Intracorporeal knot tying is an advanced laparoscopic skill that is difficult to learn. Using task analysis with videotape review, a novel instructional method has been devised to address some challenges encountered during the creation of an intracorporeal square-knot. The aim of this study was to evaluate the effectiveness of this "t-squared" teaching technique.

METHODS: Twelve fourth-year medical students with no prior knowledge of intracorporeal knot tying were randomized to receive instruction using either the "t-squared" or the standard Szabo square-knot tying technique. After cognitive, and baseline abilities testing, students trained during multiple ten-minute sessions under the guidance of a single instructor. At the end of training, ten knots were created and tested on a tensiometer to determine a performance quality knot score. The standard trained participants were subsequently crossed-over to "t-squared" instruction and an additional three knots were created and evaluated using a single subject study design. Group results were compared using a Mann-Whitney analysis.

RESULTS: Students instructed using the "t-squared" method performed their first knots faster than the standard training group (325 sec. vs. 536 sec, $p < 0.004$). Performance quality scores during the ten knot test were significantly higher within the "t-squared" group (9.8 vs 8.1, $p < 0.03$). All students trained using the standard technique improved performance quality score when re-trained using the "t-squared" method.

CONCLUSIONS The "t-squared" instructional method shows promise as a means to faster and more effective intracorporeal knot-tying among novices. This technique may serve as a useful adjunct to minimally invasive surgical instruction within the setting of a work-hours restricted training program.

Education/Outcomes-P239

LAPAROSCOPIC CHOLECYSTECTOMY AS A GUIDE TO ADVANCED LAPAROSCOPY, Candace E Moody MD, Morris J Franklin MD, Texas Endosurgery Institute

Since the advent of laparoscopic surgery, the widespread acceptance and institution of minimally invasive techniques has been slow. One of the major reasons cited in the literature for this, has been a lack of standard teaching protocols to aid during basic surgical training. As a result, there remain a number of inadequately trained surgeons attempting to perform advanced laparoscopic procedures with inadequate skills. In addition, residents are produced who do not acquire the necessary skills in order to perform advanced laparoscopy upon completion of their residency training. The aim of this paper is to present an easily applicable approach to teaching minimally invasive surgery that can be utilized in both the academic as well as the private sector.

Key Words: Laparoscopic Cholecystectomy, Advanced Laparoscopy, Teaching, Education



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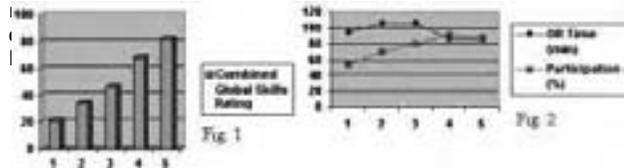
Education/Outcomes-P240

VALIDATION OF AN OPERATING ROOM PERFORMANCE ASSESSMENT TOOL FOR SURGICAL RESIDENTS. David B Earle MD, Alexander Perez MD, Neal Seymour MD, Department of Surgery, Baystate Medical Center, Springfield, MA

Introduction: Our aim is to develop and validate a tool that will objectively assess surgical resident operating room performance (knowledge base, manual skills, participation level of resident OR time), instantly give feedback to the resident, and track performance over time.

Methods: We developed a software program that utilizes a global rating scale to measure resident knowledge (patient info, disease process, surgical technique), 7 manual skills (tissue handling, knot tying, dexterity etc.), estimate the percentage of case performance, and link to clinical databases for OR time and case type. The attending surgeon observers were trained to use the software, and encouraged to review the evaluation with the resident at the end of the procedure. Data from 9/00 ? 7/05 for lap cholecystectomy were analyzed.

Results: 237 cases were observed and evaluated. Global rating scales for each manual skill individually and as a group, demonstrated statistically significant improvement amongst



Conclusions: This tool can accurately and objectively assess individual and overall OR performance among surgical residents. This can be used for an unlimited number of clinical teaching episodes, and has the ability to track performance over time. The ability to link to patient databases also makes this potentially valuable to evaluate outcomes such as case cost, length of stay, and complication rates as they relate to resident training.

Education/Outcomes-P241

THE USE OF CD-ROM PATIENT EDUCATION MODULES TO ASSIST IN ACCOMPLISHING INFORMED CONSENT FOR MINIMALLY INVASIVE PROCEDURES: AN INITIAL EVALUATION. James C Rosser MD, Brian Colsant BA, Paul Lynch MD, Bjorn Herman BA, Brian R Davis MD, Beth Israel Medical Center, New York, NY, USA; Albert Einstein College of Medicine, New York, NY, USA; New York University Medical Center, New York, NY, USA; Columbia College of Physicians and Surgeons, New York, NY, USA

Objective of the study: Patient education via computer assisted training (CAT) offers many advantages including optimized time management, and consistent coverage of all aspects of the procedure, including expectations, outcomes and complications, as well as documenting information transfer to the patient. This study seeks to evaluate the feasibility and effectiveness of CAT in attempting to achieve more effective informed consent for MIS procedures.

Methods and procedures: Seventy-seven patients were evaluated for gastroesophageal reflux disease, inguinal hernia and gallbladder disease. Candidates for surgery utilized a CD-ROM interactive tutorial designed to assist in establishing patient informed consent. At the end of each section multiple-choice questions confirm knowledge transfer to the patient. A survey was given at the end of the session to evaluate the participants' satisfaction.

Results: Seventy-seven patients (29 women and 48 men) participated in the CD-ROM based tutorial between January 1998 and July 2001. CD-ROMs were used for laparoscopic Nissen fundoplication (56), inguinal hernia repairs (19) laparoscopic cholecystectomy (9) and other similar procedures (5). Overall, 79% of patients were satisfied with the program, rating it 4 out of 5 or higher. This format was found to be impersonal by only one of the subjects and 96% of participants marked that they would use the program again. Statistical analyses were calculated to identify a correlation between patient satisfaction and

variables including computer ownership, education, and language preference. Computer ownership and speaking English as a first language yielded no statistical difference for satisfaction questions. The length of the program was thought to be too long by 23% of the patients.

Conclusions based on these results: The use of CAT to assist the surgeon with patient informed consent shows great promise. The lack of statistical differences in patient satisfaction when controlling for owning a computer, speaking English as a first language, and education level is encouraging as to the widespread applicability. Tutorial completion time is an important fact to be considered in future program development. The dynamic capture of the responses to the questions to a secure database that documents knowledge transfer may provide a new medico-legal milestone in informed consent.

Education/Outcomes-P242

GENERAL SURGERY FACULTY PERCEPTION OF SIMULATION TRAINING. J R Salameh MD, Department of Surgery, University of Mississippi

INTRODUCTION: Laparoscopic Surgical Simulation is a valuable and validated training tool. Two years after establishing a Surgical Simulation Center (SSC) at our institution, we examined the perception of simulation training and the utilization of simulation center resources among general surgery faculty.

METHODS AND PROCEDURES: Detailed questionnaires were sent to all 11 General Surgery faculty at our institution with an 82% response rate. Questions focused on laparoscopic surgery experience and training, use of SSC resources and take on surgery simulation training during and after surgical residency.

RESULTS: The great majority (89%) of general surgery faculty thinks that surgery simulation training is essential and mandatory in current surgical residency with the main reasons stated being ?acquire basic surgical skills? followed by ?replace lost operative time due to reduced work hours?; ?improving patient safety? only came in fourth. 89% actively encourage residents to use the SSC and as many feel that simulation training needs to be extended to traditional open surgery. 75% have discerned an improvement in the resident performance since the introduction of the SSC and are letting residents do more in surgery as a result of this perception. 67% keep track of the resident performance in the SSC but only 55% limit resident participation in the operating room based on that performance.

67% of the faculty have been to the SSC and 56% have used some of the equipment; only 40% however use it frequently (once a month or more). When asked how they have learned new laparoscopic procedures and/or skills, the majority of surgeons read about it (75%), watched an instructional videotape (62%) or had proctorship (62%); most of them however ranked animal laboratory followed by simulation laboratory as most useful ways to learn new skills. 67% however do not feel that a surgeon's competency should be assessed on a simulator before granting specific privileges.

CONCLUSION: The majority of general surgery faculty thinks highly of simulation training and its positive effect on surgical residents' performance. Few however personally make use of it, either routinely to maintain skills or occasionally to acquire new skills.

Education/Outcomes-P243

CONSTRUCT AND FACE VALIDITY AND TASK WORKLOAD FOR LAPAROSCOPIC CAMERA NAVIGATION: VIRTUAL REALITY VERSUS VIDEOTRAINER SYSTEMS AT THE SAGES LEARNING CENTER. Dimitrios Stefanidis MD, Randy Haluck MD, Thai Pham MD, James R Korndorffer Jr, Bruce Dunne PhD, Timothy Reinke MD, Sarah Markley MS, Paul Arellano MD, Daniel B Jones MD, Daniel J Scott MD, Tulane University School of Medicine, Pennsylvania State University

Introduction: Laparoscopic camera navigation (LCN) training on simulators has demonstrated transferability to actual operations, but no comparative data exist. The objective of this study was to compare the construct and face validity, as well as workload, of two previously validated virtual reality (VR) and videotrainer (VT) systems.

Methods: Attendees (n=90) of the SAGES 2005 Learning



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Center performed two repetitions on both VR (Endotower) and VT (Tulane Trainer) LCN systems using 30° laparoscopes in a standardized fashion and completed a questionnaire regarding demographics, simulator characteristics and task workload. Construct validity was determined by comparing the performance scores of subjects with various levels of experience according to five parameters and face validity according to eight. The validated NASA-TLX questionnaire that 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. Statistical analysis was performed using Wilcoxon- and Kruskal-Wallis ANOVA tests.

Results: Construct validity was demonstrated for both simulators according to the number of basic laparoscopic cases (p=0.005), number of advanced cases (p<0.001) and frequency of angled scope use (p<0.001), and only for VT according to training level (p<0.001) and fellowship training (p=0.008). Face validity ratings in a 1-20 scale averaged 15.4 ± 3 for VR vs. 16 ± 2.6 for VT (p=0.04). 96% of participants rated both simulators as valid educational tools. The NASA-TLX overall workload score was 69.5 ± 24 for VR vs. 68.8 ± 20.5 for VT (p=0.31).

Conclusions: This is the largest study to date comparing two validated LCN simulators. While subtle differences exist, both the VR and VT simulators demonstrated excellent construct validity, good face validity, and acceptable workload parameters. These systems thus represent useful training devices and should be widely used to improve surgical performance.

Education/Outcomes-P244

LAPAROSCOPIC FELLOWS WOULD PERFORM A WIDER VARIETY OF CASES IN THEIR "IDEAL" FELLOWSHIP, Raymond J

Taddeucci MD, David S Tichansky MD, Atul K Madan MD, Section of Minimally Invasive Surgery, Department of Surgery, University of Tennessee Health Science Center, Memphis, TN

Introduction: With the increase in minimally invasive surgery (MIS) fellowships, the concept of the ideal and standardized training curriculum is emerging in importance. We hypothesize that the procedure mix in current MIS training is different from what the current MIS fellows would call their ?ideal? fellowship.

Methods: A survey of current MIS fellows examined their perceptions of the case mix they expect to perform and the case mix of an ?ideal? fellowship. Differences between expected and ideal case volume were analyzed by Wilcoxon test.

Results: To date, 17 questionnaires were returned. Current MIS fellows believe their expected training is equivalent to ?ideal? training in ventral and inguinal hernia repair, gastric bypass, cholecystectomy, appendectomy, and diagnostic endoscopy (p=ns). However, current expected training falls short of their ?ideal? case volume in: lap banding, antireflux, colectomies, CBD exploration, thoracoscopy, therapeutic endoscopy, and gastric, esophageal, spleen, adrenal, liver, kidney, and pancreas resections (p less than 0.05), as tabulated below.

Procedure	Expected	Ideal	p-Value
Lap Band	24 +/- 28	41 +/- 33	0.001
Colon Resection	19 +/- 11	35 +/- 11	0.001
CBD Exploration	1 +/- 2	10 +/- 6	0.001
Antireflux	20 +/- 13	32 +/- 12	0.004
Therap Endo	12 +/- 14	33 +/- 32	0.02

Conclusion: In 13 of 19 procedure types, fellows were expecting to perform less case volume than in an ideal fellowship. The ideal MIS curriculum needs to be better defined.

Education/Outcomes-P245

ESTABLISHMENT OF THE TRAINING CENTER FOR ENDO-

SCOPIC SURGERY IN JAPAN, Kazuo Tanoue MD, Kozo Konishi MD, Satoshi Ieiri MD, Ken Okazaki MD, Takefumi Yasunaga, Shouhei Yamaguchi MD, Daisuke Yoshida MD, Yoshihiro Kakeji MD, Hideaki Nakashima MD, Makoto Hashizume MD, Department of Advanced Medicine and Innovative Technology, Kyushu University Hospital, Fukuoka, Japan

(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. Therefore, professional education / training for the purpose of medical safe standard improvement is very important. We have established an endoscopic surgery training center in university hospital and we regularly performed the seminars for the acquisition of a basic manual skill for surgeons.

(SUBJECTS and CONTENTS) By August, 2005, ten times of seminars were held once a month, and 148 surgeons attended these seminars. Training contents are as follows; 1: A lecture about a basic manual skill, 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 detachment, hemostasis, a suture / ligation. 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 three from 0, and the trainee who were able to accomplish initial suture ligation increased to 99% 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) Our training for the basic skills of endoscopic surgery showed an effect of clearly technical improvement, but the fault of the handling of forceps tended to increase. Therefore, we should focus on a method of education to add to technical certainty.

Education/Outcomes-P246

UNDERUTILIZATION OF MINIMALLY INVASIVE SURGERY FOR

TRAUMA DURING SURGICAL RESIDENCY, R I Thaker MD, W G Hawkins MD, N A Ahmed MD, R S Chung MD, B D Matthews MD, Washington University, Department of Surgery; Huron, Department of Surgery

Introduction: The aim of this study is to examine the impact of minimally invasive techniques on the operative trauma experience of surgical residents.

Methods: We determined the ratio of the number of cases of exploratory laparoscopy / laparotomy, and exploratory thoracoscopy / thoracotomy, for each of the past five academic years using case logs from the ACGME. We determined the change in these ratios over this period, and used linear regression to determine if there is a trend in use of minimally invasive techniques. We also examined total trauma operations per graduate, 50th %ile, for this period.

Results: The ratio of minimally invasive to open cases did not change significantly over time [p>.05]. Exploratory thoracotomy and thoracoscopy, and their ratio, remained virtually constant. Reported exploratory laparoscopy cases declined.

Notably, total trauma cases reported did not decrease, with 36 cases/graduate for four of five years.

	90-00	00-01	01-02	02-03	03-04	Change vs time
Avg # exploratory thoracoscopy	2.9	2.6	2.7	2.8	2	
thoracoscopy vs thoracotomy	0.3	0.3	0.3	0.3	0.3	
open exp thoracotomy	2.8	2.8	2.8	2.8	2.3	
ratio thoracoscopy / open	.12	.12	.09	.08	.11	(p)>.05
Avg # exploratory laparoscopy	5.6	5.4	4.9	4.3	4.9	
laparoscopy vs laparotomy	0.7	0.5	0.1	0	0	
open exp laparoscopy	4.8	4.8	4.8	4.3	4.9	
ratio laparoscopy / open	0.14	0.10	.02	0	0	(p)>.05
# surgical graduates	990	1021	1005	981	1017	
# trauma cases, 50 %ile	36	36	33	38	36	(p)>.05



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Conclusions: We conclude the impact of minimally invasive surgery has not yet surfaced for operative trauma during residency, despite attention in surgical practice and literature. This may be due to the advent of sophisticated imaging, and studies advocating expectant management for select trauma. However, the case logs may underestimate minimally invasive techniques, as conversion to open cases may be reported under other categories, and cases may be reported elsewhere once trauma category requirements are met. Thus, the ACGME data may actually reflect the rate of negative exploratory laparoscopy/thoracoscopy.

Education/Outcomes-P247

THE USE OF A VIRTUAL REALITY TRAINER TO INCREASE SURGICAL RESIDENT SKILL ON COMPLEX LAPAROSCOPIC TASKS, David Earle MD, Renee E Thompson MD, Jay Kuhn MD, Ronald W Bush BS, John Romanelli MD, Neal E Seymour MD, Baystate Medical Center

Introduction: Virtual reality (VR) simulation to train complex surgical tasks is of undefined effectiveness. We propose that objective-based VR training of a specific complex laparoscopic task improves performance in the operating room.

Methods: Following a tutorial on a standard technique of laparoscopic suturing and knot-tying, 9 surgical residents (PGY 1-5) performed 3 timed iterations of this task in a live anesthetized pig under highly standardized conditions. The final iteration was videotaped and subsequently rated using a validated survey tool designed to detect deviation from optimal task performance (higher performance event score = poorer performance). All videos were viewed independently in blinded fashion by 2 attending surgeon raters. Subjects were then trained on three suturing tasks during blocked sessions and self-directed practice on a VR device (MIST-VR Core Skills 3, Mentice AB, Göteborg, Sweden) with the aim of achievement of previously-defined expert performance. The animal OR and video assessment was repeated post-training for all residents.

Results: All residents improved performance on the VR task. 4 residents (44%) achieved VR performance objectives after 6-23 training sessions. On the OR assessment, all residents improved both time (224 ± 37 vs 132 ± 25 seconds, $p < 0.01$) and overall performance (30 ± 5 vs 13 ± 1 , $p < 0.005$; Wilcoxon matched pairs signed-ranks test). Laparoscopic cases utilizing suturing during the study period were identified from resident case logs. 4 residents had exposure to 6-10 cases, and 5 residents had exposure ≤ 2 cases.

Conclusion: In this study VR training of a complex surgical task was associated with improved performance of that task in an experimental operating room setting. However, achievement of VR expert performance objectives was hindered by inconsistent software performance. Resident case logs suggest that clinical experience was not responsible for the observed performance improvement. The impact of VR-based complex task training on skills applied in a clinical setting must be further investigated.

Education/Outcomes-P248

USE OF A NEW PERFORMANCE ASSESSMENT TOOL FOR A COMPLEX LAPAROSCOPIC TASK, Renee E Thompson MD, David B Earle MD, Jay N Kuhn MD, John R Romanelli MD, Neal E Seymour MD, Department of Surgery, Baystate Medical Center, Springfield, MA

Introduction: The difficulties of objective assessment of surgical task performance are increased with greater task complexity. This study is intended to validate a method of assessment of a complex but vital surgical skill performed under operative conditions.

Methods: PGY-1 and 2 surgical residents (novices; $n = 10$) and expert attending laparoscopists (experts; $n = 5$) observed a tutorial on a standard technique of laparoscopic suturing and intracorporeal knot-tying. All subjects then performed 3 iterations of this task in a live anesthetized pig under highly standardized conditions. The final iteration was timed and videotaped. Observable performance events defined during a period of task analysis were used in a survey tool designed to detect deviation from optimal task performance. Surveyed events included: Number needle manipulations, tissue penetrations,

tissue grasps, dropped or twisted needles, thread wrap attempts, thread damage, and achievement of functional needle position and square throws. A cumulative performance score was derived from all surveyed events, a higher score reflecting poorer performance. Study videotapes were viewed independently and in a blinded fashion by 2 attending surgeons trained on survey event definitions. Time and performance score data were compared for the expert and novice groups by Mann Whitney U test.

Results: Novice laparoscopists took significantly longer (343 ± 45 vs 76 ± 11 seconds; $p < 0.05$) and had higher survey scores (41 ± 5 vs 16 ± 2 ; $p < 0.01$) than experts. Mean inter-rater agreement for the entire course of the study was $87 \pm 4\%$.

Conclusion: The present study demonstrates construct validity for this assessment method, and shows that a high inter-rater agreement for carefully-defined and observable performance events associated with a complex laparoscopic task can be achieved. This analysis tool can be used to define performance and to assess improvement for laparoscopic suturing and knot-tying, and may be adapted to other surgical tasks.

Education/Outcomes-P249

CAN PROFICIENCY BENCHMARKS BE ESTABLISHED USING THE ENDOSCOPIC SIMULATOR?, Rebecca J Varley BS, Jamie E Goodall BS, Juliane Bingener MD, Dept of Surgery, University of Texas Health Science Center San Antonio

Introduction: Current endoscopic simulators are able to assess parameters affecting patient safety, diagnostic values, patient comfort and efficiency of a virtual exam. How these devices impact surgical training has yet to be determined. The aim of this study was to evaluate criteria for proficiency at the expert level of endoscopy.

Methods: Twenty-seven participants completed a questionnaire documenting their endoscopic training and experience. All participants performed one simulated colonoscopy using the Immersion Medical Colonoscopy Simulator. Data points including total time of procedure, area of visualized lumen, duration and intensity of patient discomfort, time spent in red out (with no clear view of the lumen), visualization of the anal verge, and retroflexion in rectum were collected. These values were compared to the number of colonoscopies performed and previous participation in an endoscopy elective. The Fisher's exact test and F-test for equal means across tertile were used for statistical analysis as appropriate. The study was exempt by the Institutional Review Board.

Results: The expert level endoscopists yielded faster times than beginners/intermediates (438 vs. 2087 seconds, $P = 0.001$) and achieved longer duration of time with no patient discomfort (420.4 vs. 2083.7 seconds, $P = 0.001$). In addition, expert endoscopists spent less time in red out (40.6 vs. 256.6 seconds, $P = 0.006$), performed retroflexion more successfully (88.9% vs. 66.7%, $P = 0.005$), and visualized the anal verge (77.8% vs. 66.7%, $P = 0.03$). Expert endoscopists performed an average of 455.6 colonoscopies compared to 21.44 in the intermediate and beginner groups, and 100% of expert endoscopists completed an endoscopic elective vs. 55.5% of beginners and intermediates.

Conclusions: Significant performance differences are evident between expert and intermediate/beginner levels of experience. Proficient (expert level) endoscopists performed a colonoscopy within 430 seconds, with 9.3% of time spent in red out, 96% of time with no patient discomfort, successful retroflexion in the rectum, and visualization of the anal verge. Performance on an expert level of endoscopy correlated with a successful completion of an endoscopic elective and performing greater than 400 colonoscopies.

Education/Outcomes-P250

EXTERNAL VALIDATION OF THE GLOBAL OPERATIVE ASSESSMENT OF LAPAROSCOPIC SKILLS (GOALS), Melina C Vassiliou MD, Dennis L Fowler MD, Nancy J Hogle RN, Christopher G Andrew MD, Ashley M Vergis MD, Dennis R Klassen MD, Liane S Feldman MD, Donna D Stanbridge RN, Gerald M Fried MD, Departments of Surgery: McGill University, Montreal; Columbia University, New York; University of Manitoba, Winnipeg; and Dalhousie University,



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Halifax.

Objective of the study: GOALS has been shown in a pilot study (21 participants) to meet high standards of reliability and validity in the host institution (H). The aim of this study was to evaluate the external validity of GOALS by exporting it to 3 other North American centers, and to compare these results to additional data accrued in the host site since initial publication.

Methods: GOALS, a 5 item Likert scale developed and tested for intraoperative assessment in laparoscopy was used by attending surgeons in 3 external institutions (X) to evaluate 16 novice (Nov., PGY1-3) and 12 experienced (Exp., PGY4- attending) participants performing laparoscopic cholecystectomy. These data were compared to 50 assessments completed by attending surgeons in the host site (31 Nov. and 19 Exp.). Construct and external validity were assessed by comparing mean total GOALS scores for novice and experienced subjects in host and external sites using two-way ANOVA with Fischer post hoc analysis.

Results:

	Mean GOALS	95% CI
Nov H	12.6	11.3 - 13.9
Exp H	21.0	19.2 - 22.8
Nov X	14.3	12.5 - 16.2
Exp X	21.4	19.6 - 23.2

Novice and experienced groups respectively scored similarly in host and external sites. Significant differences between novice and experienced operators were demonstrated, irrespective of the testing location.

Conclusions: These data provide evidence that GOALS is valid outside of the institution where it was developed and support its widespread use as an intraoperative assessment of laparoscopic skills. Results of future research employing GOALS as an outcome measure of different training strategies can be generalized to many North American programs.

Education/Outcomes–P251

“ASK THE EXPERT,” AN INTERNET RESOURCE FOR SURGICAL PATIENTS, Matthew J Weiner MD, Stephen M Kavic MD, Adrian E Park MD, J. Scott Roth MD, University of Maryland

Introduction: Direct patient to physician communication via the Internet is becoming increasingly popular across all specialties, however little evidence exists to support its usefulness, either to the patient, the physician or the institution. At our institution, an ?Ask the Expert? website was developed that allows users to contact a faculty member for an initial, brief, email-based consultation. A review of 597 consultations over an 11-month period from 10/2004 ? 9/2005 focusing on abdominal and inguinal hernias is presented.

Methods: One surgeon reviewed and responded to all 597 inquiries from the website over an 11 month period. The surgeon reported that each inquiry required approximately 5 minutes to complete. The website was promoted using search engine advertisements. Consultations were free of charge and limited to a single question and answer. After 11 months, an email-based survey was distributed to all users.

Results: 140(23.4%) of the 597 website users responded to the survey. Overall, the users were satisfied with the website, with 24.8% indicating that it was the most trustworthy health resource available on the Internet. Only 1 (0.73%) respondent found the website less trustworthy than other resources. Only 23.6% of the survey respondents live within 50 miles of the medical center, while 42.4% live >500 miles away. 10.6% of the respondents stated that they were planning to seek treatment at our institution prior to their experience using the site and 11.5% of the respondents stated that the patient ultimately obtained care at our institution.

Conclusions: Based on the results of the survey, the ?Ask the Expert? website is considered a trustworthy Internet resource. However, it did not appear to increase patient recruitment at our institution. The large number of patients based >500 miles away from the medical center complicate the analysis. Search engine and Internet technology is evolving to allow for geographic filtering of users. In order to more accurately

evaluate the recruitment utility of the ?Ask the Expert? website, a prospective trial is necessary after the application of appropriate geographic filters.

Education/Outcomes–P252

WHAT DO WE MEAN WHEN WE SAY THAT A LAPAROSCOPIC PROCEDURE IS “SAFE”? David Weizman MD, Jamie Cyriac MD, Lloyd Smith MD, Todd Penner MD, John Hagen MD, Laz Klein MD, Paul Sullivan MD, David Lindsay MD, David Urbach MD, University Health Network, Toronto, Ontario, Canada

INTRODUCTION: The literature on laparoscopic surgery contains many studies concluding that a procedure is ?safe?. The purpose of this study was to systematically review all articles from the last 10 years that concluded that a laparoscopic technique for colon resection and anastomosis was ?safe?.

METHODS: We conducted a Medline search from January 1995 to August 2005 using the search terms ?laparoscopic?, ?colon? and ?safe?. The search was limited to English language and human publications. Studies selected included those pertaining to laparoscopic colon resection or laparoscopic techniques of colonic anastomosis. Data extracted included: type of procedure, whether it was for benign or malignant disease, type and frequency of adverse outcome. We calculated exact 95% confidence intervals around estimates of the risk of adverse events reported in the studies, to determine the upper limit of the possible risk of adverse events in a study reporting zero adverse events.

RESULTS: Out of a total of 135 studies matching the search criteria, 41 (30%) described operations involving laparoscopic colonic resection or anastomosis. There were a mean number of 233 subjects enrolled for these studies. There were 29 retrospective studies, 9 prospective studies, 2 randomized control trials, and 1 case report. 16 studies included surgery for benign disease only, 14 were for malignant disease only, and 11 included both benign and malignant disease. Adverse outcomes included anastomotic leak, stricture, bowel obstruction, need for re-operation, and death. Calculated upper limit 95% confidence intervals for those cases reporting mortality ranged from 1.66% to 97.5%. 72.4% of studies claiming that laparoscopic colon surgery was “safe” that reported mortality could not exclude a mortality higher than 5%.

CONCLUSION: There is no uniform definition of ?safe? when used to describe the risk of adverse outcomes associated with laparoscopic surgical procedures. Many studies concluding that laparoscopic colon surgery was ?safe? could not exclude a possibility of death as high as 5%. The term ?safe? is not a useful descriptor of the relative safety of laparoscopic surgical procedures; statements about the safety of a surgical procedure should be justified with precise estimates of the risk of adverse events.

Education/Outcomes–P254

EFFICIENCY IN THE OR IS AFFECTED BY TEAM-RELATED ACTIVITIES BETWEEN SURGEON AND NURSE DURING LAPAROSCOPIC SURGERY, Bin Zheng PhD, Michelle D Taylor MD, Shalini R Kanneganti MD, Lee L Swanström, MIS Department, Legacy Health System

Efficient and safe performance of complex laparoscopic surgery requires close collaboration between surgeons, nurses and assistants who form the surgical team. The effectiveness and efficiency of teamwork has yet to be assessed in the context of laparoscopic surgery. This project examined the activities of a laparoscopic team to investigate OR efficiency. Actual laparoscopic anti-reflex surgeries, performed by a dedicated laparoscopic surgical team including experienced laparoscopic surgeons and nurses, were observed by a human factors investigator. All activities of the OR team as well as the operative procedure were video recorded. For this study, Team-related activities between the primary surgeon and the scrub nurse were identified and categorized according to their impact on the surgery.

The mean OR time was 161 minutes. About one-fourth of the OR time (27%) the scrub nurses were actively involved with the surgical task. On analysis, three types of team-related interactions were documented: positive interactions that improved efficiency or safety, neutral interactions, negative



interactions that cost time or were unsafe. The most common positive interaction were anticipatory movement in which the preparation and assistance was initiated before the nurse received verbal instruction from the surgeon. Anticipatory movements were counted 14 times on average for each case. Negative interactions were rare but occurred at least once in each case. Overall, for 71% of the OR time the nurse focused on the surgical monitor, an indicator for active involvement. All observed anticipatory movements of the nurse correlated with their visual cues on the surgical monitor. Surgical team interactions are complex but can be measured and quantified even in complicated surgeries like laparoscopic fundoplication.

Interactions that contribute to operative efficiency or patient safety are much more common than negative activities. Obviously these activities will vary according to the maturity of the surgical team but the fact that they can be measured and quantified by recording the duration of each team-related activity, the number of anticipatory movements, and nurses' eyes gazing pattern and errors in the performance of the surgery indicates that educative metrics can be designed to maximize OR efficiency and improve surgical safety.

Ergonomics/Instrumentation-P255

EFFECT OF LAPAROSCOPIC SURGERY ON SURGEONS' HEALTH-SURVEY IN A MIDDLE-EAST EUROPEAN COUNTRY, Istvan Gal PhD, Zoltan Szabó PhD, Department of Univ.Teaching Surgery Bugat Pal Hospital, Gyöngyös Hungary, MOET Institute San Francisco, CA, USA

A lack of understanding the ergonomics of laparoscopic surgery has a potential to pose health problems for the surgeons. This study was planned to assess the prevalence of ergonomic problems associated with laparoscopy.

A questionnaire designed to assess the frequency and degree of physical discomfort practicing surgeons experienced was distributed to approximately 140 attendants of the 57th Congress of the Hungarian Surgical Society. The response sheets were analyzed.

Eighty-four attendees completed the questionnaire, all of them perform laparoscopic surgery. The average age of answering surgeons was 44.8 years (29-62 years) 28.5% of them play any racket sports. Most of them (71.4%) use single monitors and can't alter the height of the monitor (83.3%).The camera is usually held by assistant surgeon or resident(66.6%). The answer for number of operative/advanced laparoscopic procedures per month were as follows: 1-5(33.3%), 6-10 (35.7%), 11-15 (16.6%), more than 15(9.5%). The following problems were experienced during or after performing laparoscopic procedure: eye strain (61.8%), neck ache (57.1%), upper back pain (54.6%), lower back pain (54.6%), numbness or tingling in the palm or fingers (52.3%), wrist pain (30.8%), varicose veins (35.6%).

Conclusion: Surgeons performing laparoscopy have ergonomic problems, especially eye strain, neck ache, upper-lower back pain, and numbness or tingling in the palm or fingers. These findings indicate that laparoscopic surgical technique is more taxing on the surgeon.

Ergonomics/Instrumentation-P256

INCIDENCE OF "MIGRATORY CROTCH STAPLE" WITH ENDOCUTTERS – AN IMPORTANT PREVENTABLE CAUSE OF STAPLE MISFIRING, Ashutosh Kaul MD, Michael Chen MS, Lisa Dubroskin MD, Thomas Cerabona, Thomas Sullivan, Da Wang MD, New York Medical College

Aim of this presentation is to better define the incidence of "migratory crotch staple" during use of Endocutters.

Migratory crotch staple is defined as loose staple that is displaced from its prior position by another endocutter firing and lodges at the newly formed crotch. This staple can cause stapler malfunction or a "wedge band bypass failure".

We prospectively analyzed 405 endocutter firings during laparoscopic gastric bypass surgery and analyzed data to find the incidence of "migratory crotch staple" formation. Data was analyzed to evaluate incidence during perpendicular firings (second staple firing is perpendicular to the first) and parallel firings (second firing is in same direction and at the crotch of the first).

Of these firings 79 were first firings and were thus excluded from further analysis. Of the remaining 326 firings, 79 were perpendicular and 247 were parallel firings. The incidence of "migratory crotch staple" was found to be 74.7% (59 out of 79) in perpendicular firings and 53.4% (132/247) in parallel firings.

Incidence of migratory crotch staple

Firing	Total Number	Crotch stapler	% crotch staple
Perpendicular	79	59	74.7%
Parallel	247	132	53.4%
Total	326	191	58.5%

This study highlights the high incidence of "migratory crotch staple" which we believe have an important role to play in postoperative leaks. This presentation will highlight methods to avoid crotch staple formation; tips to better identify them and techniques to handle them. These simple precautions will lead to better staple line formation and potentially prevent complications.

Ergonomics/Instrumentation-P257

LARGE SCREEN LAPAROSCOPIC SURGERY, Jyotsna S Kulkarni MS, Sanjay B Kulkarni MS, Kulkarni Endo Surgery Institute

Traditional laparoscopic surgery is performed by viewing the image on a 20" or 14" monitor. Significant advances in the digital image processing and home theatre have taken place. We use a 3 CCD digital camera with progressive scan and connect it to a high resolution and 2000 Lumens projector. The image is focused on a 6 feet by 6 feet glass bead screen (gain +3) kept 8-10 feet away. The laparoscopic surgery is performed by viewing the large screen in the OR. It gives us true magnification and a brilliant, sharp image. As the light is reflected from the screen and not emitted as in a Monitor/TV it is more pleasing and causes less fatigue of the eyes. One can watch a movie for 2-3 hours in a cinema but rarely does the same on a TV screen continuously. The large screen laparoscopic surgery is an excellent teaching tool. The true magnification helps the surgeon to dissect and divide tissue with more confidence. The operating time is and hemostasis is better. We have used the system for last one year for laparoscopic procedures like Cholecystectomy, Appendectomy, Total extraperitoneal hernia repair, Abdomino perineal resection, Incisional hernia repair, Hiatus hernia repair and various urological surgeries like nephrectomies and pyeloplasties.

Large screen laparoscopy will change the way we look at the images and will provide us more opportunities to perform those difficult surgeries considered difficult and experimental today.

Ergonomics/Instrumentation-P258

POSTURAL INSTABILITY DOES NOT NECESSARILY CORRELATE TO POOR PERFORMANCE: A CASE IN POINT, Gyusung Lee PhD, Matthew J Weiner MD, Stephen M Kavic MD, Ivan M George, Robert Shapiro PhD, Adrian E Park MD, University of Maryland

Background: It is very important for surgeons who perform minimally invasive surgery (MIS) to maintain proper postural stability, which surgical kinematic research can determine. Previous studies in surgical ergonomics have shown that postural stability is correlated to instruments, task difficulty, and, possibly, the skill level of subjects. What should additionally be considered is that surgeons may strategically change their stance or joint movement to achieve better surgical outcomes while potentially subjecting themselves to greater kinematic risk. Background information about subjects, for instance joint impairment, should be a considered surgical ergonomic element, the correlations of which may lead to more accurate and specific conclusions about postural stability and joint kinematics.

Methods: A highly experienced and skilled right-handed surgeon developing carpal tunnel syndrome in both wrists was recruited to perform pegboard transfer and circle cutting tasks from the Fundamentals of Laparoscopic Surgery (FLS) skill set. Joint kinematics and postural data were collected using a



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computerized motion capture system comprised of twelve digital, high-resolution, high-speed, infrared cameras as well as two associated force plates.

Results: Task time for each of two tasks was less than a minute. For pegboard transfer, the subject increased the shoulder abduction angle so that he could align his hand and forearm to minimize wrist flexion. When excessive wrist flexion was required to cut a certain portion of circle, the subject maintained his lower body position and stance while twisting his torso in a strategy that appeared to stabilize a tangential direction in relation to the cutting while maintaining a fixed orientation of forearm, wrist, and hand. In a different circle-cutting trial, the subject changed his stance primarily by shifting foot position as needed in order to obtain better approach angles for the scissors. These compensatory and strategic movements caused increase in overall postural sway, yet they do not necessarily represent postural instability.

Conclusions: This case study showed that poor postural stability or joint kinematics do not necessarily correlate to poor performance but may instead be positive compensatory or strategic movements.

Ergonomics/Instrumentation-P259

CHARACTERIZATION OF ANGULAR GAZE BY EXPERT LAPAROSCOPIC SURGEONS USING A FACE-MOUNTED DISPLAY, David W Lin BS, David B Earle MD, Ron W Bush BS, Neal E Seymour MD, Baystate Medical Center, Springfield, MA, and Tufts University School of Medicine, Boston, MA

Introduction: Face-mounted displays (FMDs) might be useful in displaying surgical imaging but their proper use remains undefined. The aim of this study is to characterize angular gaze of expert laparoscopic surgeons during initial use of an FMD as a first step to defining optimal use of this technology.

Methods: A VGA-resolution FMD device (EyeTrek, Olympus Optical, Hachioji, Japan) was used to perform surgical tasks on a virtual reality (VR) trainer (MIST-VR, Mentice AB, Göteborg, Sweden). During a 30-minute session, 7 expert laparoscopic surgeons were familiarized with a validated MIST-VR task displayed on a conventional monitor, then returned on a different day to perform the same task with the FMD. Each subject was asked to assume a natural and comfortable position to view the simulator image while performing two iterations of the task. 1 minute after starting each iteration, a digital photo of the subject's head was taken with camera leveled and adjusted for subject height. After task completion, subjects were asked to look straight ahead and a second photo was taken. Images were analyzed for gaze angle off horizontal. Data are expressed as mean \pm standard error.

Results: Gaze angle during task performance varied across a narrow range (4 to 32 degrees below horizontal, mean 17 ± 4 degrees). Horizontal gaze angle also varied across a narrow range (0 to 9 degrees above horizontal, mean 5 ± 1 degrees). Subjects were consistent in both their task and horizontal gaze angles between task iterations (maximum deviation between iterations 4 degrees and 2 degrees, respectively).

Conclusion: During simulated laparoscopy on an FMD, expert surgeons assumed a gaze angle slightly below horizontal very consistently in this study. This behavior contrasts with studies of conventional displays that suggest gaze angle should be down to OR field level to optimize task performance. Further work is required to characterize ergonomic factors associated with this head position and whether duration of procedure changes the way an FMD is used during laparoscopy.

Ergonomics/Instrumentation-P260

A COST COMPARISON OF DISPOSABLE INSTRUMENTS AND NOVEL REUSABLE ULTRA-VIBRATING TROCAR AND SHEARS SYSTEM IN LAPAROSCOPIC CHOLECYSTECTOMY, Sumio MATSUMOTO MSc, K KUBOCHI MSc, Y ISOBE MSc, T OHISHI MSc, A SHIMADA MSc, H TAKEUCHI MSc, N WADA MSc, T HOJO MSc, S OHSUMI MSc, S KISHI MSc, National Hospital Organization, Tokyo Medical Center

Background: When we consider the cost-effectiveness in laparoscopic surgery, we intend to compare disposable and reusable instruments.

Methods: The instrument set considered includes devices that

are available in both a disposable and reusable form. The ultra-sonic vibrating shears and trocars, SonoSurg system (Olympus), were compared with disposable instruments of shears and trocars (Ethicon) in price list. In addition, costs of cleaning, sterilization, maintenance and disposal of waste were calculated. Thereby, we compare the cost-effectiveness of disposable and reusable instruments.

Results: Reusable instruments need higher initial purchase costs. However, reusable reduces costs in comparison with a set of disposable instruments. It was calculated the disposable instruments cost per one cholecystectomy was 3 times higher than the cost with reusable instruments.

Conclusions: Novel reusable ultra-vibrating trocar and shears system reduces costs in laparoscopic cholecystectomy and reduces a volume of disposable waste.

Ergonomics/Instrumentation-P261

DEVELOPMENT OF A NEW DIGITALIZED OPERATING ROOM USING HD-PDP MONITORS AND THE SDI SYSTEM FOR ENDOSCOPIC SURGERY, Takeshi Naitoh MD, Masao Kobari MD, Takashi Tsuchiya MD, Satoshi Akaishi MD, Hiroshi Honda MD, S.C.M.C., Department of General Surgery

Imaging quality during endoscopic surgery affects a lot to performance efficiency. We have been focusing on the performance aspects of the endoscopic camera and telescope, however not really considered about performance of the monitors, so far. Besides, medical equipments and other images are rapidly switching to digital. We recently developed new full-digitalized operating rooms installing High-vision PDP as a main monitor for endoscopic surgery and endoscopic images are transmitted with Serial Digital Interface (SDI). SDI is the standard for the interface used by broadcasting stations and for exchanging digital images and sound signals. It can transmit uncompressed digital signals with a single coaxial cable more than 100 meters long without picking up noises. As for monitors, we cannot hope for higher resolution and larger screens at present with CRT monitors. Also, large LCD monitors have a problem with color irregularity depending on the viewing angle. Besides their inferior color reproduction, poor responsiveness with high-speed images make them unsuitable as main monitors for endoscopic surgery. On the other hand, PDP has higher responsiveness with high-speed images, excellent color reproduction, unrestricted viewing angle and no flicker. We have two endoscopic operating rooms and two Panasonic 42-inches HD-PDP monitors supporting SDI system suspended from the ceiling with rotating arms are placed face-to-face in each room so that every surgeon can monitor the image with a comfortable position. Endoscopic surgical system is the Karl-Storz OR-1 which contains a digital 3-CCD camera system called Image-1. These systems also support several image sources such as PACS images, pathologic images, ultrasonography images, flexible endoscope images and so on. We can monitor these images simultaneously side by side with an endoscopic view on single screen and image sources are selected with a touch panel. These images are also recorded to a HDD recorder as a digital file. This brand new OR system with HD-PDP and SDI is very useful and help us to perform precise operation. I hope in future SDI PDP system will be the standard for the medical imaging system.

Ergonomics/Instrumentation-P262

THE HARMONIC ACE SCALPEL TO TRANSECT AND LIGATE CYSTIC DUCTS IN A PORCINE BILIARY MODEL, Richard A Pierce MD, Juan A Perrone MD, Noopyr Gangopadhyay, Valerie J Halpin MD, Michael Brunt MD, Christopher Eagon MD, Margaret M Frisella RN, Brent D Matthews, Department of Surgery, Washington University, St. Louis, Missouri

Introduction: Energy sources have facilitated laparoscopic surgery by providing efficient and reliable control of vascular pedicles although the utility of these devices on bile ducts has not been established. The purpose of this study is to evaluate the effectiveness of a novel, new generation ultrasonic coagulator, the Harmonic ACE? Scalpel, to transect and ligate cystic ducts to determine its efficacy in biliary surgery.

Methods: After Institutional approval, 18 domestic female pigs



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were randomized into two groups: Group I (n=12), laparoscopic cystic duct transection/ligation with clips (n=6) or the Harmonic ACE? Scalpel (n=6) and Group II (n=6), laparoscopic cystic duct transection/ligation with clips (n=3) or the Harmonic ACE? Scalpel (n=3) after common bile duct ligation with clips to simulate biliary obstruction. Group I was sacrificed on POD #21 and the cystic ducts were harvested for burst pressure testing (mmHg). Group II was sacrificed on POD #6 due to morbidity of prolonged biliary obstruction. Statistical differences (p value < 0.05) were measured using a two-tailed t-test

Results: No cystic duct stump leaks occurred in Groups I or II. The mean maximum pressure exerted on the cystic ducts was 1028 mmHg ± 562 for clips and 887 mmHg ± 32 for the Harmonic ACE? Scalpel (p = ns) without stump failure.

Conclusions: The Harmonic ACE? Scalpel is an effective technology to ligate and transect cystic ducts in a porcine model of laparoscopic cholecystectomy with and without biliary obstruction. The utility of the Harmonic ACE? Scalpel for laparoscopic biliary and/or hepatic surgery remains investigational.

Ergonomics/Instrumentation—P263

A COMPARISON OF TROCAR INSERTION FORCE FOR LAPAROSCOPIC SECONDARY PORT PLACEMENT, Steven D Schwaitzberg MD, Cambridge Health Alliance, Cambridge MA Millions of secondary laparoscopic ports are placed worldwide each year. While the rate of unintended injury is low, continuous improvement is desirable. Despite this broad experience there is no consensus concerning optimal trocar characteristics. Reflecting this conundrum, there is a wide variety of styles including bladed, non-bladed, shielded, retracting tip, dilating, metal, plastic and the like. Placement features that have been touted as desirable include low cost, reusability and disposability, size of the fascial defect, shielding, and insertion force. Recently, a non-shielded partially reusable trocar system has been developed that uses ultrasonic energy with a frequency 23.5 KHz and amplitude of 150microns as the method for traversing the abdominal wall/peritoneum.

The purpose of this study is to evaluate insertion force characteristics for ultrasonically powered device and a number of commonly used laparoscopic trocars.

Five and twelve mm trocars were placed in fresh swine tissue blocks. The ultrasonically powered trocar and examples of shielded, non-bladed and dilating trocars from 3 manufacturers were placed. There were 20 placements for each condition. Adequate skin incisions were made and the insertion force for the trocar to traverse the abdominal wall was measured by attaching test trocars to a computerized digital strain gauge. Insertion maximal force for the 5mm ultrasonically powered trocars was .50 kgf; for four examples of shielded/bladed trocars was 2.55 kgf; and there examples of non-shielded non bladed trocars was 4.12kgf. These peaks were generally achieved within 1 to 2 seconds. For 12mm trocars, the ultrasonically powered inner trocar was inserted with .51 kgf then peaked at 7.74 kgf when inserting the outer cannula by dilation. Three examples of 12mm bladed trocars were inserted with 4.63 kgf of force. Two examples of 12mm bladeless trocars required 8.17 kgf for insertion. One dilating trocar required 16.7 kgf for insertion.

Regardless of trocar shielding higher insertion forces may be associated with less controlled secondary entries leading to higher risk of injury especially in the hands of the less experienced operators. Very low insertion force trocars still require careful operation, but may be placed into the peritoneum with fine control and precision. In this model ultrasonically activated trocars were inserted with the least force, offering a potential safety advantage for secondary port placement.

Ergonomics/Instrumentation—P264

EVALUATION OF THE 3D LAPAROSCOPE ON SURGICAL PERFORMANCE AND FATIGUE, Kazuhiko Shinohara MD, Yasushi Yamauchi PhD, School of Bionics, Tokyo University of Technology

To evaluate the effect 3D laparoscope, performance and fatigue of the laparoscopic tasks were measured under monoscopic and stereoscopic conditions. Material and Method:SK-

1057-3D-A laparoscope system (Shinko Optical) which can provide both 3D and 2D view in equal quality except stereopsis was used in this study. Three kinds of tasks (pegboard, cutting and suturing) were required to the subjects for 60min in a training box for endoscopic surgery (MATT trainer™). The subjects were 14 healthy individuals (12 novice, 1 lap surgeon and 1 non-lap. surgeon). The order of the 2D and 3D was ordered at random by the subject. All of the endoscopic procedure were recorded by VTR for the analysis of the performance. Critical flicker frequency (CFF) test was performed for the assessment of eye fatigue. Subjective Symptom Test of Fatigue (SSTF) which includes 25 questions categorized into 5 categories (1: drowsiness, 2: instability, 3: displeasure, 4: heaviness, 5: Blur) was performed for the assessment of subjective symptoms. CFF and SSTF were assessed both before and after the task. Results: The change rate of CFF-value after the task compared with that of pre-task was 1.01?0.02 in 2D and 1.02?0.02 in 3D. The subjective fatigue after the tasks increased in the category of 4 (heaviness) and 5 (blur) in SSTF. But there was no difference of the fatigue in CFF and SSTF test between 2D and 3D. (p<0.05) The performance of every task with 3D was markedly better than with 2D in the group that performed tasks with 2D before 3D (Group X). (p<0.01) In contrast, the group that performed tasks with 3D before 2D (Group Y) showed no significant difference. (p< 0.05) Conclusion: Results of this study suggest that there is no visual fatigue caused by the binocular stereopsis. The difference of the performance between group X and Y can be explained as follows. The improvement of task performance with 3D view in Group X can be explained as a result of the use of 3D display and additional learning effects. Also, in Group Y, the effect of 3D view in first task augmented the learning effect. This study revealed effectiveness of the latest 3D endoscope for laparoscopic procedures.

Esophageal/Gastric Surgery—P265

PATIENT SATISFACTION AND OUTCOME FOLLOWING HELLER MYOTOMY FOR VARIANT ACHALASIA, L M Balduf MD, T Farrell MD, University of North Carolina

Heller myotomy (HM) is a well-established treatment for classic achalasia patients, however, few studies have assessed its efficacy in cases of variant achalasia (VA), where manometric data fail to show either inadequate LES relaxation or absent esophageal peristalsis. Positive symptom response to intrasphincteric Botox injection among selected VA patients may help predict the success of more invasive treatment, such as HM. The objective of this study was to compare outcomes among VA and CA patients following HM and to assess treatment satisfaction among those VA patients treated with Botox injections followed by HM. Patients who had undergone HM at the University of North Carolina Hospitals between 1996 and 2005 were invited to complete a questionnaire addressing dysphagia and heartburn symptoms, the SF-36v2®, and overall satisfaction. Preoperative manometry, postoperative therapies and hospital charts were reviewed. CA was defined by LES relaxation pressure above 8 mmHg AND esophageal peristalsis in fewer than 30% of wet swallows. VA was defined as either LES relaxation pressure above 8 mmHg OR esophageal peristalsis in more than 30% of wet swallows. Continuous data were compared between groups using Student's t test. Crosstab data were compared using Fischer exact test.

Of respondents, 24 met criteria for CA, and 15 met criteria for VA. Mean follow-up was 37.9±26.7 months for VA and 52.2±26.9 for CA (p=0.11). VA patients had similar overall satisfaction scores (4.40 v 3.75, p=0.12) compared to CA patients. VA patients also demonstrated similar Eckhardt dysphagia scores (1.87 vs 2.54, p=0.31) and heartburn scores (7.47 vs 7.09, p=0.89), compared to CA patients. Finally, general health (43.2 vs 46.6, p=0.44), physical function (46.2 vs 46.7, p=0.92), vitality (52.8 v 48.1, p=0.27) and social function (46.7 v 43.9, p=0.53) scores of the SF-36v2 were similar between the VA and CA subjects. Of the VA patients, seven experienced symptom relief with Botox injection prior to HM. These patients had similar overall satisfaction, symptom relief and health-related quality-of-life compared to the non-Botox VA and the CA patients.



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In this preliminary study, patients with VA reported similar overall satisfaction, symptom relief and health-related quality-of-life to patients with CA after HM. In this early study, responsiveness to Botox was associated with satisfactory outcomes to HM in selected VA patients.

Esophageal/Gastric Surgery–P266

QUALITY OF LIFE AFTER REDO-HELLER MYOTOMY: BETTER GET IT RIGHT THE FIRST TIME., Eric Bedard MD, Eric Poulain MD, Christopher Schlachta MD, Joseph Mamazza MD, St. Micheal's Hospital, Toronto, Ontario, Canada

Introduction: The technical feasibility of laparoscopic redo-Heller myotomies for achalasia has been demonstrated in small published case series. However, no objective health related quality of life (HRQOL) data exists in the literature documenting an actual benefit for patients requiring these challenging redo procedures.

Methods: We compared HRQOL in 8 patients following redo-laparoscopic Heller (redoLH) myotomy with a randomly selected contemporaneous cohort of 13 patients having undergone previous primary LH only. HRQOL was assessed using the Medical Outcomes Study 36-item short form survey (SF-36), the Gastrointestinal Quality of Life Index (GIQLI) and a recently validated achalasia QOL questionnaire (AQ). Data are presented as mean +/- standard deviation.

Results: The median follow-up for patients in the redoLH group was 31 months (range 11-60) which was similar to LH patients (median 37 months, range 15-67). SF-36 scores were significantly lower in redoLH patients: overall score 52.6 vs 82.6 (p=0.008), physical health score 45.7 vs 80.1 (p=0.0004), and mental health score 55.4 vs 80.7 (p=0.03). In addition, the GIQLI global index (p=0.0004), symptom (p=0.0008) and physical function (p=0.0004) scores were significantly lower in redoLH patients versus the primary LH cohort. Finally, the disease specific achalasia questionnaire scores were significantly worse in the redoLH group (63.9 +/- 8.3) versus the primary LH group (41 +/- 18.8, p=0.001).

Conclusions: HRQOL as assessed by validated general, system specific and disease specific instruments all showed significantly worse results for patients after redoLH. Patients requiring a redo-laparoscopic Heller myotomy clearly do not achieve the same HRQOL outcomes expected with primary laparoscopic treatment for achalasia.

Esophageal/Gastric Surgery–P267

CURRENT SURGICAL MANAGEMENT OPTIONS IN GASTRO-PARESIS, Robert N Cacchione MD, Benjamin D Tanner MD, Yin Luk MD, John M Wo MD, Departments of Surgery and Gastroenterology, University of Louisville School of Medicine

Introduction: Gastroparesis is an uncommon disorder. We have been involved in the treatment of 67 patients with gastroparesis in the setting of an academic tertiary referral center as part of a multidisciplinary approach to the care of these patients.

Methods: We undertook a retrospective review of all patients undergoing surgical procedures for management of gastroparesis. We describe here the laparoscopic surgical procedures performed on these complex patients and the rationale for selecting those procedures.

Results: 67 patients underwent 78 surgical procedures. 72 of these were accomplished by minimal access (laparoscopic or endoscopic) techniques. These include full thickness gastric biopsy and/or small bowel biopsy, jejunal feeding tube placement, gastrostomy tube placement, revision or reversal of fundoplication, pyloroplasty, and placement of the Enterra Gastric stimulator. (Medtronic, Inc. Minneapolis, MN)

Conclusion: The current management of this disorder is primarily dietary and pharmacologic with the use of one or more prokinetic medications. Our experience shows that there is also a significant role for the surgical endoscopist / laparoscopist in the care of these patients.

Esophageal/Gastric Surgery–P268

PATTERNS OF FAILURE OF LAPAROSCOPIC NISSEN FUNDOPPLICATION, Robert N Cacchione MD, Benjamin D Tanner MD, John M Wo MD, Yin Luk MD, Jeffery W Allen MD, Departments of Surgery and Gastroenterology, University of Louisville School of Medicine

Introduction: Laparoscopic Nissen fundoplication has become a widely performed procedure for the management of patients with gastroesophageal reflux disease. We have some experience with laparoscopic re-operative procedures to correct problems encountered following laparoscopic Nissen fundoplication.

Methods: We undertook a retrospective review of operative notes and available videotapes to describe the reasons for failure of laparoscopic Nissen fundoplication. Twenty-four procedures were reviewed and the reasons for failure were categorized.

Results: All patients under going re-operative surgery for failed Nissen fundoplication underwent extensive pre-operative workup and then laparoscopic or open surgery for revision. We identified seven reasons for failed procedures: (1) fundoplication slipped below the gastroesophageal junction, (2) recurrent hiatal hernia, (3) poorly constructed fundoplication, (4) fundoplication which was too tight, (5) unrecognized gastroparesis, (6) unrecognized achalasia, (7) and esophago-gastric fistula. Some of the reasons for failure were not immediately recognized from the workup that these patients underwent.

Conclusions: Laparoscopic Nissen fundoplication is a widely performed procedure. There will certainly be patients that have continued symptoms, or new symptoms following surgery. Understanding the reasons for failed procedures will hopefully guide the workup of these patients, and assist in the planning of revision.

Esophageal/Gastric Surgery–P269

FOREIGN BODY INGESTION CAUSING GASTRIC PERFORATION, H. Elhassan MD, E. Panzeter MD, Robinson Memorial Hospital, Huron Hospital, CCHS

Objective Foreign body ingestions are commonly seen in children, the majority pass through the GI tract without difficulty. Perforation of the stomach is very rare. Rapid diagnosis and treatment by surgeons is necessary in order to decrease morbidity.

Method This is a case report of 56-year-old male who presented to the emergency room with epigastric & chest pain, discharged home after negative work up for CAD. The patient came back 2 days later with severe pain and peritonitis. CXR and abdominal series were unremarkable; abdominal CT showed air fluid level adjacent to the lesser curvature of the stomach. Exploration of abdomen revealed 6-cm toothpick perforating the anterior surface of the stomach and lodged into the left lobe of the liver. Postoperative recovery was uneventful.

Conclusion Gastroduodenal perforation secondary to foreign body ingestion should be included in the differential diagnosis of abdominal pain especially the atypical cases.

Pictures and radiologic films are available to be submitted when requested.

Esophageal/Gastric Surgery–P270

COMPARATIVE STUDY OF HASSAB'S OPERATION WITH ADDED GASTRIC SUTURES VERSUS WARREN'S OPERATION ON OESOPHAGEAL VARICES DUE TO SHISTOSOMAL HEPATIC INFESTATION, M EL-TAIR MS, Y KOSSBA MD, Y GAWISH MD, M RASHID MD, Department of General and Colorectal Surgery, Alexandria University, Sultan Hussein street, Egypt

Background Portal hypertension is a disorder of the hepatic vasculature which can follow obstruction of the portal or hepatic venous system. The purpose of this study was to compare the outcome of Hassab's operation with the addition of gastric sutures to Warren's operation for the management of esophageal varices in patients with or without hematemesis and melena.

Methods This study was done in Alexandria University of Egypt between 1994 and 1997. Forty patients were recruited and divided into two groups (A=20, B=20): patients in group A presented with hematemesis while group B had no hematemesis but presented with other symptoms of portal hypertension like splenomegaly and dyspepsia and had high risk signs of bleeding on endoscopy. Ten in each group underwent



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Hassab's operation with addition of gastric sutures while the other ten underwent Warren's operation .Outcome measures in each group were (a)clinically: splenic size ,ascites development, rebleeding rate , mortality rate (b)laboratory: ammonia level (c)endoscopy (d) duplex findings as regard portal vein diameter and flow , blood velocity in portal circulation then portal vein thrombosis post Hassab's and shunt patency post Warren's .

Results (a)clinically: while in decongestion operation patients were splenectomized, decrease in spleen size was noticed in 60% of bleeders and 70% of non bleeders who underwent Warren's operation . Post-Warren ascites developed in 20% of bleeders and 30% of non bleeders . Rebleeding was only noticed in one bleeder patient post Warren . There was no mortality rates in both groups. (b)Laboratory wise, blood ammonia levels decreased in all patients. (c)As regard endoscopy , post decongestion decrease of the size of the varices was noticed in 60% of bleeders and 40% of non bleeders versus 90% in bleeders and 80% of non bleeders post Warren's operation. (d)Duplex showed decrease in portal vein diameter and flow in both groups , no portal vein thrombosis was found post Hassab's and shunt remained patent post Warren's.

Conclusion both operations were successful in management of esophageal varices whether as prophylactic or as definitive therapy .There was no significant difference in outcome as regard both operations and still it is a matter of surgeon preference and patient selection .

Esophageal/Gastric Surgery–P271

LAPAROSCOPIC SURGERY FOR GASTRIC CANCER: PRELIMINARY EXPERIENCE, Alex Escalona MD, Gustavo Pérez MD, Fernando Crovari MD, Fernando Pimentel MD, Nicolas Devaud MD, Sergio Guzmán MD, Osvaldo Llanos MD, Luis Ibáñez MD, Departamento de Cirugía Digestiva. Facultad de Medicina. Pontificia Universidad Católica de Chile

Introduction: Gastric cancer is the first cause of death by cancer in Chile. Surgery is a proven effective treatment for gastric cancer. The development of the laparoscopic surgery has allowed to incorporate this technology to the surgical treatment of gastric cancer. The aim of this study was to evaluate the feasibility and postoperative results of laparoscopic gastrectomy for gastric cancer in our institution.

Methods and procedure: From May to August of 2005 four patients underwent laparoscopic gastrectomy for gastric cancer. Demographic data, clinical characteristics, intraoperative blood loss, operative time, oral intake, hospital stay and postoperative complications were registered. Postoperative complications were defined as those that were observed up to 30 days of the surgery.

Results: Four patients underwent a completely laparoscopic R0 gastrectomy with lymph node dissection. The mean age was of 63 years (Range 48 ? 80 years), 3 patients were male. Two patients underwent total gastrectomy with hand sewn Roux-en-Y esophagojejunostomy. In the other two patients a subtotal Billroth II gastrectomy was performed. Cholecystectomy by cholelithiasis was performed in two patients. There were no conversion to open surgery. There was no morbidity. The mean operative time was 260 minutes (Range 180 ? 330). The mean blood loss was 162 cc. Oral intake was started between 3th and 5th postoperative day. The mean postoperative hospital stay was 6,5 days (Range 6-7 days). The mean number of lymph nodes dissected was 40 (Range 35-54). According to histopathology two patients presented an early cancer in stage IA and IB respectively and the other two patients an advanced tumor in stage IB and IIIB.

Conclusion: Laparoscopic gastrectomy is a feasible procedure with good postoperative results in this preliminary experience.

Esophageal/Gastric Surgery–P272

LONG-TERM RESULTS OF LAPAROSCOPIC HELLER MYOTOMY IN ELDERLY PATIENTS WITH ACHALASIA, Jonathan F Finks MD, Ross Bakhtari MD, John G Hunter MD, Brett C Sheppard MD, University of Michigan, Ann Arbor, Michigan; Santa Barbara Cottage Hospital, Santa Barbara, California; Oregon Health & Science University, Portland, Oregon

The long-term results of surgery for achalasia in elderly patients is not well-established. The objective of this study was to evaluate symptom relief and quality of life following laparoscopic Heller myotomy (LHM) in this population.

The medical records of 21 consecutive patients who underwent LHM for achalasia at an academic center from 1995 to 2003 were reviewed. Subjects aged 55 or greater at the time of operation were included. Data on patient characteristics and perioperative outcomes were collected. A mailed written survey was used to assess the frequency or severity of disease-related symptoms. Participants also completed a SF-12v2 Health Survey. SF-12v2 results were compared to normative scores from US controls aged 65-74 using a two-tailed Student t test.

21 patients with a median age of 70 (range 55-84) underwent LHM. There were 4 (19%) conversions; 1 (4.8%) reoperation for esophageal perforation; 2 (9.5%) minor complications and no deaths. Follow-up was complete in 11 (52.4%) with a median of 74 months (22-126). 6 (28.6%) patients have died since surgery. Symptom frequencies are listed in Table 1. The symptoms cough, bad taste and hoarseness were rated as absent or mild in 90%, 81.9% and 90.9% respectively. 3 (27.3%) respondents have required esophageal dilation or Botox injection since surgery. Subject SF-12v2 scores were similar to those of US controls in all subscales.

	Never	< twice/week	Daily
Dysphagia (Solids)	9.1	72.7	18.2
Dysphagia (Liquids)	45.4	36.4	18.2
Regurgitation	68.2	22.7	9.1
Chest Pain	54.5	45.5	0
Heartburn	54.5	18.2	27.3

Although intermittent symptoms persist in a significant proportion of elderly patients after surgery for achalasia, LHM remains an effective treatment option. Prospective studies comparing different therapies are warranted.

Esophageal/Gastric Surgery–P273

LONG-TERM RESULTS OF LAPAROSCOPY- ASSISTED GASTRECTOMY FOR GASTRIC CANCER, Tetsu Fukunaga MD, Naoki Hiki MD, toshiharu Yamaguchi MD, The Cancer Institute Hospital of Jpanese foundation for Cancer Research

Laparoscopic surgery was introduced to Japan in 1991. I adopted the laparoscopy- assisted gastric cancer technique in 1994 and have experience with about 250 cases. Laparoscopic surgery has made remarkable progress in the last fourteen years, thanks to improvements in optical equipment.

Initially, we limited ourself to lymph node dissection only epigastric area for reasons of technique, but began performing extended lymph nodes dissections(D2) since 1997 as my techniques progressed. I have performed D2 dissections with laparoscopic assisted distal gastrectomy for gastric cancer with tumors located at either the middle or lower part of stomach. With regard to GI reconstruction, I employ the Roux-Y method in addition to the B-I reconstruction. The mean procedure time is four hours and the mean blood loss is less than 100ml.

Laparoscopy assisted total gastrectomy is not the standard procedure. GI reconstruction is the key factor in making this procedure more common. We approached this issue relatively early on and adopted two methods. I will introduce these two in my presentation.

Our clinical results show five cases (2%) converted to open procedure as the result of additional lymph node dissection with our early clinical cases. Thirteen cases (5.2%) showed both perioperative accidental symptoms and postoperative complications. One case resulted in death related to the surgical procedure. The day of hospital stay was 11 days with LADG, 12 days with LAPG, and 19days with LATG. There were no postoperative ileus.

From the aspect of postoperative prognosis results, there were three cases of recurrence even though the surgical indications were either cT1N1 or T2N0. The stages of these three cases were SM2,N1tub1, SM2,N2,por, and SS,N2,sig; the former two cases showed hepatic metastasis and the last one had both bone and peritoneum metastasis. There were seven cases in



POSTER ABSTRACTS

which deaths were related to other factors. There was no post-operative lymph node metastasis. There were no differences between the open surgery and the laparoscopic surgery with regard to postoperative prognosis.

Laparoscopy-assisted gastrectomy is an innovative procedure for the gastric cancer, which combines both minimal invasiveness and permanent cure. This technique will continue to progress, and will assume an increasingly important role among all surgical procedures.

Esophageal/Gastric Surgery-P274

LAPAROSCOPIC NON-BARIATRIC GASTRIC PROCEDURES: INDICATIONS, TECHNIQUES AND OUTCOMES, Carolina G

Goncalves MD, Suthep Udomsawaegsup MD, Nfonsam Valentine MD, Bipan Chand MD, Cleveland Clinic Foundation
Introduction: Recent trends in laparoscopic gastric procedures have focused primarily on bariatric procedures. However the advantage of laparoscopy can be applied towards a multitude of gastric pathologies. We review our experience with non-bariatric gastric procedures at the Cleveland Clinic Foundation.

Methods: From March 2003 to July 2005 all laparoscopic gastric procedures (excluding primary bariatric cases) were retrospectively analyzed. Preoperative endoscopy, radiography, and gastric function testes were reviewed and choice of operative intervention detailed. Data collected included patient demographics, indications, type of gastric procedure, and outcomes.

Results: Thirteen laparoscopic non-bariatric procedures were initiated. The mean age was 63.07 ± 4.4 and had 7 females and 6 male patients. Indication for operation included gastric neoplasms (5), post-gastrectomy/vagotomy syndrome (4), and gastric outlet obstruction (4) Operations performed included partial or total gastrectomy for patients with malignancy or post-gastrectomy/vagotomy syndrome and gastro-jejunostomy for benign obstruction. Twelve out of 13 operation were successfully completed laparoscopically (92%). The mean operative time was 227.26 ± 27.51 with mean estimated blood loss of 81.25 ± 9.44 . The mean length of stay at the hospital was 4.46 ± 0.52 days. Successful treatment of the underlying pathology was achieved in all 13 patients

Conclusion: With careful patient selection laparoscopic gastric surgery can be offered with low morbidity for multiple diseases. Successful outcomes require advanced laparoscopic skills.

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ESTABLISHMENT OF STANDARD TECHNIQUE FOR LAPAROSCOPIC GASTRECTOMY FOR GASTRIC CANCER, Naoki Hiki

MD, Tetsu Fukunaga MD, Norihito Hosoi MD, Toshiharu Yamaguchi MD, Cancer Institute Hospital, Department of Gastroenterological Surgery

[Backgrounds] Recently laparoscopy and laparoscopy-assisted surgery have been used increasingly as less-invasive and better quality life alternatives to conventional open surgery. When performed by a skilled surgeon, laparoscopy-assisted distal gastrectomy (LADG) is a safe and useful technique for patients with gastric cancer and the LADG has been associated with less postoperative pain, an early return of bowel function, shorter periods of hospitalization and disability and better cosmetic results. However, LADG is still special technique only for skilled surgeon.

[AIM] To evaluate the role of the standardization of LADG, we compared the early operative outcome between the conventional (CLADG) and the newly fixed methods (FLADG). The procedure steps of FLADG were developed for trainer for better understanding of every procedure steps of LADG.

[METHODS] Between April 2004 and August 2005, 50 patients with early gastric cancer underwent laparoscopic surgical intervention (CLADG: n=22, FLADG: n=28). The operation time, and blood loss, intra- or post-operative complication and degree of the lymph node dissection were compared.

[RESULTS], Operation time of FLADG (245 ± 9 min) was significantly shorter than that of CLADG (278 ± 12 min ($p < 0.02$)) and estimated blood loss of FLADG (56 ± 8 mL) was about 50% less than that of CLADG (132 ± 25 mL ($p < 0.01$)). The mean of the number of dissected lymph nodes were 35 ± 2 in the CLADG and 36 ± 3 ($p = 0.69$) in the FLADG. Station dependent

number of lymph node dissection also demonstrated no significant differences. Incidence of postoperative complication showed no significant differences between each groups.

CLADG group showed 1 case of drainage tube trouble (4.5 %) while FLADG showed no complication (0%). The total analgesics use, time to first flatus, time to start of oral intake and postoperative hospital stay showed no significant differences. **[CONCLUSION]** Standardization of LADG procedures significantly stabilized an operation and improved intra-operative results. Further long term observation should be recommended.

Esophageal/Gastric Surgery-P276

STATUS OF BARRETT'S ESOPHAGUS AFTER LAPAROSCOPIC ANTIREFLUX SURGERY, Natalie Hubbard MD, Vic Velanovich MD, Henry Ford Hospital

Background: Controversy exists as to whether or not Barrett's metaplasia regresses after antireflux surgery. In addition, it is unclear whether successful symptom relief is associated with regression when it occurs. The purpose of this study was to determine the frequency of Barrett's metaplasia regression and whether symptomatic relief was associated with regression.

Methods: All patients who underwent laparoscopic antireflux surgery (either a Nissen or Toupet fundoplication) had their medical records reviewed. Patients had to have biopsy proved Barrett's metaplasia preoperatively and an upper endoscopy postoperatively (at least 2 yrs after surgery) which measured the length of metaplasia. Patients were contacted by phone to assess symptoms using the GERD-HRQL symptom severity questionnaire (best possible score 0, worst possible score 50).

Results: Of 30 patients with biopsy proven Barrett's metaplasia preoperatively, 14 had postoperative upper endoscopy which measured the length of the metaplasia. Ten of these 14 patients (71%) showed regression of Barrett's, with 4 showing complete regression. Two patients (14%) were unchanged. Two showed progression, one of whom developed high grade dysplasia. Ten patients were contacted by telephone and completed the GERD-HRQL symptom severity questionnaire. Of the 8 in whom the Barrett's regressed, the median total GERD-HRQL was 0.5 (range 0 - 10); while in 2 who were unchanged, the median score was 12.5 (range 11 - 14).

Conclusion: After successful laparoscopic antireflux surgery, the majority of patients with Barrett's metaplasia had regression, with only a few progressing. In addition, although the sample size is small, it appears that patients who had regression had less severe symptoms compared to patients who were unchanged.

Esophageal/Gastric Surgery-P277

EFFECT OF ENDOLUMINAL RADIOFREQUENCY ABLATION OF BARRETT'S ESOPHAGUS ON THE REFLUX SYMPTOMS IN PATIENT WITH FUNDOPLICATIONS, Natalie Hubbard MD, Vic

Velanovich MD, Henry Ford Hospital

Background: Endoluminal radiofrequency ablation using the Barrx device is a new technique to ablate Barrett's esophagus. This procedure is done in both patients who have had and have not had antireflux surgery. The purpose of this report is to present preliminary information on the effects of endoluminal ablation on the symptoms of reflux in patients who have already had an antireflux procedure.

Methods: Six patients who have had a laparoscopic Nissen fundoplication and Barrett's esophagus underwent endoluminal ablation using the Barrx device (Barrx Medical, Sunnyvale, CA). Preprocedure, none of the patients had symptomatic related to gastroesophageal reflux disease. Patients were seen initially one to two weeks after the procedure and were questioned as to the presence of symptoms.

Results: All patients had successful ablation of the Barrett's esophagus. Postprocedure, none reported recurrence of reflux symptoms.

Conclusions: This preliminary report of a small number of patients is encouraging with respect to no disrupting a functional Nissen fundoplication. Clearly, longer term follow-up with more patients is needed.



Esophageal/Gastric Surgery–P278

USEFULNESS OF LAPAROSCOPIC GASTRECTOMY IN GERIATRIC PATIENTS, Haruhiko Imamoto MD, Kazuki Ueda MD, Eiho Ho MD, Masayuki Shinkai MD, Kensyu Kawanishi MD, Norihiko Hirai MD, Motohiro Imano MD, Horonori Shigeoka MD, Hitoshi Shiozaki MD, Department of Surgery, Kinki University School of Medicine

OBJECTIVE AND AIMS: Laparoscopic surgical indications are gaining worldwide, however, for geriatric patients, these indications are excluded because of underlying various disorders. We reviewed clinical charts of geriatric patients over 80-year-old who underwent laparoscopic gastric surgery in our institution and evaluated the efficacy of this indication for elderly patients compared with open laparotomy in the same condition.

METHODS: Ten patients underwent laparoscopic surgery for early gastric cancer via CO₂ pneumoperitoneum (Lap group). These patients were compared with 20 patients who underwent open laparotomy with same condition such as underlying disorders, postoperative course, and complications (Open group).

RESULTS: In the Lap group, 14 patients had preoperative disorders such as cardiopulmonary disorders and diabetes mellitus. Postoperative ambulation and flatus were observed 1.4 days and 2 days, respectively. Postoperative delirium was observed in 4 patients and SIRS was occurred in 4 patients. Postoperative surgical complications were observed in 4 patients. There were also no intraoperative cardiopulmonary complications caused by CO₂ pneumoperitoneum. In the Open group, 15 patients had preoperative disorders. Postoperative ambulation and flatus were delayed (2.4 days and 4.1 days, respectively). Delirium was observed in 7 patients and SIRS was occurred in 8 patients postoperatively. Postoperative surgical complications were observed in 15 patients. In the Lap group, postoperative reduction of blood protein levels was smaller and their recovery was faster than in the Open group.

CONCLUSIONS: The faster postoperative recovery and fewer surgical complications in the Lap group compared with the Open group. These results suggest that laparoscopic surgery is less invasive, safer and more appropriate procedure for geriatric patients.

Esophageal/Gastric Surgery–P279

RE-OPERATIVE (RNF) AND PRIMARY NISSEN FUNDOPLICATION (PNF) HAVE SIMILAR OUTCOMES IN TREATMENT OF GASTROESOPHAGEAL REFLUX DISEASE, Mohammad K Jamal MD, Eric J DeMaria MD, James W Maher MD, Brennan J Carmody MD, Jason M Johnson DO, Luke G Wolfe MS, Virginia Commonwealth University Health System, Richmond, Virginia

Nissen fundoplication (NF) provides alleviation of symptoms of GERD. Minimal data exists in surgical literature on clinical outcomes after RNF for failed primary operations. We reviewed the data in our series of NF performed over seven years. A retrospective analysis of 123 patients undergoing NF at an academic institution was carried out from Jan 1998 to Nov 2004. Patients were divided in 2 groups based on PNF or RNF. Pre- and post-op symptom scoring (SS) in 7 categories was carried out using a standard questionnaire. Patients were asked to quantitate their symptoms on a scale of 0 to 3 based on severity (0=none, 1=mild, 2=moderate, 3=severe). A total SS was calculated as the sum of scores in all symptom categories. The study group comprised of 73 female and 50 male patients with a mean age of 49 years and a 80 months duration of symptoms before NF. 103 patients underwent PNF whereas 20 patients underwent RNF. The most severe symptoms were in a sub-group of 72 patients with positive SS in 3 or more categories despite medical management. 41 patients underwent 24-hr pH testing with a mean DeMeester score of 56 (33%), 95 had an upper endoscopy (77%) and 88 had manometry (72%) prior to surgery. NF was completed laparoscopically in 102/103 patients while 15 patients (75%) in the RNF and 5 patients (5%) in the PNF group were treated open. The average hospital stay was 3.3 days in the laparoscopic and 8.7 days in the open group. 41 patients (33%) were discharged within 24 hours of the procedure. Mean follow-up was 1 year. There were 12 minor complications and 1 death in the group (0.8%). Pre-op SS in the 2 groups were comparable for 6/7 symptom

categories. Nocturnal cough was a predominant pre-op symptom in the RNF group ($p < 0.05$). In the PNF and RNF groups, mean pre-op SS were 6.26 and 6.45 that declined to 2.91 and 4.6 post-op, respectively. Post-op resolution of symptoms was also comparable between the 2 groups in most categories. Atypical symptoms were more persistent in the RNF group as evidenced by their total SS. These included nausea ($p < 0.04$), nocturnal cough ($p < 0.001$), asthma ($p < 0.05$) and abdominal pain ($p < 0.05$). Although the total number of symptoms was comparable between the 2 groups before surgery (3 and 3.25 in PNF and RNF), the post-op number of symptoms was statistically significant in the PNF and RNF groups (1.79 and 2.75, $p < 0.04$). Although RNF provides excellent surgical cure for GERD patients with failed PNF, atypical symptoms may still persist and require further medical management

Esophageal/Gastric Surgery–P280

NISSEN FUNDOPLICATION (NF) AS A SALVAGE PROCEDURE AFTER FAILURE OF MEDICAL MANAGEMENT FOR GASTROESOPHAGEAL REFLUX DISEASE (GERD): DETAILED ANALYSIS OF CLINICAL OUTCOMES OVER SEVEN YEARS, Mohammad K Jamal MD, Eric J DeMaria MD, Igor Belyanski BS, Alfredo M Carbonell DO, Jason M Johnson DO, Brennan J Carmody MD, Luke G Wolfe MS, Virginia Commonwealth University Health System, Richmond, Virginia

Surgical literature suggests that NF has inferior outcomes in patients with severe GERD who fail medical management. We report a single surgeon experience in a group of 123 patients who underwent NF as a salvage procedure after failed symptom control with medical management. Patients undergoing NF between 1998 and 2004 were included in this retrospective analysis. Pre- and post-operative symptom scoring (SS) in 7 categories was carried out using a standard questionnaire. Patients were asked to quantitate their symptoms on a scale of 0 to 3 based on severity (0=none, 1=mild, 2=moderate, 3=severe). A total SS was calculated as the sum of scores in all symptom categories.

Demographic characteristics included a male:female ratio of 2:3, mean age of 49 years and a lengthy mean duration of symptoms of 80 months before NF. The group included patients with prior failed NF (16%), those on combined PPI and H₂ blocker therapy (14%) and patients with Barretts esophagus (8.7%), peptic stricture (6.5%) and hiatal hernia (56%). The most severe symptoms were in a sub-group of 72 patients (59%) with positive SS in 3 or more categories despite medical management. Forty-one patients underwent 24-hr pH testing with a mean DeMeester score of 56 (33%), 95 had an upper endoscopy (77%) and 88 had manometry (72%) prior to NF.

NF was completed laparoscopically in 102/103 patients while 20 patients were treated open. The average hospital stay was 3.3 days in the laparoscopic group and 8.7 days in the open group. Forty one patients (33%) were discharged within 24 hours of the procedure. The mean duration of follow-up was 1 year. There were 12 minor complications and 1 death in the group (0.8%). Whereas only 15% of patients were free of all symptoms after NF, there was a significant postoperative improvement in SS for heartburn (1.84 ± 1.08 vs. 0.63 ± 0.91 , $p < 0.0001$), regurgitation (0.89 ± 1.09 vs. 0.45 ± 0.88 , $p < 0.0003$), vomiting (0.77 ± 1.09 vs. 0.07 ± 0.28 , $p < 0.0001$), nocturnal cough (0.74 ± 1.08 vs. 0.45 ± 0.80 , $p < 0.0005$) and chest pain (1.01 ± 1.22 vs. 0.59 ± 0.89 , $p < 0.0012$). Of the 72 patients with more than 3 positive symptoms before NF, the majority (60%) showed elimination or improvement of all preoperative symptoms and reduction in total SS (8.6 ± 2.5 vs. 3.8 ± 4.0 , $p < 0.0001$). Our results show that NF is an effective salvage procedure in patients with severe GERD who fail medical management. It can be safely performed laparoscopically with minimal morbidity.

Esophageal/Gastric Surgery–P281

LAPAROSCOPIC VERSUS OPEN REPAIR OF PARAE-SOPHAGEAL HERNIAS: A COMPARISON OF SHORT-TERM OUTCOMES, Shahzeer Karmali MD, Sean McFadden MD, Philip Mitchell MD, Andrew Graham MD, Estifanos Debru MD, Corina Tiruta BS, Gary Gelfand MD, John Graham MD, Steven Martin MD, Sean Grondin MD, Department of Surgery, Divisions of Thoracic and General Surgery, University of Calgary, Calgary, Alberta, Canada



POSTER ABSTRACTS

Introduction: The choice of the optimal surgical approach for repairing Paraesophageal hernias (PEH) has been debated. The laparoscopic approach, which has been successfully applied in the management of Type 1 sliding hernias, has been proposed as an alternative to the open approach. Our objective is to evaluate the short-term outcomes of laparoscopic and open repairs of PEH performed in the Calgary Health Region (CHR).

Methods: We conducted a retrospective review of all patients undergoing repair of PEH by certified thoracic and general surgeons in the CHR between October 1999 and February 2005. Using the CHR inpatient database and medical records, all patients who underwent elective and emergency open or laparoscopic repair of PEH were reviewed. The outcome measures evaluated included intra-operative parameters (length of operation, blood loss, intra-operative complications), post-operative variables (length of stay, post-operative complications), mortality rates, and recurrence rates. Patient satisfaction was measured post-operatively by telephone interview using The Gastroesophageal Disease Health Related Quality of Life (GERD-HRQOL) questionnaire.

Results: Over the study period, a total of 100 patient underwent either a laparoscopic (n=50) or open (n=50) repair in the CHR. The laparoscopic approach was associated with a longer mean operative time (3.1 +/- 1.3 hours versus 2.5 +/- 0.7 hours, p=0.0074) but resulted in a shorter overall hospital stay (5 days [2-16 days] versus 10 days [5-24 days]; p<0.001). A shorter time to oral intake (1 day [1-6 days] versus 6 days [0-12 days]; p<0.0001) and fewer post-operative complications (10/50 [20%] versus 25/50 [50%] p=0.0031) were observed in the laparoscopic group. The median follow-up was 7 months with an 8% recurrence rate reported with both approaches. A total of 4 re-operations (2 laparoscopic; 2 open) were performed. The GERD-HRQOL score was similar in both groups (p=0.7) with the majority of patients reporting excellent outcomes (Laparoscopic: 87% [34/39]; Open 78% [29/37]).

Conclusion: Our five-year review suggests that the laparoscopic approach to repairing PEH is safe with a shorter hospital stay and recovery compared with the open approach. Although early follow-up suggests that recurrence rates and patient satisfaction are similar, long term follow-up is required to determine whether the laparoscopic approach will become the procedure of choice.

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SUITABILITY OF LAPAROSCOPIC NISSEN FUNDOPPLICATION TO THE DAY-CARE SETTING, Iqbal Z Khan MD, M Al-Akash MD, O N Tucker MD, K Austin, I Mohammad MD, Afaq Zaman Khan MD, D S O'Riordan MD, The Department of Surgery, The Adelaide and Meath Hospital, Tallaght, Dublin 24, & Naas General Hospital, Co.Kildare, Ireland.

Aims: Minimally invasive surgery has significantly facilitated the expansion of day care surgery. This study was to evaluate safety, patient acceptability and outcome of laparoscopic Nissen fundoplication in day-care setting.

Methods: Consecutive patients undergoing Laparoscopic Nissen Fundoplication from 2002 to 2004 for proven symptomatic gastro-oesophageal reflux disease (GORD) were preferentially treated as day-cases. Suitable patients were admitted to a dedicated day unit and discharged later. Standard protocols were formulated for preoperative analgesic, anti-emetic use, postoperative oral intake and discharge policy. Patients were reviewed at 6 weeks and asked to complete a satisfaction questionnaire.

Results: Thirty patients were admitted as day cases for laparoscopic Nissen fundoplication; median age 38 (range 18-60) years, Male: female ratio was 2.1:1. All patients were ASA grade 1-2. All patients had significant symptoms of GORD. Symptoms duration on average was 8.4 years (range 1- 40 years). Median anaesthetic time was 64 mins (range 40-90). 82% of the patients were discharged within 4-6 hours of surgery. 7 patients (18%) were admitted overnight. Indications included pain (n=2), dysphagia (n=1) and side effects of opiate use (n=4). Mean hospital stay in the admitted group was 50 hrs (range 24-108). 11 patients (22.4%) complained of transient dysphagia in immediate postoperative period. Completed questionnaires were returned by 94%. The majority 90% satisfied

with the day case surgery experience. No patient discharged from day care was readmitted.

Conclusions: Our experience demonstrates that laparoscopic Nissen fundoplication can be performed in a day-care setting in a safe manner and with a high degree of patient acceptability and satisfaction.

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ARE THERE PREOPERATIVE FINDINGS THAT PREDICT POOR OUTCOMES FOLLOWING NISSEN FUNDOPPLICATION?, Amy E Leatherwood MS, Yashodhan S Khajanchee MD, Shalini R Kanneganti MD, Lee L Swanstrom MD, Minimally Invasive Surgery Department, Legacy Health System, Portland, OR

Objective: Laparoscopic Nissen fundoplication provides excellent long-term relief of reflux in patients with gastroesophageal reflux disease (GERD). However, a small proportion of patients continue to have symptomatic and/or objective reflux following this operation. The objective of our study was to identify preoperative subjective and objective factors significant for predicting failure following Nissen.

Methods: Patients were selected from a prospective database. Only patients with objective documentation of GERD who underwent Nissen fundoplication between 1994 and 2004, and had complete follow-up of at least 6 months were selected. Patients undergoing, partial fundoplication, Hill repair, paraesophageal repair, Collis gastroplasty or redo Nissen were excluded. Data was obtained on patient demographics, preoperative symptom severity, endoscopic Savory-Miller grade of esophagitis and Hill-grading of esophageal flap-valve, DeMeester score (DMS), and manometric LES-pressure, LES-length, and body motility. Failure was defined as persistence or recurrence of grade-2 typical symptoms of GERD (heartburn and/ or reflux) and/ or DMS >14.7 on postoperative pH study. Univariate and logistic regression analyses were performed to find factors significant for failure. P values of < 0.05 were considered statistically significant.

Results: Total of 415 patients (mean age 49.89 [SD+13.66], 190 male) qualified the inclusion criteria. 218 patients (52.53%) had postoperative 24-Hr. pH study results available. After a mean follow-up period of 23 months 45 (10.84%) patients demonstrated symptomatic failure. 32/219 patients (14.6%) had abnormal DMS postoperatively. Patients with severe preoperative GERD symptoms (>grade-3) and those with poor esophageal motility had higher odds of symptomatic failure (Odds ratio [OR], CI [95% confidence interval]; 1.90 [0.71-5.11], and 1.6 [0.64-4.26] respectively). The odds of objective failure were highest among patients with preoperative DMS >30 (OR, CI ? 2.07 [0.72 ? 5.95]). None of these results, however, reached statistical significance.

Conclusion: Nissen Fundoplication provides excellent mid- to long-term symptomatic and objective results in GERD patients. There are no preoperative test results or clinical findings that can definitively predict subjective or objective failure after a Nissen. However, patients with severe preoperative symptoms, high DMS or poor motility should be cautioned about the possible higher risk of failure.

Esophageal/Gastric Surgery-P284

VERTICAL SIDE-TO-SIDE GASTROENTEROANASTOMOSIS WITH LINEAR STAPLER, AFTER DISTAL GASTRECTOMY OR GASTRIC PARTITIONING., Silvio L S Lemos MD, Aguinado P Nadai MD, Vilma J F Simões MD, Dorival Ricci Jr MD, Thiago A Domingos MD, Joaquim M Vinha MD, Santa Casa Hospital, Campo Grande/MS, Brazil.

OBJECTIVE: To improve gastric deflation in patients submitted to partial gastrectomy or gastric partitioning with rebuilding in Roux-en-Y?, according to Scopinaro?s classic or modified technique with distal gastric preservation for the morbid obesity treatment, we now carry out the gastroenteroanastomosis in a vertical side-to-side way with a linear stapler, for either the conventional method or videolaparoscopy.

METHODS AND PROCEDURES: From August/2002 to August/2003, we operated 42 patients, six patients were submitted to Scopinaro?s traditional surgery with distal gastric resection and 36 patients were submitted to Scopinaro?s modified surgery with partitioning and preservation of the distal



gastric segment. We used vertical side-to-side gastroenteroanastomosis with a stapler in all patients. The gastroenteroanastomosis to perform the Roux-en-Y was done using the posterior wall of the stomach longitudinally, starting in the stapling line of the gastric section, 4cm far from the greater curvature of the stomach. The technique was done using laparoscopic method in 11 patients. The follow-up minimum was 12 months.

RESULTS: During the procedure we observed excellent field of vision along the stapling line, internally and externally, and also, good irrigation in the area of the anastomosis. Regarding to surgery time, it wasn't increased. We also observed easiness in positioning the stapler to be shot. During post-surgery period, all the patients had good recovery with good gastric deflation, no gastric stasis or persistent vomits. Fistulas were not observed.

CONCLUSION: The vertical side-to-side gastroenteroanastomosis with linear stapler was considered a safe and technically easy procedure, with excellent outcomes in this sample. Besides being a good option for Scopinaro's surgery, it may also be an option for patients submitted to partial gastrectomy due to neoplasia or complicated peptic disease.

Esophageal/Gastric Surgery-P285

LAPAROSCOPIC REPAIR OF ESOPHAGEAL PERFORATION SECONDARY TO IATROGENIC TRAUMA, Sheilendra S Mehta MD, Mark T Toyama MD, Jay C Long, Pratibha B Lal, Garth Davis, Robert R Davis, Patrick R Reardon, The Methodist Hospital, Houston, Texas

INTRODUCTION: Iatrogenic esophageal perforation is a rare but devastating complication of balloon dilatation for achalasia. With an increased experience in laparoscopy, repair using a minimally invasive technique is possible in the hands of experienced laparoscopic surgeons. Here we present our experience with two cases of achalasia, where both patients suffered from the complication of esophageal perforation during pneumatic dilatation.

METHODS: The 1st patient is a 71 year old male with a long-standing history of dysphagia who was eventually diagnosed with achalasia and underwent multiple bougie dilatation attempts after which he developed chest and abdominal pain. An UGI and CT scan showed an esophageal perforation. He underwent a laparoscopic repair of the perforation with a myotomy and partial fundoplication. The 2nd patient is a 65 year old obese woman with longstanding GERD who was found to have achalasia after a 2 years of dysphagia. She was taken for balloon dilatation and developed chest pain afterwards. A barium swallow revealed an esophageal leak, and she was taken to the OR for a laparoscopic repair of the esophageal perforation in a similar fashion.

RESULTS: Both patients had anterior tears and underwent successful laparoscopic repair of their injuries. The 1st patient had an OR time of 440min, EBL100cc, with a LOS 22 days. The 2nd patient had an OR time of 220min, EBL25cc, and a LOS 7 days. The first patient had a complicated course involving prolonged ventilation secondary to sympathetic effusions which required drainage on POD 7. The 2nd patient had an uncomplicated hospital course and was discharged on day 7. Both patients were tolerating a regular diet upon discharge, with no dysphagia at 30 days. The 2nd patient had mild reflux symptoms requiring continuation of her PPIs.

CONCLUSION: Laparoscopic repair of esophageal injuries following dilatation for achalasia is a viable option for surgeons who are experienced with laparoscopy and with gastroesophageal surgery.

Esophageal/Gastric Surgery-P286

SYSTEMATIC REVIEW OF OUTCOME FOLLOWING LAPAROSCOPIC PARAESOPHAGEAL HERNIA REPAIR, S Mehta MD, A Boddy MD, M Rhodes MD, Department of Upper Gastrointestinal Surgery, Norfolk and Norwich Hospital, Norwich UK

Introduction: Laparoscopic surgery is becoming a commonly used technique for the repair of paraesophageal hernias. Many studies have confirmed its effectiveness, but there are reports of high recurrence rates following surgery. This is a systematic

review of the literature to determine whether laparoscopic repair is a safe and durable procedure.

Methods: A literature search on Medline, Embase and CINAHL was performed independently by two authors. All papers in the English language that were relevant to laparoscopic paraesophageal hernia repair were identified. Studies were only included in the analysis if more than 30 procedures had been performed successfully.

Results: A total of 20 studies met the inclusion criteria for the review. There was only one randomised trial. The others were either case series or retrospective accounts (class III evidence). In total, 1415 patients underwent attempted laparoscopic repair (mean age 65.7 yrs) of which 94% underwent some type of anti-reflux procedure. There were 70 (5.3%) episodes of morbidity and 173 (12.7%) patients experienced post-operative complications. In 10 studies radiographic follow-up was offered to patients after a mean of 16.5 months. Of those undergoing contrast swallow, 26.7% had evidence of anatomical recurrence.

Conclusion: Although early morbidity and mortality rates are low for laparoscopic paraesophageal hernia repair, recurrence rates appear to be high compared to earlier studies of open repair. The long-term consequences of anatomic recurrence are currently uncertain.

Esophageal/Gastric Surgery-P287

PROSPECTIVE RANDOMIZED BLINDED TRIAL FOR LAPAROSCOPIC ANTIREFLUX SURGERY, Mucio Moreno MD, Martin Rojano MD, Antonio Carrasco MD, Eduardo Montalvo-Jave MD, Departments of General, Endoscopic and Experimental Surgery, Hospital General "Dr. Manuel Gea Gonzalez. School of Medicine. UNAM. Mexico City, Mexico.

Introduction. Gastroesophageal Reflux Disease (GERD) is a common disease in adult population, a Nissen fundoplication is one of best choices for this groups of patients. The aim of this study was to evaluate the surgical outcomes of three laparoscopic antireflux procedures, compared symptoms, complications and follow-up.

Methods and Procedures. Between 1993 and 2001, a group of 100 consecutive GERD patients underwent a laparoscopic antireflux surgery, agreed to be prospectively randomized to Nissen (n=40), Toupet (n=25) and ?Gea? (n=35) groups. The same experienced surgical attendings performed all operations. All procedures utilized general anesthesia and postoperative follow-up was 4-10 years.

Results. There were no significant different (SD) in operative time, blood loss and postoperative improvement in symptoms in the Nissen and Gea groups.

Failure and reoperation rate was higher in Nissen than Gea groups, but no

SD were noted. (4 vs.2). No mortality was noted.

Conclusion. Our findings suggest that Nissen and ?Gea? groups can be safely and successfully performed in adults with GERD. We consider that ?Gea? surgical procedure is feasible and could be applicable to the patients with GERD.

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LAPAROSCOPIC TREATMENT OF ACHALASIA PROVIDES DURABLE CONTROL OF SYMPTOMS AND IMPROVED QUALITY OF LIFE, Allan Okrainec MD, Gerry N Polyhronopoulos MD, Liane S Feldman MD, Lorenzo E Ferri MD, Serge Mayrand MD, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal

Purpose: To assess the durability of laparoscopic cardiomyotomy and Dor fundoplication (LCD) on symptoms and quality of life using validated questionnaires.

Methods: 55 consecutive patients with achalasia (28M:27F) were evaluated prospectively before and serially after LCD performed by a single surgeon (1999-2005). Outcomes measured were dysphagia (5 pt scale), disease specific quality of life (GERD-HRQL, 0=best, 45=worst), and general health related quality of life (SF-12 physical component and mental component summary scores, PCS and MCS). The proportion of patients with daily bothersome symptoms of dysphagia (score > 2) was calculated for each follow-up period. QOL data are reported as mean (SD). Pre-op and 6 month data were compared using McNemar test



or paired t-test; change over time with ANOVA; post-hoc analysis was performed using Tukey procedure.

Results: Mean age was 53 (16) years. Twenty-two patients (40%) had received prior treatment for achalasia. Complete follow-up was obtained for 89% of patients, with mean follow-up time of 24 (19) months.

Time	Preop	6 mo	12 mo	24 mo	36 mo	≥48 mo
n	53	44	42	23	17	11
Dysphagia%	87%	7%	14%	13%	0	18%
GERD-HRQL	14 (9)	3 (4)	7 (8)	8 (5)	8 (8)	8 (4)
PCS	46 (10)	52 (6)	49 (10)	48 (11)	53 (7)	54 (5)
MCS	45 (12)	52 (10)	54 (9)	51 (10)	51 (16)	50 (12)

There was a significant change in dysphagia ($p=.000$), GERD-HRQL ($p=.000$), PCS ($p=.000$) and MCS ($p=.001$) at 6 months when compared to pre-op. ANOVA revealed significant improvement in dysphagia from preop to all postop intervals but no significant change over the duration of follow-up.

Conclusion: Laparoscopic cardiomyotomy and Dor fundoplication provides durable control of achalasia up to 48 months after surgery, with no significant increase in GERD symptoms over this same time period. Mental and physical QOL improve to and remain at levels equal to or better than population norms after surgery.

Esophageal/Gastric Surgery-P289

LAPAROSCOPIC CARDIOMYOTOMY- FOUR YEARS EXPERIENCE FROM A TERTIARY CARE CENTRE IN INDIA, Rajinder Parshad MS, Priya Hazrah MS, Anoop Saraya MD, Pramod Garg MD, Govind Makharia MD, All India Institute of Medical Sciences, New Delhi, India.

Objective: There is scant literature of laparoscopic cardiomyotomy from India. The present study assesses the results of laparoscopic cardiomyotomy without fundoplication in 40 consecutive cases over a period of four years.

Methods: Forty patients of achalasia cardia, with or without prior dilatation were included in the study. Patients with megaesophagus were excluded. Patients were evaluated with symptom scoring, barium and endoscopy. Manometry was done subject to the availability and indications.

Results: 40 patients underwent 41 cardiomyotomies during the above period. The mean age was 36.4 years. Twenty-three were males and 17 females. Eighteen patients had history of previous dilatations. Preoperative dysphagia was present in all. Three patients had absolute dysphagia. The mean preoperative dysphagia score was 2.11, median 2. Preoperative symptoms of regurgitation were present in 39/40 patients, 9 had history of pulmonary aspiration. The mean preoperative regurgitation score was 1.83, median 2. Eleven patients had symptoms of heartburn preoperatively. Laparoscopic cardiomyotomy was successfully completed in 39/40 patients; one patient was converted. There were two mucosal perforations both were sutured laparoscopically. There was no mortality. At a mean follow up of 14 months, (range 1- 48 months) there was a significant improvement in the mean postoperative dysphagia (0.22) and regurgitation (0.14) scores ($p=0.000$). Two patients had persistent dysphagia in the immediate postoperative period. One patient who had a persistently high postoperative LES pressure has improved following a redo laparoscopic cardiomyotomy and the other who had a low postoperative LES pressure has improved on conservative management. In 7/8 patients with more than three months follow preoperative heartburn was relieved after cardiomyotomy. Post-operative heartburn developed in one patient with no prior history and is on PPIs.

Conclusion: Laparoscopic cardiomyotomy without fundoplication results in excellent relief of dysphagia without producing significant symptomatic reflux in the early follow up.

Esophageal/Gastric Surgery-P290

LAPAROSCOPIC SURGERY FOR ACHALASIA: DO THREE MONTH RESULTS PREDICT LONGER TERM PATIENT-CENTERED OUTCOMES?, Gerry N Polyhronopoulos MD, Liane S Feldman MD, Alan Okrainec MD, Lorenzo E Ferri MD, Sebastian Demyttenaere MD, Donna D Stanbridge RN, Serge Mayrand MD, Gerald M Fried MD, Steinberg-Bernstein Centre for Minimally Invasive Surgery, McGill University, Montreal, Quebec, Canada.

INTRODUCTION: Laparoscopic Heller myotomy and Dor fundoplication (H-D) is widely used to treat achalasia. We sought to determine if short-term improvements in patient-centered outcomes predict longer-term results.

METHODS: Prospectively collected data on all H-D performed (1999-2005, $n=55$) were reviewed. General (SF-12) and disease-specific QOL (GERD-HRQL, 0: best - 45: worst), and dysphagia (0: best - 5: worst) were compared pre-op, at 3 mos and 2 yrs. Esophageal manometry was performed pre-op and 3 mos post-op. Groups were defined based on dysphagia scores and manometry at 3 mos post-op, and 2 year outcomes were compared. Data are expressed as median, and compared between groups with Wilcoxon signed rank test or Mann-Whitney U test. **RESULTS:** 31 patients were >2 years post-op, and 24 had complete (questionnaire) data for analysis. Dysphagia scores improved from 4 (symptoms affect daily activities) at baseline, to 0 (no symptoms) ($p<0.0001$) at 3 mos, and increased at 2 years to 2 (symptoms bothersome, but not every day), ($p=0.036$ vs 3 mos, $p<0.0001$ vs baseline). At 3 mos, 18 (75%) had no bothersome dysphagia (group 1) and 6 (25%) had bothersome symptoms (group 2). Of the 18 patients in group 1, 17 (94%) remained free of daily dysphagia symptoms at 2 years (0 at 3 mos vs 1 at 2 years, $p=0.006$). Of the 6 patients in group 2, none were worse at 2 years (2 vs 2, $p=0.655$). Comparison at 2 years showed a difference in dysphagia scores between the groups (1 vs 2, $p=0.013$), but no significant difference in general or disease specific QOL. When stratified by LES pressure (above or below 12 mmHg) measured 3 mos post-op, there was no difference in dysphagia scores and QOL at 2 years.

CONCLUSION: Dysphagia scores 3 months after laparoscopic Heller myotomy and Dor fundoplication were predictive of 2 year outcomes. Almost all patients doing well at 3 months continued to remain free of daily symptoms at 2 years, while patients doing less well at 3 months did not deteriorate further. Post-op LES pressure measurements at 3 months were not helpful in predicting longer-term patient-centered outcomes.

Esophageal/Gastric Surgery-P291

LAPAROSCOPIC ENDOLUMINAL RESECTION OF LEIOMYOMAS, Emil L Popa MD, Daniel T Dempsey MD, Amit Kharod MD, Christopher Kowalski MD, Temple University Hospital

Objective: The objective of this presentation is to demonstrate and discuss the use of newer minimally invasive techniques in the management of gastric tumors that are too large for the now commonly used endomucosal resection, or inaccessible to laparoscopic wedge resection.

Method: We described three cases of large intragastric juxtacardial benign tumors that were diagnosed and biopsied endoscopically prior to removal by laparoscopic endoluminal technique. Upper endoscopy was used at the end of the procedure to verify the caliber of the GE junction, to test the integrity of staple lines and verify hemostasis. We used two intragastric working ports and one camera port that were placed through gastrotomies made in the anterior gastric wall. An extra surveillance port was intraperitoneal only. Balloon ports were unnecessary. We attached each gastric entry point with two stay sutures that were also used at the end for traction while the entry gastrotomies were stapled closed. The specimen was removed transperitoneal within an endobag. An upper gastrointestinal swallow on postoperative day # 1 confirmed no leak, stricture or stasis.





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Results: The success rate was 100%, with minimal blood loss, a significant increase in postoperative patient comfort level, diet resumed on postoperative day # 2 and early discharge home (also on postoperative day # 2), as compared to laparotomy.

Conclusions: These three cases demonstrate the ease and safety with which endoluminal resection of gastric lesions not amenable to endoscopic removal may be performed with standard laparoscopic instrumentation and technique.

Esophageal/Gastric Surgery-P292

LONG TERM OBJECTIVE FOLLOW-UP AFTER LAPAROSCOPIC REPAIR OF LARGE TYPE II-III HIATAL HERNIAS: THE USE OF MESH ALLOWS LOWER RECURRENCE RATE. Giuseppe Portale MD, Giovanni Zaninotto MD, Mario Costantini MD, Emanuela Guirrola MD, Loredana Nicoletti RN, Ermanno Ancona MD, Department of Medical and Surgical Sciences, Clinica Chirurgica III, Padova, Italy

Introduction: Laparoscopic repair of large paraesophageal or mixed (type II-III) hiatal hernias (HH) with prosthetic hiatal closure is now considered feasible and effective with similar results to open surgery. However, in most studies, the outcome analyses are based on symptomatic assessment and relatively short-term follow-up (F-up); concerns remain on possible high recurrence rates in the long-term F-up with objective tests. We retrospectively evaluated the outcomes of laparoscopic repair of large type II-III HH, with or without prosthetic hiatal closure, in the long-term F-up, by means of both symptomatic and radiologic or endoscopic evaluation.

Methods and procedures: From January 1995 to August 2005, 56 pts (10M:46F, mean age 63 yrs) with a diagnosis of large type II-III HH (>1/3 radiographic/intraoperative stomach in the chest) underwent laparoscopic repair at our Department. Principles of surgical technique included reduction of the hernia, complete excision of the sac, primary closure of the crura (with/without mesh reinforcement) and antireflux procedure. Laparoscopic fundoplication (Nissen or Toupet) with simple sutured crural closure was performed in 19 pts (group A); a double mesh was added in 37 pts (group B).

Results: There were 5 conversions to open surgery. The mean length of radiographic/endoscopic F-up was similar in the two groups [31 mos (\pm 32) group A, 23 months (\pm 26) group B, p=n.s.]. Recurrences occurred in 7/19 (37%) group A pts and in 3/37 (8%) group B (p=0.02). They were classified as ?early? (total disruption of the hiatal closure on POD 5, 1 pt), ?mid-term? (1-12 mos post-op, 3 pts) and ?late? (12-72 mos post-op, 6 pts). 4 of these pts underwent reoperation and 1 is scheduled for surgery. Additional 3 (5.4%) pts presented a small sliding hernia (<3 cm ?telescoping?) on post-op barium swallow and did not require reoperation (asymptomatic at 73 mos F-up). 1 group B pt had severe dysphagia on POD 2, due to both obstruction from the mesh and tight fundoplication: she underwent reoperation.

Conclusions: Laparoscopic repair of large type II-III hiatal hernia is a safe and effective treatment. Short-term symptomatic results are excellent, but long-term objective radiologic and/or endoscopic evaluation reveals a significant percentage of recurrence: the main reason for failure of hiatal repair is tension. The use of prosthetic mesh effectively reduce the incidence of postoperative hernia recurrence or wrap migration in the chest.

Esophageal/Gastric Surgery-P293

LAPAROSCOPIC SUBTOTAL GASTRECTOMY FOR GASTRIC MALIGNANCY. Danny Rosin MD, Oded Zmora MD, Yaron Munz MD, Yuri Goldes MD, Barak Bar-Zakai MD, Moshe Shabtai MD, Amram Ayalon MD, Department of General Surgery & Transplantation, Sheba Medical Center, Tel Hashomer, Israel

Introduction: The use of laparoscopy to treat gastric malignancy is still controversial, and has not yet gained wide acceptance.

We present our experience with laparoscopic gastrectomy for gastric malignant tumors, which were amenable to distal subtotal gastrectomy.

Methods: Laparoscopic distal subtotal gastrectomy was the

selected procedure according to the surgeon's and the patient's preference. D1 subtotal gastrectomy with Billroth-2 reconstruction was performed in all cases. Data regarding demographics, operative procedures, post-operative course and follow-up information was prospectively collected in a computerized database. Survival data was obtained from the national census.

Results: Seventeen patients were operated over a period of four years, 16 for gastric adenocarcinoma and one for gastric lymphoma. There were 8 males and 9 females, at a mean age of 68 years (33-91). The mean procedure duration was 332 minutes (189-452). Tumor-free margins were obtained in all cases, and the mean number of lymph nodes in the specimen was 13 (5-61). Median post operative hospital stay was 13 days (7-108). Post operative complications were leak from the duodenal stump (2) intra-abdominal abscess (2), anastomotic leak (1) and wound infection (1). Re-operation was required in three patients. No peri-operative mortality was observed. Pathological examination showed nodal involvement in 8 patients. During the follow-up period (1-51 months, mean=26) 3 patients expired from recurrent and metastatic disease, all of them had nodal involvement. Calculated 3 year survival is 79.8%.

Conclusion: Although a challenging and lengthy procedure, laparoscopic subtotal gastrectomy yields acceptable surgical and oncological results.

Esophageal/Gastric Surgery-P294

VIDEO ASSISTED ESOPHAGECTOMY FOR THORACIC ESOPHAGEAL CANCER. Toshiaki Shichinohe MD, Shunichi Okushiba MD, You Kawarada MD, Shuji Kitashiro MD, Hiroto Manase MD, Satoshi Kondo, Surgical Oncology, Hokkaido University Graduate School of Medicine, Sapporo, Japan. Tonan Hospital Sapporo, Japan. Asahikawa Red Cross Hospital, Asahikawa, Japan

Introduction: Laparoscopic surgery offers a new approach to surgical management of esophageal cancer. We apply two different operation procedures. Hand assisted thoracoscopic surgery (HATS) as the standard procedure for thoracic esophageal cancer. Mediastinoscope-assisted transhiatal esophagectomy (MATHE) is applied for the superficial esophageal cancer and for high medical risk patients. By applying these two operative procedures, the overall percentage of the video assisted operation has hit over 90%.

Methods and procedures: HATS: Assistant surgeon inserts his left hand into the right thoracic cavity through a small incision in the upper abdomen to help surgeon's VATS procedure. The abdominal incision is then used for hand assisted laparoscopic surgery (HALS).

MATHE: Mediastinoscope equipped with a dissector is inserted from the cervical incision. The blood vessels and connective tissues around the thoracic esophagus are dissected by LCS. Transhiatal approach is performed with HALS procedure under the vision of flexible endoscope.

Results: We experienced 68 cases of HATS and 18 cases of MATHE. The HATS group was compared to the radical open thoracotomy group. The amount of blood loss (325 vs 430mL) and the number of dissected mediastinal lymph nodes (23 vs 20) were not notable, whereas the time of thoracic approach was significantly longer (225 vs 159min). The average of 5-year survival rate of HATS group marked 68%, which is equal to the rate of the open thoracotomy group. The operative result of MATHE shows the following records; operation time; 475min, blood loss; 590mL. 5-year survival rate of high risk group; 55%.

Conclusion: Video assisted esophagectomy for thoracic esophageal cancer is feasible procedure in order for the less invasive surgery.

Esophageal/Gastric Surgery-P295

LAPAROSCOPIC FUNDOPLICATION. Ashok Sundaraman MS, Suraj Balaji MS, Rama Ramakrishnan MS, Sri Ramachandra Medical College & Research Institute

Laparoscopic Surgery has in the last few years become a Routine approach, particularly in the gastrointestinal field. Series of 72 cases have been performed since 1994 and the



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result will be presented.

Abnormal and gastro esophageal reflux can be treated with several different surgical procedures, even if the most effective one the cure or prevention of reflux is the Nissen Fundoplication. Use of only the anterior wall of the gastric fundus for plication.

In some cases most of the stomach enter in to the thorax. In one case fundus adherent to right lung and formed fistula. In such cases Fundoplication done along with prolene mesh was used for repair.

The patients do not complain post-operative pain. Better respiratory activity and discharged on 3rd day, 7th day normal activity.

Esophageal/Gastric Surgery–P296

LAPAROSCOPY-ASSISTED DISTAL GASTRECTOMY WITH LYMPH NODES DISSECTION FOR EARLY GASTRIC CANCER: OUR SIMPLE AND PRACTICAL PROCEDURE, Tatsushi Suwa

MD, Masayoshi Sakuma MD, Yoshifumi Takenaka MD, Takayuki Furuuchi MD, Tomoo Shatari MD, Takahiro Sasaki MD, Kenichi Okada MD, Tatzuma Yamamoto MD, Mito Red Cross Hospital

Laparoscopy-assisted distal gastrectomy is getting popular these days. But the procedure of LADG is complicated and needs advanced techniques for laparoscopic surgery. We have developed a simple and practical procedure for LADG.

OPERATIVE PROCEDURE: 1. A 5 cm incision was made in the upper midline and omentectomy is initiated through this small incision using Kent mini-retractor.

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, and a 12 mm trochar was inserted in the upper left abdomen. A abdominal wall sealing device (the Lap Disk) was used for a 5 cm incision and a 12 mm trochar was inserted through Lap Disk.

3. Under laparoscopic view, additional dissection for omentum and lymph nodes along the right gastroepiploic vessels and left gastroepiploic vessels were made, and the stomach was lifted from the pancreas. The left gastric vein and artery was divided after double-clipping. The dissection of the lymph nodes along the left gastric artery was made. The lesser omentum was cut with preserving the hepatic branch of vagus nerve.

4. Through a 5 cm incision, the stomach was cut using linear stapler at the oral excision line. By pulling up the distal stomach and pulling abdominal wall by Kent mini-retractor to right direction, the base of right gastroepiploic vessels were easily identified and exposed, then the suprapyloric and infrapyloric lymph nodes were dissected. The duodenum was cut using Purstring and the distal stomach was resected. After distal gastrectomy, the lymph nodes along the common hepatic artery were dissected with nice view through a 5 cm incision. The anterior wall of residual stomach was partially cut and opened. Through this small anterior wall window, the gastroduodenostomy was made by a anastomotic devise (ILS 29 mm).

RESULT: We have performed this LADG procedure in total 26 cases by August 2005. The operation time was 167 min and the blood loss was 64 g on average. The operation time was shortened by learning curve and 128 min in recent 10 cases on average. The diet was restarted at 4POD and the median hospital stay was 12 days. In dissecting back side of the stomach or lymph nodes along the left gastric artery a laparoscope could provide a very nice view, this was considered as an advantage of laparoscopy-assisted surgery.

CONCLUSION: We have developed a simple and practical procedure of LADG that needs only two surgeons and shorter time.

Esophageal/Gastric Surgery–P297

ROUX-EN-Y OESOPHAGOJEJUNOSTOMY AFTER TOTAL GASTRECTOMY FOR GASTRIC MALIGNANCY, Safwan A Taha MD,

Hashim S Khayat MD, Basrah Teaching Hospital & Basrah General Hospital

Out of 62 patients who underwent total gastrectomy for gastric malignancy, 40 patients had roux-en-y esophagojejunostomy.

Their age ranged from 32 to 70 years. Seventeen patients were less than 60 years old and 27 were older. There were 23 males and 17 females. Operations were done through thoraco-abdominal incisions in 28 patients and upper midline incisions in 12. The anastomoses, on the other hand, were hand sewn in 34 patients and stapled in the other 6. The procedure included splenectomy in 37 patients, distal pancreatectomy in 6 and transverse colectomy in 2 patients. Postoperative complications included chest infection (8 patients), wound infection (7 patients) and anastomotic leak (1 patient). Eleven patients died postoperatively, the leading cause being pulmonary embolism, respiratory failure and over-whelming sepsis. Out of our surviving patients, 4 (10%) are still alive 5 years or more after surgery and are enjoying good health.

Our results are well within the international figures although we think that the outlook could have improved had we gained access to certain facilities like hyperalimentation, chest physiotherapy units and measures that could prevent deep venous thrombosis.

Roux-en-y esophagojejunostomy is a safe method to restore the continuity of the alimentary tract after gastrectomy. It requires less time than pouch-forming procedures, has less incidence of anastomotic leakage, produces acceptable morbidity and mortality, gives good nutritional value and does not require the special expertise needed to perform the pouch-forming procedures.

Esophageal/Gastric Surgery–P298

INCIDENCE AND SIGNIFICANCE OF PLEURAL TEARS OCCURRING DURING LAPAROSCOPIC ESOPHAGEAL OPERATIONS,

Thomas K Varghese MD, Nathaniel J Soper MD, Department of Surgery, Northwestern University Feinberg School of Medicine

Background: Laparoscopic procedures of the esophagus?fundoplication, hiatal hernia repair, and Heller myotomy?may lead to pleural tears and pneumothorax. Pleural tears generally occur as a result of dissection near the mediastinal pleura. A wide variety of treatment modalities for intraoperative and postoperative pneumothorax have been offered in anecdotal case reports in the literature. Optimal management strategies for these patients are warranted.

Aim: To determine the incidence of pleural tears during laparoscopic esophageal surgery, and their associated clinical significance.

Methods: We reviewed 250 consecutive cases of laparoscopic esophageal procedures (Heller myotomy, Nissen fundoplications, paraesophageal hernia repairs, and reoperative esophageal procedures) performed between 1/1/03 and 6/30/04. The incidence of pleural tears and associated complications (intraoperative hypotension, increased airway pressures, pneumothorax requiring chest tube placement) were noted.

Results: Out of a total experience of >1500 laparoscopic esophageal procedures, prospective data pertaining to pleural tears were collected in the most recent 250 procedures. These operations were performed in 117 females and 133 males ranging in age from 16 to 86 yrs (mean 47 +/- 6). There were 30 pleural tears (incidence rate 12%) associated with 2 episodes of hypotension and 1 case of significantly increased airway pressure, each of which resolved after decreasing intraabdominal pressure to 10 mmHg. No patient required conversion to open surgery or chest tube placement. In one patient, a chest X-ray performed immediately postoperatively revealed an 80% pneumothorax that had nearly completely resolved spontaneously in 75 minutes. In >1500 laparoscopic esophageal operations performed by the senior author, there has been only one case of intraoperative tension pneumothorax requiring chest tube placement? a reoperative procedure, where the small pleural tear presumably had a?ball-valve? effect.

Conclusions: Although pleural tears occur relatively frequently during laparoscopic esophageal surgery, they rarely are clinically significant. Good communication between surgeon and anesthetist must be maintained to monitor intraoperative arterial and airway pressures, with adverse changes managed by decreasing pneumoperitoneum to 10 mm Hg. Routine postop-



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erative chest X-rays are unnecessary; resultant pneumothoraces will generally resolve with expectant observation.

Oesophageal/Gastric Surgery–P299

ROLE OF LAPAROSCOPY IN STAGING UPPER GASTROINTESTINAL CANCER., Naseem Waraich, Muhammad Ali Tausif, Javed Ahmed, Syed Y Iftikhar, Derby Hospitals NHS Foundation Trust UK

Oesophageal cancer is the fastest growing malignancy in the western world. Oesophageal and gastric cancers are distinct carcinomas of the upper gastrointestinal tract, although this distinction becomes less clear at the gastro-oesophageal junction (GOJ). Surgery remains the standard primary treatment for oesophageal and gastric carcinoma but overall survival for all patients undergoing primary surgery is dismal. The presence or absence of metastatic lymph nodes is the single most important prognostic factor. For primary oesophageal cancer anatomical position i-e, upper, mid, and lower oesophagus is used to define the local nodal basin. Involvement of lymph nodes outside the local basin is considered to be metastatic disease (M) rather than regional lymph node involvement (N). Accurate staging plays a primary role in planning the appropriate treatment for oesophageal and gastric malignancies. Peritoneal tumor spread and occult liver and lymph node metastases are some times only detected at time of surgery in some patients, despite significant improvements in preoperative tumor staging using Endoscopic Ultrasound (EUS) and CT. Laparoscopy has emerged as a staging modality that is more sensitive and specific in staging upper gastrointestinal cancers than other preoperative imaging modalities. Our results showed that staging laparoscopy was very effective in detecting metastatic adenocarcinoma of lower oesophagus/ gastro-oesophageal (GOJ), which was not detected either by CT scan or EUS.

Oesophageal/Gastric Surgery–P300

GASTROINTESTINAL STROMAL TUMOR OF THE STOMACH SUCCESSFULLY TREATED BY LAPAROSCOPY: A CASE REPORT, Hiroshi Yano MD, Masahiro Murakami MD, Takushi Monden MD, Shigeru Okamoto MD, NTT West Osaka Hospital We report a case of gastrointestinal stromal tumor (GIST) of the stomach that was successfully treated by laparoscopic surgery. A 52-year-old woman was admitted to our department for the treatment of a submucosal tumor of the stomach. After gastrointestinal endoscopy, ultrasonography, computed tomography, and magnetic resonance imaging, we suspected that the mass measuring 3.0 cm in diameter, was GIST in the stomach. However, we preoperatively could not rule out the possibility of a malignant neoplasm because it had been gradually growing. First, a mini-laparotomy was performed with a 3-cm skin incision in the mid upper abdomen. A Lapdisc-mini, abdominal wall sealing device, was inserted through the mini-laparotomy wound to prevent the leakage of CO₂ gas. Three additional trocars were inserted in the upper abdomen. The tumor was lifted towards the abdominal wall by a grasper, and then, it was resected by a multifire endoscopic stapling device, allowing a sufficient distance from the tumor. The duration of surgery was 90 minutes and the intraoperative blood loss was 10 g. The pathological diagnosis of the resected specimen was GIST with low-grade malignancy of the stomach. The patient was discharged on the 10th postoperative day. She remains well with no sign of recurrence of GIST, 14 months after operation. Laparoscopic surgery may be a good indication for a GIST of the stomach that is difficult to diagnose preoperatively whether it is malignant or benign, because it is safe and minimally invasive, promoting faster recovery.

Flexible Diagnostic & Therapeutic Endoscopy–P301

PATIENT FACTORS ASSOCIATED WITH A FASTER INSERTION OF THE COLONOSCOPE, Rodolfo Arcovedo MD, Charles Larsen, Scripps Mercy Chula Vista

INTRODUCTION: There are many factors, which account for a difficult colonoscopy. I chose to study the first half of the colonoscopy to try testing the hypothesis that colonoscopy is more difficult in thin patients. To try to prove the above and to

better understand the characteristics of the patients in which the insertion of the colonoscope is quicker and easier, the following prospective study was undertaken.

METHODS: During 2 years, in a prospective fashion, 435 consecutive patients who underwent elective colonoscopy by one surgeon were included in the study. Patients with prior colectomy, with cancer other than the cecum or having an emergent endoscopy were excluded from the study. The time of insertion of the colonoscope from the anus to the cecum was recorded and rounded to the nearest minute. Gender, Age, BMI, abdominal girth, diagnosis, presence or absence of prior surgery, need for external compression, quality of the bowel preparation were considered in the statistical analysis. The Mann-Whitney test was utilized to compare the median of each sample, which seemed to have demonstrated a difference.

RESULTS: There was no direct correlation between the BMI, abdominal girth, presence or absence of prior abdominal surgery and the length of insertion of the endoscope. Statistical significance was reached between the gender male versus female. The quality of bowel preparation, the application of external compression and the successful insertion of the endoscope into the terminal ileum, correlated with the length of time of insertion of the endoscope. The median time to insert the colonoscope in the males was 7 minutes (mean 8.14 minutes) and the median to insert the endoscope in the females was 10 minutes (mean 10.6 minutes).

CONCLUSIONS: Contrary to my hypothesis, the body habitus of the patient does not seem to play a role in the difficulty of insertion of the colonoscope. Poor bowel preparation and female gender had a direct relationship with length of time of insertion. difficulty Colonoscope insertion seems more difficult in females as demonstrated by the statistical difference between the means.

Flexible Diagnostic & Therapeutic Endoscopy–P302

RETAINED COMMON BILE DUCT STONE SECONDARY TO PANCREATIC DUCT STENT PLACEMENT AT ERCP, Wayne A Blevins, Jr. MD, Michael J Roach MD, Ross D Segan MD, Robert A Wascher MD, Tripler Army Medical Center The use of pancreatic stent placement as an adjunct to ERCP has been demonstrated to decrease the incidence of post-ERCP pancreatitis in the setting of difficult pancreatic duct cannulation, Sphincter of Oddi manometry, and endoscopic sphincterotomy. Retained common duct stones due to pancreatic duct stenting have not previously been reported in the literature. We report a case of a patient with cholelithiasis who underwent preoperative ERCP, balloon extraction of a common bile duct stone, and sphincterotomy. At ERCP, a pancreatic duct stent was placed due to inadvertent pancreatic duct cannulation. Post-ERCP, the patient developed hyperbilirubinemia, as well as mild elevations of serum ALT, AST, amylase, and lipase. The patient was taken to the operating room where intraoperative cholangiography demonstrated a retained common bile duct stone impacted against the pancreatic duct stent. Laparoscopic common bile duct exploration was successful at clearance of the stone, and a laparoscopic cholecystectomy was performed followed by an uneventful recovery. While pancreatic duct stenting may be beneficial in the prevention of post-ERCP pancreatitis, this potential benefit must be weighed against its potential complications. This case demonstrates that pancreatic duct stenting in patients with nondilated common bile ducts may increase the risk for retained common duct stones.

Flexible Diagnostic & Therapeutic Endoscopy–P303

ENDOSCOPIC THERAPY FOR ORGANIZED PANCREATIC NECROSIS, Djalma E Coelho MD, José Flávio E Coelho PhD, José Marcus R Eulalio PhD, José Eduardo Manso PhD, Ricardo Antonio Refinetti PhD, Vinicius G Kock PhD, Orlando M Vieira PhD, Universidade Federal do Rio de Janeiro (Brasil) Hospital Universitário Clementino Fraga Filho

Background: Pancreatic necrosis are severe complications of

acute pancreatitis, the treatment of patients with extensive pancreatic necrosis remains controversial. Endoscopic therapy has the potential to offer a safer and more effective alternative treatment modality. This a retrospective study of the outcome of consecutive patients with pancreatic necrosis. Nine patients with organized pancreatic necrosis (6 sterile and 3 infected) after severe acute necrotizing pancreatitis underwent attempted endoscopic drainage. The treatment includes synchronous transmural and/or transpapillary drainage procedures followed by balloon dilatation of cystogastrostoma or cystoduodenostoma; daily endoscopic necrosectomy and saline solution lavage.

Flexible Diagnostic & Therapeutic Endoscopy–P304

TRANSPAPILLARY AND TRANSMURAL DRAINAGE OF PANCREATIC PSEUDOCYSTS., Djalma E Coelho MD, José Flávio E Coelho PhD, José Marcus R Eulalio PhD, José Eduardo F Manso PhD, Ricardo Antonio Refinetti PhD, Universidade Federal do Rio de Janeiro (Brasil) Hospital Universitário Clementino Fraga Filho

Background: Endoscopic drainage of pseudocyst using the transpapillary and transmural approaches has been reported. Between January 2003 and June 2005, we evaluated endoscopic drainage in 38 patients with symptomatic pancreatic pseudocysts in whom conservative management had failed.

Methods: After preliminary endoscopic retrograde pancreatography, transpapillary drainage was attempted in 14 patients with pseudocysts that communicated with the main pancreatic duct. Transmural drainage of pseudocysts in contact with the stomach or duodenal wall was attempted in the remaining 24 patients and 17 patients selected for combined transpapillary and transmural drainage. **Results:** Endoscopic drainage was technically successful in 36 patients (94, 6%), of whom 36 had complete pseudocyst resolution. Complications occurred in 7, 9% and bleeding (n = 1), after transmural drainage, and pancreatitis (n=1) after transpapillary drainage; stent clogging (n = 1). Mean follow up was 18 months (range, 1 to 30 months).

Conclusion: Transpapillary and transmural drainage are highly effective in patients with pancreatic pseudocysts demonstrating suitable anatomy for these endoscopic techniques.

Flexible Diagnostic & Therapeutic Endoscopy–P305

LONG TERM RESULTS OF ENDOSCOPIC MANAGEMENT OF BILE DUCT INJURIES AFTER LAPAROSCOPIC CHOLECYSTECTOMY., Djalma E Coelho MD, José Flávio E Coelho PhD, José Marcus R Eulalio PhD, José Eduardo F Manso PhD, Antonio A Peixoto PhD, Ricardo A Refinetti PhD, Universidade Federal do Rio de Janeiro (Brasil) Hospital Universitário Clementino Fraga Filho

Background: The outcome of endoscopic biliary dilatation and stent insertion for postoperative bile duct injuries was retrospectively evaluated.

Methods: Seventy-nine patients with biliary stenosis postcholecystectomy laparoscopic were included from January 1995 to December 2004. One to five stents were inserted for average of 15 months, with stent exchange every three months to avoid cholangitis caused by obstruction.

Results: Endoscopic stricture stent insertion successful was achieved in 70/76 (92,1%) patients. No procedure-related mortality was observed. The endoscopic therapy was feasible only in 58/70 the success rate was 82, 8%. Endoscopic treatment was interrupted in three patients. Stricture relapse occurred in nine patients. Early complications occurred in three patients (1 perforation, 1 cholangitis 1 stent migration) and stent occlusion that required early exchanges occurred in 6 patients.

Conclusion: Endoscopic retrograde cholangiopancreatography is a safe and feasible mode of therapy for patients presenting with suspected bile duct injuries. This form of intervention should be considered as the initial step in the diagnosis and treatment of postcholecystectomy laparoscopic complications.

Flexible Diagnostic & Therapeutic Endoscopy–P306

ENDOSCOPIC MANAGEMENT OF BILE DUCT INJURIES IN 203 PATIENTS: EXPERIENCE OF A RIO DE JANEIRO REFERRAL CENTER., Djalma E Coelho MD, José Flávio E Coelho PhD, José Marcus R Eulalio PhD, José Eduardo F Manso PhD, Antonio A Peixoto PhD, Ricardo A Refinetti PhD, Universidade Federal do Rio de Janeiro (Brasil) Hospital Universitário Clementino Fraga Filho

Background: Management of postcholecystectomy complications has been variably discussed. Various options exist but the recent trend has been towards the endoscopic retrograde approach favoring a simultaneous diagnostic and therapeutic potential. We studied the various endoscopic modalities to evaluate the efficacy of the approach

Methods: A retrospective analysis was conducted of 203 patients referred to the endoscopy department for postcholecystectomy laparoscopic complications. The study period extend from January 1995 to December 2004. All cases of bile duct injury were evaluated by endoscopic retrograde cholangiopancreatography for the feasibility of offering therapy.

Results: There were 103 patients with benign stricture and 64 patients with leaks and another 36 patients had a combination of leaks and stricture. Endoscopic diagnosis was feasible in all cases. Subsequently, 170 patients for 83, 7% of the cases were considered for endotherapy and success healing was shown in 85, 3%. Complications occurred in 6 (3, 5%), perforation (n = 1), mild pancreatitis (n=3), and cholangitis (n = 2).

Conclusion: Endoscopic retrograde cholangiopancreatography is a safe and feasible mode of therapy for patients presenting with suspected bile duct injuries. This form of intervention should be considered as the initial step in the diagnosis and treatment of postcholecystectomy laparoscopic complications.

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ENDOSCOPIC MANAGEMENT OF BILE LEAKAGE AFTER LAPAROSCOPIC CHOLECYSTECTOMY BASED ON ETIOLOGICAL CLASSIFICATION: RESULTS IN 100 PATIENTS., Djalma E Coelho MD, José Flávio E Coelho PhD, José Marcus R Eulalio PhD, José Eduardo F Manso PhD, Antonio A Peixoto PhD, Ricardo A Refinetti PhD, Universidade Federal do Rio de Janeiro (Brasil) Hospital Universitário Clementino Fraga Filho

Background: To analyze and classify bile leakage after laparoscopic cholecystectomy according to its etiology. This classification will help to determine the most appropriate management strategy, whereby unnecessary intervention can be avoided.

Methods: We examined the medical records of 100 patients in whom bile leakage occurred as complications of laparoscopic cholecystectomy

Results: A total 100 patients (75 women, 25 men; median age 47 years) with bile leak were referred for endoscopic management. Symptoms included pain (17%), jaundice (25%), fever (9%), and abdominal distension (%). Persistent drainage was present in 75% (percutaneous drainage in 18% and drainage with drain in 57%). The severity of bile leak was classified by endoscopic into low-grade or high grade. Bile leakage was classified according low or high grade to its cause into the following groups. There were 64 simple biliary fistulas: 44 from the cystic duct stump, 8 the T-tube, 8 the hepatic common, 2 the left hepatic and 2 right hepatic. There were 36 patients had a combination of leakage and stricture: 9 complete transections, 12 from the hepatic common, 7 the cystic duct stump, 8 the T-tube, 5 the choledoco, 1 the left hepatic, 2 right hepatic and 1 the hepatic common and right hepatic. Treatment included sphincterotomy alone (68), combination stent/ sphincterotomy (23), none (9). Closure of the leak was documented by endoscopic retrograde cholangiopancreatography in all 98 patients. Two patients with leaks not amenable to endoscopic treatment were referred for surgery. Bile duct stones were identified in 41 patients, biloma in 2, ascariis in 2, and ampuloma in 2. Overall complications in 1 patients (pancreatitis) and managed with managed conservatively with no mortality.

Conclusion: The optimal endoscopic intervention for postcholecystectomy



cystectomy laparoscopic bile like should include sphinterotomy alone alternatively, when a fistula is large, endoscopic placement of prosthesis can be proposed as the first treatments.

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UPPER GI FOREIGN BODY: AN ADULT URBAN EMERGENCY HOSPITAL EXPERIENCE, William C Conway MD, Choichi Sugawa MD, Hiromi Ono MD, Charles E Lucas MD, Department of Surgery, Wayne State University/Detroit Medical Center, Detroit, MI

Introduction: In order to evaluate the use of flexible endoscopy in the therapy of foreign body ingestion we reviewed the experience of a single endoscopist at an adult urban emergency hospital in dealing with this acute problem. Foreign body ingestion is a common occurrence. Rigid esophagoscopy has been recommended for treatment; however, the use of flexible endoscopy has become more widespread. **Methods:** A retrospective review of 51 adult cases of upper GI foreign body ingestion treated at Detroit Receiving Hospital by a surgical endoscopist, from 1988 to 2004 was undertaken. **Results:** Of the 51 cases reviewed, 75%(38) were food related; most (75%) after eating meat. Four phytobezoars were noted, often after previous upper GI surgery, one of which required the use of a gallstone lithotripter for removal. Dysphagia was the most common symptom (75%). Nearly 80% of these cases had post-surgical or other upper GI pathology. One patient had an esophageal stricture secondary to previous Sengstaken-Blakemore tube insertion with subsequent esophageal necrosis. Flexible endoscopy was used in all cases, with snare extraction the most common therapeutic modality. All cases had successful removal. The remaining cases (13,25%) were true foreign bodies. These true foreign bodies included a screwdriver, ballpoint pen, spoons, coat hanger pieces, batteries, and latex gloves, among others. Dysphagia was again a common symptom, however pain was more often cited in this group. 62% of this group reported psychiatric difficulties or problems with drug abuse. Flexible endoscopy was again performed in all cases, often with snare extraction. The overtube was required often in these cases to protect the upper aerodigestive structures. Two cases in this group had unsuccessful attempts at removal. There was one morbidity in each group, each consisting of minor bleeding that did not require further treatment, and no mortalities.

Conclusion: Most cases of upper GI foreign body are related to food impaction, with meat most often found. Underlying pathology is the rule and should be dealt with immediately. Flexible endoscopy is the treatment of choice for upper GI foreign body ingestion with near perfect success, except in rare cases where removal may precipitate further injury.

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ENDOLUMINAL ESOPHAGEAL VALVULOPLASTY WITH TISSUE ANCHORS, Aureo L dePaula MD, Desmond H Birkett MD, Richard A Kozarek MD, Steven C Gross MD, Lee L Swanstrom MD, Dept. of Surgery, Hospital de Especialidades Goiania; Dept. of Surgery, Lahey Clinic; Section of Gastroenterology, Virginia Mason Medical Center; Dept. of Surgery, Legacy Health System

Introduction. Surgical operations intended to treat gastroesophageal reflux disease (GERD), all recreate the esophageal flap valve in the course of the external repair. This study was undertaken to assess the feasibility of creating a durable endoluminal antireflux barrier that would be comparable to that achieved with standard surgery. Tissue anchors were implanted across the upper cardia at the angle of His in order to assess their potential to create an esophageal flap valve in dogs.

Methods and Procedures. Three types of tissue anchors (USGI Medical, Inc. San Clemente, CA) were developed for intragastric plication. Tissue anchors are constructed so that a pair of anchors is strung on a length of suture with terminal and proximal suture pledgets and proximal cinch. These anchors fit within a needle for delivery through tissue. Anchors were

implanted and studied in dogs for four weeks. A variable number of anchor pairs were placed in a 180° arc to create a full thickness fold extending 3-4cm. Endoscopic evaluation was used to assess the formation of the flap valve acutely with more anchors added as needed. Histological examination was made after the anchors had been implanted for 4 weeks.

Results. All anchor types were successfully deployed to create a ridge of tissue in an arc around the shaft of the retroflexed endoscope, per Hill's definition of a Grade I flap valve. Gross examination of the flap valve upon necropsy at 4 weeks demonstrated a durable ridge of tissue. Microscopic examination of the tissue demonstrated a deep fibrotic remodeling through the extent of the created tissue ridge.

Conclusions. The use of endoluminally applied tissue anchors to create a durable esophageal flap valve has been demonstrated. It was shown that these anchors are well tolerated and well integrated by the body. Endoscopically, an adequate valve was created, but further evaluation is warranted in order to assess the antireflux properties of this flap valve.

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LAPAROSCOPIC RETRIEVAL OF RETAINED VIDEO CAPSULE ENDOSCOPY, Edward P Dominguez MD, Yong U Choi MD, Isaac L Raijman MD, John F Sweeney MD, Michael E. DeBakey Department of Surgery, Baylor College of Medicine

Introduction: Currently, capsule endoscopy is used to evaluate obscure gastrointestinal bleeding, but its indications are broadening. There have been various reports describing the capsule becoming impacted or retained in the small bowel requiring retrieval. This scenario may identify clinically significant pathology that requires surgical intervention. We report a case of a video capsule retrieved with laparoscopic techniques. **Case Presentation:** A 74 year old female had a history of lower gastrointestinal bleeding and underwent a capsule endoscopy which was not spontaneously passed. A colonoscopy visualized the capsule in the terminal ileum, but attempts at endoscopic retrieval of the capsule were unsuccessful. Upon exploration with the laparoscope, the patient was found to have a bulge in the terminal ileum consistent with the retained capsule.

The right colon and transverse colon were mobilized and laparoscopic ileocecectomy was performed. The specimen was delivered through a 4 cm infraumbilical incision revealing the capsule in the terminal ileum at an area with visible scarring. A side to side anastomosis was formed between the ileum and the colon with a 3.5 mm endo-GIA stapler. The patient was seen several weeks later in the surgery clinic and was doing well with no complications. Final pathology demonstrated no evidence inflammatory bowel disease or malignancy.

Conclusion: Retention or non-passage of the capsule endoscopy is an uncommon occurrence that is likely to become a more frequent surgical situation as the indications for the technology broaden. Surgical retrieval is often required secondary to the underlying pathologic process causing the stricture or obstruction. Using the fundamentals of safe laparoscopy and maintaining the principles of surgical management in specific disease processes, successful outcomes can be expected in patients with retained capsules.

Flexible Diagnostic & Therapeutic Endoscopy—P311

PANCREAS DIVISUM: TREATMENT WITH COMBINED ENDOSCOPIC AND OPEN MODALITIES WITH EXTENDED STENTING OF DORSAL PANCREATIC DUCT, David A Edelman MD, Choichi Sugawa MD, Hiromi Ono MD, James Tyburski MD, Department of Surgery, Wayne State University

Introduction: Pancreas divisum is the most common congenital variant of pancreatic ductal development. Although a minority of patients become symptomatic with acute recurrent pancreatitis secondary to pancreas divisum, the morbidity can be significant. The underlying mechanism in these symptomatic cases is thought to be a relative outflow obstruction at the site of the minor papilla. Therapeutic interventions for symptomatic pancreas divisum aim to relieve obstruction of the minor papilla by improving pancreatic drainage.



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Methods: This is a case report of a single patient with symptomatic pancreas divisum treated and followed prospectively for 5 years six months by the same physician. Additionally, we review the current treatment options for symptomatic pancreas divisum.

Results: This case report serves as an example of treatment of symptomatic pancreas divisum with combined endoscopic sphincterotomy, surgical transduodenal sphincteroplasty, and stenting of the minor papilla for 5 years and six months. Initially, the minor papilla was not identified until sprayed with methylene blue followed by a secretin injection. This is the first case report in the literature we could find using a stent in the dorsal pancreatic duct for treatment of pancreas divisum for an extended period of time (5 years and six months)

Conclusions: Pancreatic divisum can be safely treated long-term with minor sphincterotomy and endoscopic stenting of the dorsal pancreatic duct.

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ENDOSCOPIC GASTRIC BAND REMOVAL (AGB) WITH THE GASTRIC BAND CUTTER (GBC). MULTICENTRIC EXPERIENCE IN 44 CASES, Manoel P Galvao Neto MD, Josemberg M

Campos MD, Thiago Secchi MD, Eduardo G Moura MD, Armando Joya MD, Glauco Alvarez MD, Jose A Sallet MD, Mario C Raffaeli MD, Alvaro Ferraz MD, Artur Parada MD, Almino C Ramos MD, Gastro Obeso Center, São Paulo, Brazil; 9th of July Hospital Endoscopic Service, São Paulo, Brazil; Sao Luiz Hospital Endoscopic Service, Sao Paulo, Brazil; Federal University of Pernambuco, Recife, Brazil; San Javier Marina Hospital, Puerto Vallarta, Ja

INTRODUCTION: The AGB is one of the options in terms of bariatric surgery. One of its particularly complications is the partial migration in to the stomach who will lead to a revisional procedure to remove it. Despite the regular way to remove it is by laparoscopic means, the removal by endoscopic is less invasive and seems more logical. With the Gastric Band Cutter (GBC) of AMI® the endoscopic AGB removal becomes standardized.

Aim: To present the procedure and the results of endoscopic AGB removal with GBC.

CONTENTS: Between August of 2003 and January of 2005, 44 AGB between 4 brands (Helioscopie® ? 5/ Midband® - 8/ Lapband® - 6/ SAGB® ? 25) were removed with the GBC among 7 services in Brazil and Mexico. 27 patients (65%) were female, the age between 25-55y (M=36y). BMI pre-op was from 34-50 Kg/m² (M= 43,2 Kg/m²). BMI at the procedure varied between 24-41 Kg/m² (M= 31,8 Kg/m²). The maximum weight loss in pos-op varied from 10-65Kg (M= 33,8Kg). The migrations occurred in a range of 6-36m (M=16,3m). All the migrations were discovered by endoscopy and the symptoms leading to diagnostic endoscopy were pain in 14p(31%), port infection and weight gain in 13 each (29%) and 8 (18%) patients had their AGB migration discovered in routine endoscopies

RESULTS: 36 AGB (81%) were removed in one session. The Lapband® was the harder to remove representing more than 80% of the band that needed more than one session to be removed. 2 AGB (4,5%) were just divided and not able to be removed. The procedure time were between 25 and 140min (M= 57min). 4 patients (9%) had pneumo-peritoneum (2 clinical treat, 1 Verres needle puncture and 1 conversion to laparoscopy) with no mortality.

Conclusion: endoscopic AGB removal is a safe and effective procedure and be procedure of choice in treating AGB migration

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GASTROJEJUNOSTOMY STENOSIS. ENDOSCOPIC DILATATION WITH TTS BALLOONS IN 107 PATIENTS, Manoel P

Galvao Neto MD, Eduardo G Moura MD, Thiago Secchi MD, Josemberg M Moura MD, Armando Joya MD, Almino C Ramos MD, Santa Rita Hospital Endoscopic Service, Sao Paulo, Brazil; Sao Luiz Hospital Endoscopic Service, Sao Paulo, Brazil; Federal University of Pernambuco, Recife, Brazil; San Javier Marina Hospital, Puerto Vallarta, Jalisco, Mexico

INTRODUCTION: The Gastric Bypass with Roux and Y are one

of the gold standards to treat morbid obesity. One of its possible complications is the gastrojejunostomy (G-J) stenosis.

AIM: Evaluate a series of G-J stenosis endoscopic dilatation with Trough The Scope (TTS) balloons. **CONTENT:** Between dec-2001 and feb-2005, retrospective data about 1992 patients submitted to lap gastric bypass with a calibrated G-J to 11-12mm were analyzed to see the incidence of stenosis and the output of its treatment with endoscopic TTS balloons. The dilatation criteria were to find a G-J with diameter less than 10mm in patients submitted to an upper endoscopy due to symptoms that suggests stenosis. All of this patients were dilated with a TTS until reaches 12mm for 5min at maximum pressure allowed.

RESULTS: G-J stenosis was 5,4% in 107 p. 58p were dilated between 10 and 40d (early) e 49p between 41d and 1,5a (late). The mean of dilatations were 2 session varying between 1 to 6 sessions. The estimated diameter of G-J was on 1 to 10mm range (M = 4mm). The length of the G-J varied in a 2 to 10mm range. The patients who significantly needed more than 2 sessions of dilatation (P > 0,05) were the ones with early dilatation and with an anastomosis length with more the 5mm. No perforations happened in this series and 3 patients on the group of early dilatation referred abdominal pain needing to be medicated but without radiological signs of perforation.

CONCLUSIONS: Endoscopic dilatations with TTS balloons is a safe and effective option on calibrated G-J stenosis with minimum complication range and no perforation

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PEDIATRIC ERCP IN A MULTI-DISCIPLINARY COMMUNITY SETTING: EXPERIENCE WITH A FELLOWSHIP-TRAINED GENERAL SURGEON, Joel A Green BA, David E Scheeres MD,

Harold A Conrad MD, Marc G Schlatter MD, Depts. Of Surgery and Pediatrics, Mich. St. U. / College of Human Medicine, Grand Rapids Campus

Objective: Endoscopic retrograde cholangiopancreatography (ERCP) has been used to evaluate and treat pancreaticobiliary disorders and trauma in the pediatric population. Still representing a small percentage of total pediatric endoscopies, this procedure has been performed most commonly by a small subset of adult and pediatric gastroenterologists at quaternary referral centers. In this study, we present a review of one fellowship-trained general surgeon's experience with pediatric ERCP in a teaching community pediatric hospital for the purpose of comparison with national series.

Methods/Procedures: All ERCPs performed by one general surgeon as part of a multidisciplinary team over an 8-year period in patients aged 16 years or less were reviewed. Success and complication rates were compared between our series and published pediatric and adult series using Fisher's Exact Test. Comparisons were made of indications, type of anesthesia, final diagnosis, and therapeutic interventions to ensure similar study populations.

Results: A total of 23 ERCPs were performed in 17 patients ranging from 7 to 16 years old. Therapeutic procedures included sphincterotomy (10), stent placement (8), stone removal (2), and dilation (4). In one case stone removal and stent placement were performed in conjunction with pancreatic lithotripsy. In two cases general anesthesia was required for successful completion. In two cases the involved duct was not visualized. There were no instances of pancreatitis, bleeding, or perforation related to ERCP. When compared with published series, our data demonstrated no significant difference in success or complication rates.

Conclusion: Our study demonstrates that pediatric ERCP can be performed by fellowship-trained general surgeons with success and complication rates comparable to accepted standards. Integration of the ERCP-trained general surgeon into the pediatric team is a potential asset in the care of pediatric patients with pancreaticobiliary disorders.



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ENDOLUMINAL GASTROPLICATION IS EFFECTIVE FOR GASTROESOPHAGEAL REFLUX DISEASE DEVELOPED AFTER PYLORUS-PRESERVING GASTRECTOMY FOR GASTRIC CANCER Hitoshi Idani MD, Takayuki Iwamoto MD, Takashi Ishikawa MD, Department of Surgery, Fukuyama City Hospital and Department of Gastrointestinal Surgery, Okayama University Graduate School of Medicine

Introduction: Endoluminal gastroplication (ELGP) is one of the newly developed endoscopic treatments for gastroesophageal reflux disease (GERD). We had first reported the efficacy of ELGP for GERD developed after the lymph nodes dissection along the lesser curvature of the stomach simultaneously performed with left lateral segmentectomy for metastatic liver cancer as a good model of post gastrectomy GERD. In this paper, we report the first case of GERD developed after pylorus preserving gastrectomy (PPG) successfully treated by ELGP.

Case report: A 57 year-old man presented with heart burn, regurgitation and dysphagia which had appeared 2 months after PPG with D1 lymph nodes dissection for the treatment of T1 gastric cancer. Esophagogastrobioscopy showed grade B esophagitis and small hiatal hernia. Since the symptom had not been controlled by medical therapy, ELGP was performed. Using BARD endoscopic suturing system (EndoCinchTM), three plications were placed at the esophagogastric junction (EGJ). The procedure time was 60 min. There were no adverse events without a slight chest pain which disappeared within few days. The patient had liquid food the first postoperative day (POD) and solid food on the third POD. The patient discharged on the fifth POD. The symptoms associated with GER markedly reduced after the treatment. Symptom score composed of heart burn, dysphagia, regurgitation, chest pain and abdominal pain (0-4: none to severe) was also reduced after the treatment (Table 1).

Table 1. Symptom score

	Pre-treatment	Post-treatment
Heart burn	4	1
Dysphagia	1	1
Regurgitation	4	0
Chest pain	1	0
Abdominal pain (0-4, none to severe)	0	0

Acid exposure time and bile reflux time were improved after the procedure (pH<4: from 5.9 to 1.7%, bile reflux: from 11.1 to 5.7 %).

Conclusion: This is the first case report which showed that ELGP was safe and effective for GERD developed after PPG with lymph nodes dissection for gastric cancer. ELGP can be useful for the treatment of GERD developed after B-1 gastrectomy, which is most common procedure for gastric cancer in Japan.

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INTERVAL COMMON BILE DUCT STENTING FOR NONEXTRACTABLE COMMON BILE DUCT STONES, Dan G Kolder MD, Saed Jaber MD, Nitin J Rangnekar MD, University of Missouri Hospitals and Clinics

Common bile duct (CBD) stones are a common cause of morbidity. Since the evolution of laparoscopic cholecystectomy, surgeons have managed CBD stones with different modalities. Despite widely available technology for the removal of CBD stones, 3 % of patients with CBD stones fail extraction. The goal of this study is to facilitate extraction of CBD stones that failed extraction during endoscopic retrograde cholangiopancreatography (ERCP) by using interval stenting of the CBD.

Method: Six patients diagnosed with CBD stones, ranging from 1.5 to 2.0 cm in diameter, underwent ERCP. Extraction of stones failed at the initial attempt after sphincterotomy. An endostent was placed with the intent to alleviate patient symptoms and reduce the risk of cholangitis. Most patients were

started on Ursodeoxycholic acid empirically to help soften the stones. After three to six weeks, patients underwent a second ERCP which successfully removed all CBD stones.

Conclusion: Interval stenting is a useful technique to facilitate extraction of multiple CBD stones that cannot be extracted at the initial attempt.

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INTRALUMINAL STITCHES OF THE GASTROJEJUNOSTOMY (GJ) FOLLOWING LAPAROSCOPIC GASTRIC BYPASS (LGB): INCIDENCE, DIAGNOSIS, AND TREATMENT, C L McBride MD, C Ringley MD, V Bochkarev MD, R Gilroy MD, D Oleynikov, University of Nebraska Medical Center

OBJECTIVE: Intraluminal foreign bodies, such as retained suture (RS) material, may contribute to anastomotic Gastrojejunal ulceration (GJU) and pain. The purpose of this study is to examine the association of GJU with retained suture using the linear stapled (LSA) technique during LGB.

METHODS: From November 2002 to present, 159 patients had LSA during LGB. The first 73 had a non-absorbable suture; the technique was changed to an absorbable inner layer in the remaining 86. The charts were reviewed for patient complaints and medical treatment. Endoscopy reports and photos were reviewed for presence of suture and therapeutic interventions.

RESULTS: 17/159 (10.1%) patients had GJU (15 (20.5%) with a non-absorbable inner layer and 2 (2.3%) with absorbable). 14/17 patients with GJU had RS on at least one endoscopy. One patient had symptomatic RS without GJU. These 15 patients are described as the RS group. Presenting symptom was epigastric pain/dyspepsia in 14(93.3%), and melena in 1(6.7%). Mean time to diagnosis of GJU was 10.1 months (1.1-24.5) for patient with RS and 1.6 months (0.7-2.6) without RS. Diagnosis of RS required an average of 1.5 (1-3) diagnostic endoscopies. 5 (33.3%) patients had stitch at base of ulcer that could not be resected were treated by proton pump inhibitor (PPI). 2/12 with potentially removable stitch had the stitch removed using an Olympus double lumen therapeutic upper endoscope (Melville, NY), endoscopic biopsy forceps and scissors on their first endoscopy. The other 8/10 were treated with PPI then, if they had persistent pain or recurrent pain with cessation of PPI, they had re-endoscopy. 50% had persistent GJU with stitch, 50% had RS but no ulcer. All underwent removal of the stitch. 4/5 with stitch in the base only who did not have RS removal are currently pain free and off PPI versus 4/10 who had intraluminal stitch with RS removal.

CONCLUSION: Use of an absorbable inner layer appears to decrease the incidence of RS from 20% to 2% but does not eliminate the problem. Because of the long interval between surgery and presentation on-going follow-up is necessary. Patients with visible stitch in the base but not the lumen will resolve with PPI alone. Because 80% of patients with retained potentially removable intraluminal stitch develop recurrent pain when off PPI, a therapeutic endoscope should be available for all endoscopies and surgical endoscopist should be prepared to remove these stitches on the first attempt.

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IMPROVING RATES FOR SCREENING COLONOSCOPY, Brent W Miedema MD, Muger V Geana, Nitin J Rangnekar MD, Glen T Cameron, University of Missouri; Departments of Surgery and Journalism

Colonoscopy is an effective modality for colorectal cancer screening. The objectives of this study were to identify colorectal cancer knowledge and barriers to screening colonoscopy in the general US population.

Methods: Data was obtained from the Health Information National Trends Survey (HINTS I), conducted by the NCI and completed in December, 2003. The dataset (n=6369) included responses to a 34 question survey on colorectal cancer knowledge. The influence of age, race, gender, education, income, media usage, and interactions with health care providers were evaluated to establish knowledge, attitudes, and behavior regarding screening for colorectal cancer with colonoscopy. Both descriptive statistics and between subjects analysis were



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used to evaluate the impact of the independent variables.

Results: Most respondents felt they were at low risk of developing colon cancer (62%) and rarely or never worried about getting colon cancer (75%). The term "colonoscopy" is recognized by most participants in the survey (80% over age 35), however only 35% of the respondents perceive it as a major method for colon cancer screening. Hispanics had the least awareness of colonoscopy for screening (16 vs. 39% non-Hispanic). Female gender, education, and income all correlated with the knowledge and use of colonoscopy as a screening method for cancer. In respondents over age 50, 41% stated that they had undergone colonoscopy. The respondents who had undergone an endoscopic examination were more convinced that it increased the chances of finding a treatable cancer (84 vs. 71%). There is a positive correlation between media usage and having a colonoscopy ($r = .095, p < .01$). Having a health care provider was strongly correlated with having undergone a colonoscopy ($r = .249, p < .01$); the most common reasons for not having colonoscopy were "no reason" (29%), "doctor didn't order it" (24%), and "didn't know I needed the test" (15%). Regarding media preferences for receiving cancer related material, personalized materials ranked 1st (85%).

Conclusions: Knowledge of and participation in screening colonoscopy is low in the US population, especially among Hispanics. The most important immediate action is to increase physician referral for screening colonoscopy. Tailored education materials focused on specific socio-demographic segments and targeted communication campaigns need to be developed to encourage screening.

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EVOLUTION OF THE PEG: THE SLIC TECHNIQUE, Valentine N Nfonsam MD, Suthep Udomsawaengsup MD, Rockson Liu MD, Adheesh Sabnis MD, Bipand Chand MD, Cleveland Clinic Foundation, Cleveland, Ohio

INTRODUCTION: Percutaneous endoscopic gastrostomy (PEG) tube is the most commonly used form of enteral access. The traditional techniques for endoscopic gastrostomy tube placement include the pull, push, and introducer method. These modalities have proven to be safe and effective. Despite the advantages of the traditional technique contraindications still exist. Contraindications include large head and neck cancers that preclude the safe passage of the endoscope and gastrostomy tube. We review our indications, complications, and short-term outcomes using the new SLiC technique.

METHODS AND PROCEDURE: Patients with head and neck cancer that required long term feeding access were evaluated for the SLiC procedure. The procedure starts with the passage of a pediatric endoscope into the stomach. After diagnostic endoscopy, the stomach is distended with air and the scope is positioned for visualization of tube placement. The abdomen is prepped and utilizing finger indentation, and the Safe-tract technique a blunt catheter and dilating trocar is passed through the abdominal wall into the lumen of the stomach. The inner catheter is removed and a Malecot tube passed through the trocar into the dependant portion of the stomach. The trocar is removed and the catheter secured in place.

RESULTS: From October 2004 to August 2005, 7 male patients with the average age of 59.8 (range 51-70) were evaluated for the SLiC technique. All patients had head and neck cancers and presented with dysphagia and obstructive symptoms. SLiC placement was successful in 6 of 7 patients (86%). One case required conversion to laparoscopic gastrostomy due to the loss of gastric insufflation with subsequent poor visualization. There were no major complications. Patients were able to use the tubes for enteral feeding and undergo definitive therapy for their head and neck cancer.

CONCLUSION: The SLiC technique is a safe, effective and alternative approach to traditional percutaneous gastrostomy. Advantages include the use of smaller endoscopes in patients with near obstructing head and neck cancer and the avoidance of potential seeding of malignant cells at the gastrostomy site.

Flexible Diagnostic & Therapeutic Endoscopy—P320

UTILITY OF CAPSULE ENDOSCOPY IN EVALUATING SURGICAL DISEASES OF THE SMALL INTESTINE, B L Paton MD, Y W Novitski MD, M Zerey MD, A G Harrrell MD, R F Sing DO, K W Kercher MD, B T Heniford, Carolinas Medical Center, Charlotte NC

Objective: Wireless-capsule endoscopy (WCE) is touted to have a high diagnostic yield where other imaging techniques have failed in the evaluation of occult gastrointestinal bleeding and small bowel pathology. The purpose of this study was to evaluate the utility of WCE in diagnosing pathology amenable to surgical treatment.

Methods: An IRB-approved retrospective review of the Endoscopy Outcomes Database at an urban, teaching hospital was performed to identify all patients that underwent surgical treatment based on results from WCE (Given Video Capsule System, Given Imaging, Israel).

Results: Over the past eighteen months, WCE was performed in 149 patients (77 males: 72 females) with an average age of 59.9 years (range, 19 to 94 years). Indications included obscure anemia or gastrointestinal bleeding for one hundred and forty patients (94%) and abdominal pain for nine patients (6%). Prior to WCE, all patients underwent a thorough upper and lower endoscopy. WCE identified pathology in sixty-one patients (40%) and included the diagnosis of small bowel ulcers (14 patients), arteriovenous malformations (35 patients) and small bowel masses (12 patients). Seven patients (4.7%) underwent surgical treatment based on results from the WCE evaluation. Four patients with anemia and a negative small bowel follow-through had a jejunal mass found on WCE. At laparoscopy; no masses were palpable and push enteroscopy was performed. In three patients, the lesion was identified and was excised. The fourth patient had many small mucosal lipomas with many of them undergoing full thickness suturing. In three patients who had a history of abdominal pain, questionable symptoms from partial small bowel obstructions (PSBO), and a negative radiologic work-up, the capsule lodged at the site of pathology without causing a complete obstruction. These patients underwent surgical exploration and resection of the diseased bowel with pathology examination revealing radiation enteritis, malignant lymphoma and a benign stricture. At a mean follow-up of 12 months, all patients are without symptoms of anemia or small bowel obstruction.

Conclusion: Wire capsule endoscopy can diagnose the etiology of obscure gastrointestinal bleeding and partial small bowel obstruction when other modalities have failed. Importantly, localization of small bowel masses is not exact and having push endoscopy available in the OR may be valuable to guide definitive surgical treatment.

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OPTIMIZING PERITONEAL ACCESS FOR NATURAL ORIFICE TRANSVISCERAL ENDOSCOPIC SURGERY (NOTES), Michael J Rosen MD, Michael McGee MD, Jeffrey Marks MD, Amitabh Chak MD, Raymond Onders MD, Ashley Faulx MD, Anthony Ignagni PhD, Steve Schmoisich, Jeffrey L Ponsky MD, Case Western Reserve School of Medicine, University Hospitals of Cleveland

Introduction: NOTES involves novel techniques to access the peritoneal cavity without creating abdominal scars. Identifying a reliable technique to access the peritoneal cavity through the gastric wall is an important step in the safe development of this procedure. This study evaluates three techniques to gain peritoneal access.

Methods: Four female pigs underwent NOTES having three separate access techniques performed at separate sites in the gastric wall. In all pigs, a percutaneous guidewire was placed using the seldinger technique through the gastric wall and brought out transorally to maintain transgastric peritoneal access. The gastroscope was then reinserted alongside the wire. In technique 1, a needle knife cautery was used to make a 3 mm free cut along the wire. A 12 or 20 mm endoscopic balloon was passed alongside the wire and the gastrostomy



was dilated and peritoneal cavity entered. In technique 2, a 3mm free hand cut was placed next to the percutaneous wire, and a double channel sphincterotome was used to create a gastrotomy. In technique 3, a 10 to 12mm free hand full thickness cut was made using a needle knife cautery and the scope was passed directly into the abdominal cavity. After successful access to the peritoneal cavity the stomach exit site was inspected at laparotomy for the size of the defect created, surrounding tissue injury, or any adjacent visceral injury and then sutured closed. Time from intubation of the esophagus to successful identification of the peritoneal cavity was recorded. If peritoneal access was not achieved within 20 min the technique was aborted and deemed a failure.

Results: Technique 1 was aborted when a balloon size less than 20 mm was used. The 20 mm balloon provided a reliable access and was typically achieved in under 10 min. Technique 2 was aborted in 3 of 4 cases secondary to false passage or inability to accurately direct the tip of the catheter. Technique 3 provided the fastest access to the peritoneal cavity in typically under 8 min but tended to result in a larger gastrotomy. No thermal injuries to surrounding structures occurred in this study.

Conclusions: This study demonstrates that a 20 mm endoscopic balloon dilatation system or a free transmural cut provide the most reliable techniques to enter the peritoneal cavity. Further study in a chronic animal model is necessary to identify the implications of these techniques on eventual gastrotomy closure.

Flexible Diagnostic & Therapeutic Endoscopy–P322

USE OF THE SIDE VIEWING DUODENOSCOPE THROUGH A ROUX-EN-Y SUBCUTANEOUS LIMB FOR MANAGEMENT OF BILE DUCT ANASTOMOTIC STRICTURE, Ray Sarmiento MD, G Duque MD, VJ Villafior MD, R Casipit MD, V V Villafior MD, Dagupan Endoscopic and Laparoscopic Surgery Center Inc., Dagupan Doctors Villafior Memorial Hospital, Dagupan City, Philippines

Roux en y jejunal limb reconstruction (bilioenteric) for bile duct injury repair is currently the treatment of choice for complete duct transection with severe tissue loss. A subcutaneous limb for future access into the bilioenteric anastomosis is optional to the procedure. Stricture of the anastomosis is an expected sequelae. Stricture dilatation or stenting can be done either transhepatic (PTBD) or endoluminal in patients with a subcutaneous access. We are to here present the use of a side viewing duodenoscope through the subcutaneous access to facilitate these therapies.

Our case is of a 45 year old female who had laparoscopic cholecystectomy for gallstones. Two months post operative she came in with obstructive jaundice. ERCP done showed a long segment stricture from the common hepatic duct to the distal common bile duct. The R and L intrahepatic ducts were dilated and communicating with less than 2 cm of the common hepatic duct left for possible reconstruction. She eventually had a bilioenteric reconstruction with a subcutaneous limb. One year after the repair she presented again with obstructive jaundice. CTSCAN showed dilatation of the IHD and possible stricture of the bilioenteric anastomosis. Access through the subcutaneous limb was done with a 3.5 mm choledochoscope. Dilatation and stenting was contemplated but proved to be difficult because of catheter/guidewire kinking and buckling inside the wide lumen of the limb. All therapies were done outside the scope. We decided to enlarge the subcut. access and insert a side viewing scope through the limb. With the relative stiffness of the scope and capacity to do the therapies through the scope channel facilitated dilatation with a TTS CRE biliary balloon dilatator and insertion of a 10 Fr x 5 cm (cut to size) stent to bypass the stricture. All the 12 cardinal movements of the scope for ERCP was also made available to this procedure by the side viewing scope facilitating the above mentioned endoscopic therapies. We are reporting our experience to present the feasibility of such procedure, that our surgeon/physician-endoscopist colleagues might find useful in clinical practice.

Flexible Diagnostic & Therapeutic Endoscopy–P323

UNSEDATED TRANSNASAL ESOPHAGOGASTROSCOPY INTEGRATION INTO A GENERAL SURGERY PRACTICE, Nikhilesh R Sekhar MD, Alfonso Torquati MD, Yassar K Youssef MD, William O Richards MD, Vanderbilt University Medical Center

BACKGROUND: We instituted a program at our institution to evaluate a 5mm transnasal endoscope that can be placed without sedation in a conscious and alert patient.

METHODS: 126 patients were evaluated for symptoms of GERD or dysphagia from 7/04-9/05. The patients nares and back of throat are numbed with cetacaine. Tetracaine, phenylephrine and viscous lidocaine are applied to the nostril to aid with dilatation and passage of the scope. The scope which is 60 cm in length can visualize the esophagus, stomach and GE junction but not the duodenum in most patients

RESULTS: Of the 126 patients who underwent endoscopy none experienced adverse effects. In 14 patients(11%) we were unable to pass the scope past the nares due to patient anatomy or prior nasal surgery. 2 patients(1.5%) were unable to tolerate the procedure and requested withdrawal of the scope. All were able to resume normal function immediately and there were no complications. Biopsies were taken from 13 patients. Three biopsies revealed Barrett's esophagus, two revealed esophagitis, four revealed gastritis, two revealed fundic gland polyps and two were normal. Average length of procedure was 6 +/-3 minutes.

CONCLUSION: Transnasal unsedated esophagogastrosopy is a safe and well tolerated endoscopic modality that can be done without sedation in an outpatient setting. This procedure can be integrated easily into a surgeon's outpatient clinic.

Flexible Diagnostic & Therapeutic Endoscopy–P324

LAPAROSCOPIC ASSISTED TRANSGASTRIC ENDOSCOPY IN THE GASTRIC BYPASS PATIENT: A CASE SERIES AND REVIEW OF THE LITERATURE, W R Silliman MD, S Scott MD, R A de la Torre MD, N Rangnekar MD, University of Missouri-Columbia

Introduction: Morbid obesity has become a significant health problem in the United States. Many patients are undergoing surgical treatment for their obesity and, there has been a significant increase in the number of laparoscopic roux-en-y gastric bypass (RYGB) operations performed. Occasionally, patients who have undergone a RYGB return with symptoms which require further investigation. Diseases affecting the bypassed gastric remnant and biliary tree can pose a diagnostic and therapeutic dilemma. Methods to access the bypassed gastric remnant have not been well described.

Materials and Methods: We have employed laparoscopic assisted endoscopic access to the bypassed gastric remnant in 4 patients since 2004. We have performed gastroscopy and duodenoscopy in 2 patients and an endoscopic retrograde cholangio-pancreatography (ERCP) in another 2 patients.

Results: Our series consists of four patients who had undergone previous RYGB (one open and three laparoscopic). The most common indication for the procedure was abdominal pain. Operative findings included: duodenal polyp, choledocholithiasis, pancreas divisum, and gastritis. Operative times varied from 1 hour to 4 hours. One patient had post-operative sepsis secondary to gastrostomy site leak. Blood loss was minimal for all patients.

Conclusions: Laparoscopic assisted transgastric endoscopy in the gastric bypass patient is an effective method to evaluate and treat patients who have undergone previous RYGB. This technique may also be useful in diagnosis and treatment of patients who suffer upper GI hemorrhage, choledocholithiasis, pancreatitis, and peptic ulcer disease following RYGB.



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Flexible Diagnostic & Therapeutic Endoscopy—P325

TRAUMATIC SPLENIC LACERATION FOLLOWING COLONOSCOPY, G. Brent Sorensen MD, Nitin Rangnekar MD, University of Missouri Hospitals and Clinics

There are many known and accepted common complications which accompany colonoscopic procedures. These include bleeding, perforation, infection, electrolyte imbalance, hypotension, hypoxia, abdominal distention, and abdominal pain. Another rare, but potentially lethal complication of colonoscopy is splenic injury. This is thought to be caused by either direct trauma to the spleen itself during the procedure, by excessive splenicocolic ligament traction, or by tearing of splenic adhesions from prior surgeries. There have been only about 20 cases of this event presented in the literature. We present a brief literature review, and also the interesting case of a 47 year old female who presented to the Emergency Room after routine colonoscopy complaining only of left neck pain. CT evaluation to rule out pulmonary embolism revealed a significant splenic laceration. This patient was managed conservatively and ultimately was discharged home. Although splenic injuries during colonoscopy are rare, it is important to be aware of this complication as it is potentially life-threatening.

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LACK OF AWARENESS ABOUT APPROPRIATE SCREENING GUIDELINES AFTER COLONOSCOPY IN AN URBAN POPULATION, Ayaz Matin MD, Sunil Lal MD, Asyia Ahmad MD, David E Stein MD, Divisions of Colorectal Surgery and Gastroenterology; Drexel University College of Medicine

Introduction: Colorectal cancer is the second leading cause of cancer mortality in the United States. Those who undergo screening require education on appropriate follow-up intervals for repeat procedures. We hypothesized that most patients are unaware of the appropriate follow-up required after screening colonoscopy.

Methods: A retrospective review of persons who attended a free colorectal cancer screening day was performed. Publicity was generated via public service announcements in free area newspapers and on the radio. A detailed history and physical examination including DRE and FOBT was performed. Information recorded included family history, previous screening procedures for colorectal cancers, and general medical history. Results were recorded and analyzed with respect to the current American Gastroenterology Association's screening guidelines for colorectal cancer.

Results: 59 people attended and 54 of them underwent a complete examination. The cohort had a mean age of 60 years, 50% were women. 27 (50%) people had a prior screening colonoscopy. Based on screening guidelines, 23 (85%) people with a prior colonoscopy were due for a repeat colonoscopy. Of those, 11 were due based on the time interval from the prior procedure and 12 were due based on a personal history of polyps. None of these patients were aware that they were due for a repeat procedure.

Conclusions: A lack of awareness on the appropriate follow-up required after screening colonoscopy exists in an urban population. Educational programs for appropriate follow-up for colorectal cancer screening are required.

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ENTEROSCOPIC DIAGNOSIS OF INTERNAL HERNIA AFTER ROUX-EN-Y GASTRIC BYPASS, A CASE STUDY, Christopher C Thompson MD, Malcolm K Robinson MD, David B Lautz MD, Department of Gastroenterology, Brigham and Women's Hospital Boston, MA

Introduction: Internal hernia following a Roux-en-Y gastric bypass is a complication, which poses a diagnostic challenge to clinicians. Contrast studies and CT scans are often unremarkable, particularly if performed when the patient is asymptomatic. If left undiagnosed this complication can lead to

severe morbidity or even mortality. A case of internal hernia after Roux-en-Y gastric bypass surgery is presented in which enteroscopic findings led to surgical intervention and repair of a hernia, despite a normal abdominal CT scan.

Methods: A 57 year old woman 26 months status post Roux-en-Y gastric bypass presented with a two-week duration of nausea, vomiting and intermittent abdominal pain. Physical exam revealed stable VS and diffuse abdominal tenderness. Abdominal CT with contrast showed no evidence of small bowel obstruction or acute intra-abdominal inflammatory process. The patient underwent upper endoscopy/enteroscopy. Endoscopically the gastric pouch, roux limb and biliopancreatic limbs were all normal. The common limb had a stenotic area just beyond the jejunojejunostomy, through which the scope could be passed. Beyond the stenosis, there was an area of the common limb that appeared mildly ischemic. The patient underwent laparotomy, and was found to have an internal hernia at the jejuno-jejunostomy with a segment of the common limb herniated through the mesenteric defect. This was reduced and the defect repaired.

Conclusion: Enteroscopic evaluation of the jejunal limbs in a patient presenting with nausea, vomiting and intermittent abdominal pain after gastric bypass may offer an alternative method of diagnosing an internal hernia, when contrast studies are negative, in the non-acute setting.

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DO SYMPTOMS CORRELATE WITH ENDOSCOPIC FINDINGS IN POST LRYGB PATIENTS?, Suthep Udomsawaengsup MD, Valentine Nfonsam MD, Carolina Goncalves MD, Stacy Brethauer MD, Bipan Chand MD, Cleveland Clinic Foundation, OH

INTRODUCTION: Anastomotic strictures and marginal ulcers are not uncommon after gastric bypass. Patients may experience dysphagia and abdominal pain to suggest these complications, however many patients may not have true abnormalities. Endoscopy may offer both a diagnosis and allow for therapeutic intervention. We review our database for patients with dysphagia and abdominal pain and correlate endoscopic findings with the time interval from surgery to symptom development.

METHODS AND PROCEDURES: From July 2004 to July 2005 69 patients had symptoms of dysphagia or abdominal pain after LRYGB. EGD was performed and pathology evaluated in all. Endoscopic dilation was added if strictures were found. The time interval from surgery to endoscopy was assessed to see the yield of endoscopy.

RESULTS: 18 of the 35 patients (51%) with dysphagia were found to have a stricture. 16 patients (89%) were within 3 months of surgery. All were successfully treated with dilation. 13 patients (72%) required one dilation. Two patients were greater than 3 months after surgery and one had a marginal ulcer and the other a prior history of gastrojejunal leakage. Both successfully treated with dilation. Six of the 34 patients (18%) with abdominal pain were found to have a marginal ulcer. All ulcers were diagnosed after 3 months and two required revisional surgery.

CONCLUSION: Patients with dysphagia within three months after gastric bypass have a high index of having a treatable stricture and should be offered early endoscopy. Patients greater than three months from surgery with dysphagia are less likely to have an abnormality. Pain after gastric bypass is seen later in the post-operative period and endoscopy has a lower yield in identifying a pathology.

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OUTCOME OF BI-LEVEL POSITIVE AIRWAY PRESSURE ASSISTED PERCUTANEOUS ENDOSCOPIC GASTROSTOMY TUBE PLACEMENT IN PATIENTS WITH AMYOTROPHIC LATERAL SCLEROSIS, R. Matthew Walsh MD, Steven Thompson BS, Erik Pioro MD, Scott Marlow, Nancy Brown RN, Cleveland Clinic Foundation

Amyotrophic lateral sclerosis (ALS) with bulbar dysfunction is a progressive neurodegenerative disorder associated with nutritional debilitation. Enteral support by percutaneous endo-



scopic gastrostomy (PEG) can alleviate symptoms of dysphage while improving nutritional status. Bi-level positive airway pressure (BiPAP) is a ventilatory support device which may reduce the respiratory risks during PEG insertion. Consecutive patients with bulbar-ALS were prospectively entered into a BiPAP-assisted PEG insertion protocol and their procedure-related, and long-term outcome were assessed.

A total of 83 ALS patients received a BiPAP-assisted PEG over 6 years ending in July 2005. There were 47 men and 37 women with a mean age of 62 (34-83) years. Patients were diagnosed with ALS at a mean of 15 months prior to PEG, and had been symptomatic for a mean of 25 months. Thirty-nine patients (47%) had lost at least 20 pounds, and as much as 70 pounds. Home BiPAP was used in 26 (31%) prior to PEG. The mean predicted forced vital capacity (FVC) percentile prior to PEG was 49%. The PEG procedure included topical Lidocaine spray in all, and intravenous sedation with 50 mg Meperidine and 2 mg Midazolam. Complete endoscopy to the duodenum was achieved in all; abnormalities were diagnosed in 20 (24%) with hiatal hernia, gastritis and Barrett's esophagus being most common. The median duration of the procedure was 9 (5-17) minutes. The median BiPAP inspiratory pressure was 10 (6-40) cm H₂O, and the median end-inspiratory pressure was 4 (2-9) cm H₂O to achieve a median lowest oxygen saturation of 95 (50-100)%. There were no procedure related complications, although 9 (11%) died within 30 days due to disease progression. The median survival post-PEG was 6 (1-61) months. Actuarial survival curves for patients with predicted FVC < 50% versus FVC > 50% show a median survival of 6.0 months (95%CI 2.9-8.8) versus 7.0 month (95% CI 5.2-11.9), respectively (p=0.17). In summary, BiPAP-assisted PEG insertion is safe in ALS patients, even those with compromised respiratory function. Survival following PEG for ALS is independent of pulmonary function assessed prior to the procedure.

Flexible Diagnostic & Therapeutic Endoscopy-P330

COLONOSCOPY IN THE VERY ELDERLY: A REVIEW OF 118 CASES. Marc Zerey MD, Phillip D Khan MD, Amy E Lincourt PhD, B Lauren Paton MD, Kent W Kercher MD, B Todd Heniford MD, Division of Gastrointestinal and Minimally Invasive Surgery, Carolinas Medical Center, Charlotte NC

Background: Colonoscopy is the best diagnostic modality for evaluating colonic diseases but studies of its use in the very elderly are limited.

Methods: A single-institution review of all patients aged 85 years or older who underwent colonoscopy from June 2003 to June 2005 was performed. Parameters evaluated included indications for colonoscopy, findings, ability to perform a complete colonoscopy, and immediate and delayed (<= 21 days) complications.

Results: A total of 118 patients aged 85 years or older (median 87, range 85-99) underwent colonoscopy during the 2 year period. Immediate complications included: hemorrhage at a polypectomy site in one patient that was controlled endoscopically, one episode of bradycardia, and one incident of atrial fibrillation. There were no delayed complications resulting from colonoscopy. The cecal intubation rate was 90%. Number of cancers detected / indications for colonoscopy include: gross or occult bleeding per rectum, 4/42 (9.5%); abnormal abdominal computed tomography, 3/5 (60%); change in bowel habits, 1/10 (10%); anemia, 1/17 (5.9%); screening, 0/14; previous history of colonic malignancy, 0/6; previous history of polyps, 0/16; family history of colonic malignancy, 0/6; abdominal pain, 0/2.

Conclusions: Our data suggests that colonoscopy can be safely and successfully performed in the very elderly. Patients with symptoms or suggestive radiographic findings had cancer discovered in 5.9% - 60% of cases. No cases of cancer were discovered in those patients that are asymptomatic.

Hepatobiliary/Pancreatic Surgery-P331

MINIMALLY INVASIVE RADIOFREQUENCY ABLATION OF HEPATIC TUMORS. Michael T Adams MD, James C Garber MD, Christopher K Senkowski MD, Steven T Brower, Memorial Health University Medical Center

Objective: Laparoscopic radiofrequency ablation (RFA) in conjunction with intraoperative ultrasonography (IOUS) of hepatic tumors has become increasingly established in the management of unresectable liver malignancies. The purpose of this study was to evaluate the outcome of laparoscopic RFA of unresectable primary and secondary hepatic malignancies.

Methods: We conducted a retrospective review of 20 consecutive cases of laparoscopic ultrasound-guided hepatic RFA performed between May 2003 and June 2005. Indications for RFA were unresectable primary hepatic tumors (n=9), metastatic colorectal carcinoma (n=7), and neuroendocrine metastases (n=4). Outcome measures were operative time, blood loss, length of hospital stay, morbidity, mortality, survival, and completeness of ablation on postoperative CT scanning. Patients underwent helical CT scanning at 1-2 weeks post procedure.

Results: Laparoscopic IOUS identified metastatic disease not detected by preoperative CT in 4 of 11 patients (36%). Fifty-two lesions with a median size of 2 cm (range 0.8 - 10 cm) were treated in 20 patients. Six patients underwent concomitant resective procedures following laparoscopic RFA, which were performed laparoscopically (n=3) or via an open approach (n=3). Major complications occurred in 5 patients (25%). There were no 30-day operative deaths. At a mean follow-up of 12 months, 16 patients survived. Postoperative CT scanning demonstrated complete ablation of 44 of 52 lesions (84%).

Conclusions: IOUS consistently permits the discovery of occult metastases. While morbidity is greatest in patients undergoing concurrent resective procedures, laparoscopic RFA is a safe and effective procedure in selected patients.

Hepatobiliary/Pancreatic Surgery-P332

USAGE OF THE TRANSESOPHAGEAL ECHOCARDIOGRAM FOR MONITORING OF THE GAS EMBOLIZATION WITH LAPAROSCOPIC HEPATECTOMY. Hideaki Andoh MD, Tasturu Akashi MD, Yoshio Kobayashi MD, Yuichi Tanaka MD, Takao Hanaoka MD, Division of Surgery, Nakadori General Hospital

[Aim] Transesophageal ecocardiogram (TEE) had been used for evaluating of intraoperative cardiac function. We report, in this study, usage of the TEE for keeping watch on intra cardiac gas embolization during the laparoscopic hepatectomy.

[Patients] Fifteen patients were performed the TEE for monitoring of gas embolization, ten were laparoscopic cholecystectomy and five was laparoscopic or open hepatectomy.

[Methods] TEE were performed during pneumoperitoneum with CO₂ gas under 6mmHg to monitor in the bilateral atrium and left ventricle. Hepatectomy were performed with microwave coagulator, radiofrequency wave coagulator, ultrasonic coagulator and Argon plasma coagulator.

[Result] Laparoscopic partial hepatectomy was performed for four patients and only coagulation therapy for one patient with radiofrequency wave coagulator. No patients were occurred gas embolization. But, under TEE monitoring, few small bubble were observed in four patients in laparoscopic cholecystectomy and one case of partial hepatectomy. A lot of small micro-bubbles were detected 3 cases in partial hepatectomy or coagulation therapy with radiofrequency or microwave coagulator. But, almost air bubbles were absorbed in lung and disappeared in the left atrium and ventricle.

[Summary] Air embolization during hepatectomy was not related with amount of bleeding, pneumoperitoneum but also related with surgical devices such as microwave coagulator and radiofrequency coagulator. TEE was useful for the monitoring of gas intraoperative embolization.

Hepatobiliary/Pancreatic Surgery-P333

HAND ASSISTED LAPAROSCOPIC LIVER TRANSPLANTATION.

A FEASIBILITY STUDY. SERGIO J BARDARO MD, VICENTE C MITIDIERI PhD, HORACIO A CONESA MD, MICHEL GAGNER MD, Department of Surgery. Weill Medical College of Cornell University New York Presbyterian Hospital, New York, NY. Surgical Anatomy Institute. School of Medicine. Buenos Aires University. Argentina

Introduction: More than 18,000 patients are on the liver transplantation waiting list with approximately 5,000 patients receiving transplant annually. Part of this problem has been addressed with living related donor liver transplantation. This



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is the first attempt to perform this complex procedure with a minimally invasive technique to test its feasibility.

Material and Methods: We performed a hand assisted laparoscopic liver transplantation in two fresh human cadavers.

Harvesting: A total hepatectomy was performed through a right subcostal incision, sectioning a lateral portion of vena cava that includes the 3 hepatic veins, transverse section of the common bile duct, portal vein and hepatic artery. We then closed the subcostal incision.

Partitioning: A right hepatectomy with ligation of the right vascular and biliary structures was performed in the table. We reserved the left liver for auto-transplantation.

Transplantation: The left liver was introduced into the abdominal cavity through a median supraumbilical incision where we set a hand to assist during the procedure with additional 3 ports, a 10 mm for a laparoscope and two 2.7 mm needle-holders. We performed the caval anastomosis with a 4-0 unabsorbable running suture, and the arterial, portal and biliary end-to-end anastomosis with 6-0 running sutures.

Conclusion: We consider this complex procedure feasible in a cadaver model.

Hepatobiliary/Pancreatic Surgery-P334

A NOVEL TECHNIQUE FOR HEPATIC FLOW OCCLUSION DURING RADIOFREQUENCY ABLATION: THE LAPAROSCOPIC PRINGLE MANEUVER, Prayag Barot MD, Gary Gecelter MD, North Shore / Long Island Jewish Medical Center, New Hyde Park, NY 11040

Introduction: The heat-sink effect of the hepatic vasculature has been known to limit the effectiveness of radiofrequency ablation (RFA) of liver tumors in proximity to vascular structures. If the flow is occluded at the time of RFA, the zone of ablation will be greater, and a more complete oncologic procedure can be achieved.

Hypothesis: In this study, we have devised a novel method to perform a laparoscopic Pringle maneuver, which can be applied during RFA of tumors near the portal vein tributaries. Prior methods to apply the Pringle maneuver have used an atraumatic bowel clamp placed across the hepatoduodenal ligament to occlude flow. This may be damaging to the vessels, but more importantly, it does not provide adequate flow occlusion as a linear clamp is being used to compress a circular lumen.

Technique: This new technique uses a doubly looped silastic vessel loop encircled around the portal triad after dissection of the porta hepatis. Individual vessels need not be isolated for this purpose. Gentle traction of the vessel loop will cause flow occlusion of the portal vein and the hepatic artery. The vascular flow characteristics both before and after the Pringle maneuver are measured by laparoscopic duplex ultrasound.

Conclusions: The zone of ablation can be visualized and measured by ultrasound. We have concluded that this new method of applying the Pringle maneuver is safe and more effective than previously used techniques. Also, the zone of ablation is greater when the Pringle maneuver is used, especially when the tumor lies near the hepatic vasculature.

Hepatobiliary/Pancreatic Surgery-P335

THE EFFECT OF INTRAPERITONEAL LOCAL ANAESTHESIA IN LAPAROSCOPIC CHOLECYSTECTOMY: A META-ANALYSIS, A P Boddy BM BCh, S Mehta BM BCh, M Rhodes MD, Dept of General Surgery, Norfolk and Norwich University Hospital, Norwich, UK

Introduction: Intraperitoneal administration of local anaesthesia is often used to improve pain relief following laparoscopic cholecystectomy. However, several studies have shown that this technique may be ineffective, and there are concerns over the possible toxic effects of the agents used. We have conducted a meta-analysis to establish whether intraperitoneal local anaesthesia is beneficial in laparoscopic cholecystectomy.

Methods: A search of MEDLINE, EMBASE and the Cochrane Library databases revealed 28 randomised controlled trials assessing intraperitoneal local anaesthetic use in laparoscopic cholecystectomy. Of these, 18 studies with 875 patients met the inclusion criteria for quantitative analysis. The weighted mean differences (WMD) in visual analogue pain score at 4 hours post operatively were pooled using a random effects

model. In addition, we analysed the mean differences in post-operative analgesic consumption.

Results: Overall, the use of intraperitoneal local anaesthesia resulted in a significantly reduced pain score at 4 hours (WMD -9mm, 95% CI 13 to -5). Subgroup analysis showed that the effect was greater when the local anaesthetic was given at the start of the operation (WMD -12mm, 95% CI -16 to -7) compared to instillation at the end (WMD -5mm, 95% CI -9 to -2). There was also a significantly reduced analgesia requirement following the use of intraperitoneal local anaesthesia (standardised mean difference = -1.4, 95% CI -2.6 to -0.1).

Conclusions: Administration of intraperitoneal local anaesthesia results in a significant improvement in early post-operative pain. Furthermore, the effect may be greater if instillation is performed at the start of the procedure. This technique may be particularly useful for day-case laparoscopic cholecystectomy.

Hepatobiliary/Pancreatic Surgery-P336

LAPAROSCOPIC ROUX-EN-Y CHOLEDOCHOJEJUNOSTOMY FOR RECURRENT CBD STONES ? REPORTS OF TWO CASES, Kuo-Hsin Chen MD, Heng-Fu Lin MD, Jiann-Ming Wu MD, Shih-Hong Huang MD, FAR-EASTERN MEMORIAL HOSPITAL, TAIPEI TAIWAN

Laparoscopic common bile duct exploration is a well established approach to common bile duct stones. However for patients with recurrent CBD stones after previous choledocholithotomy, the choices are limited. The adhesion around liver hilum is usually extensive and obscures the main anatomical landmarks. Endoscopic sphincterotomy and stone extraction is a reasonable approach but can not prevent further recurrence. Bilio-enteric bypass is probably the best procedure for these patients. We present our initial experience of laparoscopic Roux-en-Y choledochojejunostomy for recurrent CBD stones after previous open choledocholithotomy.

Two women, 51 and 59 year-old respectively, received open cholecystectomy and choledocholithomy for gall stones and combined CBD stones years ago. Recurrent CBD stones were noted with repeat cholangitis and obstruction. EPT was tried first but failed to extract the stones.

The procedure included laparoscopic adhesiolysis first and identified the common bile duct. Choledochotomy with intraoperative choledochoscopy was done to remove all the CBD stones. Then the left subcostal port site was widened to 3 cm and the upper jejunum was taken out of the abdomen. Roux-en-Y anastomosis was done outside the abdomen and placed back into the abdominal cavity. Side to side choledochojejunostomy was done by interrupted intracorporeal sutures. The two patients resumed oral intake the day after surgery and recovered smoothly without complications.

In conclusion, laparoscopic Roux-en-Y choledochojejunostomy is feasible even in patients with history of previous CBD surgery. In cases with obscured anatomical landmark, needle identification of CBD is a possible way to avoid injury to other structure of hepatic hilum.

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LAPAROSCOPIC LEFT HEMIHEPATECTOMY, In Seok Choi PhD, IL Keung Park MD, Dae Keung Go MD, Won Jun Choi PhD, Dae Sung Yoon PhD, Department of Surgery, Konyang University Medical School, Daejeon, Korea

(Background) The development of laparoscopic tools along with the accumulation of surgical experiences has brought about trials of laparoscopic surgical operation of the liver. However, compared to simple procedures, such as liver biopsy and small incision procedures for benign tumors, major hepatic resection is not easy to perform with laparoscopy. The authors are reporting successful cases of total laparoscopic left hepatic resection for hepatolithiasis and cholangiocarcinoma.

(Materials and Methods) Between January to August of 2005, 6 cases of laparoscopic left hepatic resection were performed. 5 cases were performed for hepatolithiasis, of which 2 had already received open cholecystectomy due to prior cholecystitis, and the remaining for cholangiocarcinoma. Male to female ratio was 3:3 and mean patient age was 56.6 (37-73 years). Of 5 patients of hepatolithiasis, common bile duct



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exploration was performed in 3 cases. The laparoscopic procedure was performed using the 4-hole-method (12mm-12mm - 11mm-5mm). A telescope was inserted through the port below the umbilicus (12mm) and ports were inserted in the order of 12mm, 11mm, and 5mm. The tissue of the five hepatolithiasis patients were retrieved through the incision below the umbilicus and for the purpose of preserving, the tissue of the cholangiocarcinoma patient's tissue was retrieved by making an additional 6cm incision that included the 12 and 11mm ports below the xyphoid process.

(Results) The mean operation time was 8 hours (5-11 hours) and the mean blood loss was 460ml (250-800ml). Oral nutrition was started three days after the operation and the mean hospital stay was 11 days (8-16days). Blood transfusion was made on only one patient with the amount of 2 units. Complications included two wound infections of the umbilicus and acute renal failure in the final case where the patient was referred to the department of internal medicine for further treatment.

(Conclusion) Laparoscopic left hemihepatectomy can be considered as a feasible and adequate surgical method in selected patients, however further study and experiences for bleeding control should be warranted.

Hepatobiliary/Pancreatic Surgery-P338

IS THERE A JUSTIFICATION FOR ROUTINE HISTOLOGICAL EXAMINATION OF THE STRAIGHTFORWARD CHOLECYSTECTOMY SPECIMENS?, S Mahmud, B Darmas, A Abbass, S Paravastu, C V Rao, A L Baker, Wrexham maelor Hospital, Wrexham, LL12 8ND, United Kingdom

Background: Gall Bladder Carcinoma (GBCa) is the commonest biliary tract malignancy and carries a very poor prognosis. Laparoscopic cholecystectomy (LC) has established as a gold standard treatment for symptomatic gall stones, which has led to an increase in the number of cholecystectomies per annum and an increase in the numbers of incidental Gall Bladder Carcinoma (IGBCa) is expected.

The aim of the study is to assess the incidence of IGBCa and the need to reduce the routine histological examination of all gall bladder specimens.

Method: Pathology laboratory data of all gallbladder specimens over the period of last 5 years (June 2000 to July 2005) were analysed retrospectively. The case notes were reviewed in all the cases of malignancies.

Results: 1452 gall bladder specimens were subjected to histopathological examination in the last 5 years. 4 cases (0.27%) of primary GBCa, one primary B- cell lymphoma and one secondary carcinoma were detected. One case of epithelial dysplasia was also detected. Operative notes revealed that there was a high index of suspicion of malignancy at the time of surgery in all the four primary GBCa and also that the dissection was difficult because of an obvious mass. Of the four primary GBCa, three were stage T2 and one T4. Rest of the 1446 cases had benign pathology. Preoperative ultrasound scan suspected carcinoma in only the case of T4 GBCa, but thickened gall bladder wall was noted in all cases.

Conclusion: All the cases of GBCa were suspected preoperatively or peroperatively and histological examination did not alter the management or outcome of any case. There was no incidence of IGBCa. We suggest that selective histopathology of gall bladder specimens could be more measured approach in saving the time and money of the pathology department.

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SPIRAL CYSTIC DUCT: BEWARE!!, Ehab Elakkary MD, Karen Ching MD, Michael J Jacobs, North Oakland Medical Centers, Pontiac, Michigan, USA - Providence Hospital and Medical Centers, Southfield, Michigan, USA

BACKGROUND & OBJECTIVE: Knowledge of the cystic duct (CD) anatomy is crucial to avoid injury to the common bile duct (CBD). Our objective is to emphasize the superiority of the critical view technique over the infundibular technique in case of inflammation or aberrant anatomy.

CASE PRESENTATION: A 21-year old Caucasian female presented to the emergency department with biliary pancreatitis. After the pancreatitis resolved, the patient was taken for laparoscopic cholecystectomy (LC). The cystic duct and

infundibulum were funnel shaped and spiraled along themselves from lateral to medial rotation. The critical view technique was utilized to confirm that only two structures were entering into the gall bladder proper. The cystic duct and artery were serially clipped and divided.

DISCUSSION: Variations in the CD anatomy are common. The CD usually joins the CBD at an acute angle. It may run parallel to the common hepatic duct (CHD) and join it on its right side or left side. The CD may join the right hepatic duct (RHD). A cholecystohepatic duct may enter the gallbladder directly through the gallbladder fossa. In cases of aberrant CD anatomy, injury to the CBD can be avoided by extensive dissection of the triangle of Calot and utilizing the 'critical view technique' or performing a cholangiogram. Injury usually occurs when using the 'infundibular technique' especially in the case of inflammation or aberrant anatomy.

CONCLUSION: The critical view technique or the use of intraoperative cholangiogram should be applied to identify the CD rather than using the infundibular technique which might be a contributing factor to CBD injury.

Hepatobiliary/Pancreatic Surgery-P340

INTRAOPERATIVE ULTRASONOGRAPHY IN PATIENTS UNDERGOING PLANNED LIVER RESECTIONS: WHY ARE WE STILL PERFORMING IT?, J Ellsmere MD, R Kane MD, R Grinbaum MD, M Edwards MD, V Sanchez MD, B Schneider MD, D Jones MD, Departments of Radiology and Surgery, Beth Israel Deaconess Medical Center, Boston MA

Objective: We routinely use intraoperative ultrasonography (US) prior to liver resections to detect additional tumors and to evaluate the relationship of known tumors to major vascular structures. Advances in preoperative imaging have lead several authors to recently conclude that the value of intraoperative liver US is diminishing. Our aim was to determine if fewer unrecognized tumors were being detected and whether the role of intraoperative US had shifted primarily to establishing surgical resection margins.

Methods: We identified 100 consecutive patients who underwent laparotomy for a planned resection of primary liver malignancies or metastases since 2000. Dedicated intraoperative US of the liver was performed by a gastrointestinal radiologist using a 5.0 MHz linear- or curvilinear-array transducer during each procedure. To identify if the indications have changed, we compared the most recent 50 patients (Group A, 23 female and 27 male, age range 30-75, mean age 57) with the previous 50 patients (Group B, 25 female and 25 male, age range 23-77, mean age 57).

Results: The lesion distribution is shown below. The rate of detecting unrecognized tumors has not changed significantly (14 vs 20%). The resection rate was similar for both groups (70 vs 68%). The percentage of cases where the US findings were responsible for altering surgical management was 20% for both groups. The use of US to establish the relationship between tumor and the vasculature has not changed (54 vs 60%). The negative resection margin rate has increased but not significantly (86 vs 69%).

	Group A (n)	Group B (n)
colon mets	19	21
hepatocellular	10	13
other	21	16

Conclusions: Despite the advances in cross-sectional imaging, the frequency of unrecognized tumors found during intraoperative liver US and its use for surgical guidance has not changed over the last five years. Intraoperative US remains an important tool in the management of patients undergoing attempted liver resection for primary malignancies or metastases.

Hepatobiliary/Pancreatic Surgery-P341

A GROWING EXPERIENCE IN PRIMARY RECONSTRUCTION OF IATROGENIC COMMON BILE DUCT INJURIES, M EL-TAIR MS, I MAZLOUM MPH, Y GAWISH MD, Department Of Surgery , Alexandria University , Sultan Hussein Street , Egypt



POSTER ABSTRACTS

Background: It has long been considered that iatrogenic injuries can best be repaired with biliary enteric anastomosis between a Roux loop of jejunum and the proximally dissected segment of the extra hepatic biliary tree. The traditional teaching includes a mucosa to mucosa tension free anastomosis with or without stenting between the biliary segment and the defunctionalized jejunal loop, to avoid ascending reflux cholangitis. The idea of using the proximal and the distal biliary tree is tempting because of the use of the mechanism of the sphincter located down around the insertion of the CBD to avoid reflux cholangitis and to regulate the entry of bile into the duodenum together with pancreatic secretions to effect the best mix between digestive enzymes and food.

Methods: seven cases presented with iatrogenic bile duct injury to the General Surgery Department, Alexandria University, Egypt, within the last year (August 2004 to July 2005) primary reconstructed using a T-tube inserted in the CBD distal to the site of injury.

Results: five females and two males with an age range between 28 and 65 years underwent exploration and primary bile duct reconstruction, followed up for nearly a year. There was no leakage, one developed mild stricture and one died of massive postoperative pulmonary embolism.

Conclusion: Direct anastomosis is almost always feasible with no tension on suture line if adequate mobilization of the distal segment was done with adequate Khorization of the duodenum.

Hepatobiliary/Pancreatic Surgery-P342

A RANDOMIZED CONTROLLED TRIAL COMPARING ROUTINE ANTIBIOTIC PROPHYLAXIS (CEFAZOLIN) WITH PLACEBO IN ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY, Alex A

Erasmio MD, Anna Marie F Villora MD, Maita P Rigor MD, 1Section of Hepatobiliary Surgery, Department of Surgery, Jose Reyes Memorial Medical Center 2Research Center for the Health Sciences, University of Santo Tomas

Objective of the Study: This study aims to determine if antibiotic prophylaxis is necessary in preventing superficial incisional surgical site infection (SSSI) among adult patients undergoing elective laparoscopic cholecystectomy at the Jose R. Reyes Memorial Medical Center, Manila, Philippines.

Methods and Procedures: A double-blind prospective, placebo-controlled randomized trial (RCT) was performed on patients randomly assigned in either of these two groups- the cefazolin group (C) (n=15) that received 1g of Cefazolin or the placebo group (P) (n=15) that received sterile normal saline solution. The antibiotic or the placebo was given within two hours prior to skin incision.

Results: One (7%) of the 15 placebo patients developed SISSI while none developed SISSI in the cefazolin group. The profiles between the two groups- mean age (P=43.7, C=42.7); male/ female ratio, (P=36.36%, C=25%); and the smoker/non-smoker ratio (P=25%, C=25%) were comparable. Our data revealed that the relative risk reduction was 0.619 (p=0.922; 95% CI, -7.621-0.983), the absolute risk reduction was 0.058 (p=0.922; 95% CI, -0.115-0.231), and the number needed to treat was 17.231 (p=0.922; 95% CI, 4-9).

Conclusion: This study shows that antibiotic prophylaxis in patients undergoing elective laparoscopic cholecystectomy offers no advantage to placebo in reducing the risks of developing SISSI. However, this preliminary result is based on a small number of patients and, thus, is still inconclusive.

Hepatobiliary/Pancreatic Surgery-P343

THE EXPERIENCE OF LAPAROSCOPIC ENUCLEATION FOR PANCREATIC INSULINOMA, Shoji Fukuyama MD, Shinichi Egawa MD, Makoto Sunamura MD, Michiaki Unno MD, TOHOKU UNIVERSITY GRADUATE SCHOOL OF MEDICINE, THE DEPARTMENT OF GASTROINTESTINAL SURGERY

Introduction: Insulinoma is the most common functional endocrine tumor of the pancreas. In most cases the lesions are benign, solitary, and located within the pancreatic parenchyma. Because of these characteristics, the majority of these lesions can be treated with simple enucleation. Advances in laparoscopic techniques have recently enabled the safe resection of pancreatic islet cell tumors and may provide patients

with the benefits of minimally invasive surgery.

Objective: We reviewed our experience of laparoscopic enucleation of insulinoma to establish the feasibility of this approach and the characteristics of the operating procedure.

Methods and Procedures: Six patients with a mean age of 53 years were deemed for laparoscopic enucleation.

Results: Operative mortality was nil. Two cases required conversion to open surgery for technical difficulty. Postoperative course was uneventful in three cases. One patient experienced postoperative complication: reoperation for bleeding from a removal site of the catheter into portal vein. The average operation time was 360 minutes. Length of stay ranged from 19 to 39 days.

Conclusion: These preliminary results confirm that in selected cases laparoscopic enucleation of insulinoma is feasible and safe.

Hepatobiliary/Pancreatic Surgery-P344

LAPAROSCOPIC DISTAL PANCREATECTOMY, Kazunori Furuta PhD, Kouichi Itabashi PhD, Hiroyuki Katagiri PhD, Muneki Yoshida PhD, Masahiko Watanabe PhD, Department of Surgery, Kitasato University

A minimally invasive approach to pancreatic disease is increasingly performed although its ultimate benefit is yet to be confirmed. Laparoscopic distal pancreatectomy is not a common procedure.

Although technically demanding, laparoscopic distal pancreatectomy with splenectomy is gradually gaining acceptance as an alternative to open resection in selected patients. The aim of this study is to report our initial single-institution experience with laparoscopic distal pancreatectomy in 6 patients.

METHODS: From 2004.7-2005.7, we performed distal pancreatectomies, of which 6 were managed by laparoscopic approach. These 6 patients were included in the study with varying pre-operative diagnosis such as, pancreatic cyst, insulinoma, cystadenoma, islet cell tumor.

The median age was 55.8 years old (39-70years old) with a female to male ratio of 2:4. In addition to 2 to 3 ports, a hand port was placed in the midline to aid in dissection and the distal pancreatectomy and splenectomy was performed extracorporeally through midline laparotomy.

RESULTS: One patient was distal pancreatectomy with the preservation of spleen. Of the remaining 5 patients, one were converted to open procedure due to bleeding from spleen and severe adhesion. The median operating time was 217.5 minutes (150-280) with a tumor size of 2.7cm (1-5cm). The median time to resuming regular diet and converting to oral pain medications was 2 days and 2.5 days respectively. The length of stay was 10.3days(8-13 days)

Of the 5 patients that successfully underwent the procedure laparoscopically without morbidity. There were no mortalities. With a median follow up to 6.5 months (2-14), 1 Of 6 patients with diagnosis of malignancy have no evidence of recurrent disease.

CONCLUSION: 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.

Hepatobiliary/Pancreatic Surgery-P345

LAPAROSCOPY-ASSISTED AND TOTAL LAPAROSCOPIC METHODS IN ANATOMICAL LIVER RESECTION, Ho-Seong Han MD, Yoo-Seok Yoon MD, Yoo-shin Choi MD, Seoul National University College of Medicine

Objectives: Anatomical liver resection can be performed by using the laparoscopy-assisted or the total laparoscopic methods. We describe our experiences of laparoscopic hepatic resection using these two procedures and methods.

Method: We retrospectively reviewed the results of 10 cases of laparoscopy-assisted (Lap-Assist) and 25 cases of total laparoscopic (Total-Lap) anatomical liver resection registered between April 2001 and June 2004.

Results: Indications for laparoscopic anatomical liver resection included 25 cases of IHD stones, 7 cases of HCC (cholangiocarcinoma were confirmed postoperatively in 2 cases) and 3 cases of benign tumors. In Lap-Assist group, there were 7



cases of left lateral sectionectomy, and one case each of left hemihepatectomy, right hemihepatectomy, and open conversion. In Total-Lap group, there were 11 cases of left hemihepatectomy, 12 cases of left lateral sectionectomy, one case of right posterior sectionectomy, and one case of S5,6 bisegmentectomy. The respective sizes of the incisions were 8.7cm and 4.6cm ($p < 0.001$) for these two procedures. No differences between two groups (Lap-Assist vs. Total-Lap) were observed in operation time (351.0 vs. 411.8 minutes), transfusion amount (1.8 vs. 1.6 units), starting day of diet (3.7 vs. 3.8 days), complication rates (30% vs. 8%) or the duration of hospital stay (8.7 vs. 12.2 days). Postoperative mortality occurred in one patient of Total-Lap group due to sepsis. However, the remaining postoperative complications (2 atelectasis, 1 minimal bile leakage, 1 infarction of one segment) responded to the conservative management.

Conclusions: Both the laparoscopy-assisted method and the total laparoscopic method are feasible for anatomical liver resection.

Hepatobiliary/Pancreatic Surgery-P346 LAPAROSCOPIC TREATMENT OF INTRAHEPATIC DUCT STONE IN THE ERA OF LAPAROSCOPY, Ho-Seong Han MD, Yoo-Seok Yoon MD, Yoo-shin Choi MD, Seoul National University College of Medicine

Introduction: Until now, laparoscopic surgery for intrahepatic duct (IHD) stone has been rarely reported. The aim of this study is to analyze our experiences of laparoscopic surgery for IHD stone and evaluate its role in the management of IHD stone.

Methods: From October 1998 to December 2004, 47 cases of laparoscopic surgery for IHD stone (22 laparoscopic IHD exploration (LIHDE), 25 laparoscopic hepatectomy(LH): 9 left hepatectomy, 16 left lateral segmentectomy) were performed. The choice between LIHDE and LH was based on the presence and severity of IHD stricture determined by preoperative cholangiography and intraoperative choledochoscopy; LIHDE was performed in case of no or mild stricture (> 5 mm), and LH in case of moderate (2-5mm) or severe stricture (< 2 mm). We retrospectively analyzed the clinical outcomes of these 47 patients.

Results: The mean operation time (LIHDE vs. LH) was 281.4 and 414.4 minutes, and the open conversion rate was 18.2% (4 cases) and 4.0% (1 case), respectively. The mean postoperative hospital stay was 14.9 and 13.0 days. Postoperative complications occurred in 2 cases (9.1%) of LIHDE group and 3 (12.0%) of LH group, all of which responded to the conservative medical management. There was one case of postoperative mortality in LH group due to sepsis. Remnant stone was identified by postoperative T-tube cholangiography in 4 cases (18.2%) of LIHDE group and 3 (12.0%) of LH group. Of these, 3 cases were not managed due to asymptomatic small stones and the remaining 4 underwent choledochoscopic removal. Recurrent stones were detected in CBD by follow-up ultrasonogram in 1 case (4.5%) of LIHDE group and 3 (12.0%) of LH group, all of which were treated with endoscopic sphincterotomy and lithotripsy.

Conclusions: This study suggests that laparoscopic surgery could be a safe and effective option in the management of IHD stones.

Hepatobiliary/Pancreatic Surgery-P347 RESULTS OF LAPAROSCOPIC ASSISTED HEPATECTOMY FOR METASTATIC LIVER TUMORS, Hitoshi Inagaki MD, Tsuyoshi Kurokawa MD, Tadashi Yokoyama MD, Manabu Kikuchi MD, Yasuhisa Yokoyama MD, Toshiaki Nonami MD, Department of Surgery, Yokoyama Hospital for Gastroenterological Diseases, Nagoya, Japan.

Introduction: Although an increasing number of reports and publications concerned laparoscopic liver surgery, this procedure remains uncommon and its feasibility, safety and effectiveness are not yet established.

Methods: To investigate significance of laparoscopic hepatectomy for metastatic liver tumors in the short term outcomes, 8 patients with metastatic liver tumors (LH group) among 60 patients who underwent laparoscopic hepatectomy were compared with 10 patients who underwent conventional open

hepatectomy (OH group) during the same period. The medical records were retrospectively reviewed. In LH group, the primary diseases were colorectal cancer (7 patients) and cancer of the parotid gland (1 patient).

Results: For five patients in LH group, we used the hand-assisted laparoscopic surgery. No differences in operative time, preoperative mortality and incidence of postoperative complications were found between the two groups. Postoperative hospital stay in LH group was shorter than in OH group. With prognosis, no difference was found in survival rate between the two groups. No port site recurrence was found after laparoscopic hepatectomy.

Conclusions: Laparoscopic approach for metastatic liver tumors is feasible, although its safety in strictly selected patients is dependent on surgeon experience and technology availability.

Hepatobiliary/Pancreatic Surgery-P348 MINI-LAPAROSCOPIC CHOLECYSTECTOMY IN THE ELDERLY, Pratibha B Lal MD, Jay C Long MD, Sheilendra S Mehta MD, Garth Davis MD, Robert Davis MD, Patrick R Reardon MD, The Methodist Hospital

Introduction: At The Methodist Hospital, mini-laparoscopic cholecystectomy (mini-LC) has been performed on all age groups since 1996. Documented benefits of mini-LC include improved immediate postoperative pain control and cosmesis. To date, there is minimal data on the use and outcomes of mini-LC in the elderly, defined as age greater than 65 years. The purpose of this investigation is to compare outcomes of mini-LC in patients less than 65 (group one) and greater than or equal to 65 years (group two).

Methods: As previously reported, a prospective database of mini-LC cases has been maintained since 1996. The database contains demographic, clinical, and treatment parameters. The database was queried to study the two age groups. Patient and disease characteristics that were compared include: age, BMI, operative time, and postoperative length of stay(poLOS).

Results: A total of 740 mini-LC cases were performed from 1996 to 2005. 550 cases were less than 65 years and 190 cases were greater than 65 years. Group one characteristics include: mean age 46 years, BMI 28.9, OR time 1:07 hours, and poLOS 0.75 days. Group two characteristics include: mean age 73.5 years, BMI 27.9, OR time 1:15 hours, and poLOS 1.54 days. In both groups, there were no conversions to open cholecystectomy and there were no mortalities. Group one complications include: retained CBD stone(2), trocar site hematoma, myocardial infarction, bleeding from liver bed(2), and umbilical wound hematoma(2). Group two complications include: duct of luschka leak, retained stone(2), infected abdominal wall hematoma, cardiac arrhythmia(2), pulmonary embolus, and mesenteric injury.

Conclusion: This study confirms that mini-LC can be performed safely in the elderly population with results comparable to younger patients. The elderly group had a slightly higher postoperative length of stay.

Hepatobiliary/Pancreatic Surgery-P349 SIX-YEAR EXPERIENCE WITH LAPAROSCOPIC CHOLECYSTECTOMY PERFORMED BY ULTRASONIC DISSECTION, Marco Maria Lirici MD, Cristiano Hüscher MD, Massimiliano Di Paola MD, Cecilia Ponzano MD, Giovanna Sgarzini MD, Maria Giovanna Fava MD, Flora Salerno MD, Department of Surgery, BMM Hospital, Reggio Calabria

Preliminary results of lapchole (LC) totally performed by means of ultrasonically activated device were first reported by the Authors in 1999. From 1999 to 2005 a prospective nonrandomized trial was carried on in 2 centers to assess the benefits of US dissection in LC. Primary endpoint was to evaluate the possible reduction of BD thermal injury risk. Secondary endpoint was to evaluate whether US dissection may affect (improve) the surgical technique.

Overall 1075 LC were performed by US dissection. Pts. were divided in 2 groups: LC totally performed by US with no need of cystic duct (CD) ligation 744 (69.2%), and LC with US dissection where CD was further secured by absorbable loop or clip 331 (30.8%). Each arm was divided in 2 subgroups: expert and



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surgeon-in-training. Morbidity, mortality, operating time, conversion rate, length of p.o. stay were analyzed using Statistica for Windows 5.0 software (Statsoft)- Student's t-test, chi-square, Yates corrected chi-square and Fisher's exact tests were used for data analysis; p value = 0.05 was considered significant.

US lapcholes with CD further secured by loop or clip were mainly performed in severe acute cholecystitis or when CD was >3 mm. In those cases an upside-down procedure was mostly performed. In all cases the US device was the only working instrument beside the grasper.

Complications were divided into major (MC) and minor (mC) according to the Clavien classification. MC (grade 2-4) were 4.0% and mC (grade 1) were 7.2%. Overall mortality rate was 0.46%: mortality in emergent ASA IV pts. was .28% while that in elective pts. was .18%. No death was related to BDI. BDI rate was 0.37%, bile leaks were 1.30% (conservative management .65%, surgical management .65%). No statistically significant difference was found between the 2 groups. MC, BDI and bile leaks were significantly different in the expert and surgeon-in-training subgroups (p respectively = .026, .03, .049).

Compared to BDI and BDI related mortality in major cumulative series published in the literature, BDI rate in our series was pretty low and BDI related mortality was nil. Furthermore in those difficult cases with unclear anatomy US dissection allows to perform an upside-down procedure with an almost bloodless field. Overall ergonomics of surgery is improved. Nevertheless, a learning curve in the use of US shears is required to reduce the risk of thermal damage to the bowel in case of visceral adhesions.

Hepatobiliary/Pancreatic Surgery-P350

LAPAROSCOPIC TREATMENT OF LIVER CYSTS: A META-ANALYSIS REVIEW, Jonathan C Liu MD, Jack Needham MD, Adam Kopelan MD, Newark Beth Israel Medical Center and Monmouth Medical Center

Introduction: Is laparoscopic treatment a viable alternative to open fenestration? Simple liver cysts have been shown to occur in roughly 5% of the population and symptomatic in a fraction of those. Current therapy options include percutaneous drainage with or without sclerotherapy, laparotomy with deroofing, laparoscopic deroofing, and partial liver resection. Open surgical fenestration of giant symptomatic liver cysts has been the preferred to percutaneous drainage because of lower recurrence rates. Since the advent of laparoscopic intervention, multiple series have been performed attempting laparoscopic deroofing of liver cysts as an alternative to the open procedure with varied results.

Methods: A systematic search of published case series was performed for laparoscopic intervention of symptomatic giant liver cysts. Over one dozen such case series were discovered. A metaanalysis was performed to analyze recurrence rates compared to open deroofing and percutaneous drainage. Perioperative morbidity and mortality as well as postoperative hospital stay were also reviewed.

Results: Metaanalysis of the multiple series of cases reveal that recurrence rates of simple hepatic cysts treated via laparoscopic route is at least comparable to that of the open procedure and in many series was shown to be significantly lower. Recurrence rates following laparoscopic intervention ranged from 0% in several series to as high as 23% in one study. Laparoscopic unroofing had a lower recurrence rate than that of percutaneous drainage.

Discussion: Surgical intervention of simple liver cysts should be undertaken only if symptomatic. Laparoscopic unroofing of symptomatic giant liver cysts is the safer alternative to open procedures and should be the preferred method once hydatid disease is ruled out. It has been shown to have lower morbidity with decreased hospital stay postoperatively as well as a low recurrence rate.

Hepatobiliary/Pancreatic Surgery-P351

LAPAROSCOPIC CHOLECYSTECTOMY IN DIFFICULT SITUATIONS, Shiva K Misra MD, A P Misra MD, Mariampur Hospital, Kanpur, India

Introduction: Laparoscopic Cholecystectomy (LC) is the gold standard for uncomplicated gallstones. Increasing experience

and improved instrumentation has left hardly any contra-indication to LC or necessity to convert to open cholecystectomy. I present my experience of 3528 cases of LC since June 1995 at a missionary hospital with respect to conversion to open procedure.

Methods: Patients who underwent LC from June 1995 to June 2005 were analyzed. The cases were analyzed in relation to conversion rate to open surgery, factors leading to conversion, and completion rate of LC. Patients having absolute contraindication to LC like Carcinoma gall bladder, severe Acute Pancreatitis, advance cirrhosis liver with bleeding disorders and advance cardio-respiratory diseases were not included in the study.

Results: out of 3528 cases, 1278 (27.6%) were identified as difficult cases. LC was successfully completed in 3493 patients (99.1%). Laparoscopic procedure had to be converted to the open procedure in 35 patients with the conversion rate of 0.99% of total LCs and 2.74% of difficult cases. Conversion had to be done for various reasons.

Conclusion: LC is the preferred method even in the difficult cases. Although rate of conversion to open surgery and complication rate are low in hands of experienced surgeon, conversion is the patient's safety exit.

Hepatobiliary/Pancreatic Surgery-P352

CRITICAL VIEW IN LAPAROSCOPIC CHOLECYSTECTOMY, Prasanta K Raj MD, Subhasis Misra MD, Richard C Treat MD, Department of Surgery, Fairview Hospital, Cleveland Clinic Health System

Objective: Unexpected injuries to the common bile duct have been one of the major complications of laparoscopic cholecystectomy. As the operation is performed in two-dimensional views, the picture seen in the monitor may not actually reflect the true anatomy. Analyzing the picture through a critical view is necessary to prevent serious complications.

Methods and Procedures: We present a case where even though the illustrated picture appears to be anatomically normal, in reality, the perceived cystic duct is actually the common bile duct. Continuing dissection may lead to inadvertent common bile duct (CBD) injury. By modifying the dissection to a fundus-down technique, a potential CBD injury was prevented. After the gall bladder was dissected using the fundus-down approach, the anatomy of the CBD that was initially presumed to be the cystic duct, became more apparent. Especially in Mirizzi's syndrome, there is more chance of injury to the CBD as the cystic duct is fused with the CBD making visualized anatomy deceiving in nature. We recommend using the fundus-down technique, if the critical view of the surgical anatomy perceives any slight deviation from the normal anatomy.

Conclusions: We recommend taking a critical view of the anatomy if the structures are not clearly defined, and being flexible enough to use the fundus-down method and also to have a low threshold to perform open cholecystectomy if necessary. We also suggest analyzing the anatomy with a critical view to decide which laparoscopic technique may be better suited to that particular case.

Hepatobiliary/Pancreatic Surgery-P353

LAPAROSCOPIC CHOLECYSTECTOMY FOR HONEYCOMB GALLBLADDER, Prasanta K. Raj, M.D., Subhasis Misra, M.D., Julie P. Adams, D.O., Richard C. Treat, M.D., Department of Surgery, Fairview Hospital, Cleveland Clinic Health System

Objective: Multiseptate gallbladder, a rare congenital anomaly, is characterized by the presence of multiple thin septa dividing the gallbladder lumen into various sized chambers, often with a honeycomb appearance. We present the first such cholecystectomy in the United States performed by the laparoscopic technique.

Methods and Procedures: A 28-year-old female who presented with right upper quadrant pain and discomfort underwent an ultrasound and CT scan, which showed gallbladder with multiple septa giving a honeycomb appearance. A review of the literature shows that only eight such cases have been reported so far. To our knowledge, the only other laparoscopic cholecystectomy for honeycomb gallbladder was performed in



Japan and hence this is the first reported case from the United States. Our patient underwent a successful laparoscopic cholecystectomy with a normal intraoperative cholangiogram. No other associated congenital anomalies were noted. Patient had an uneventful recovery.

Conclusions: We report the first laparoscopic cholecystectomy for honeycomb gallbladder in the United States. Being an extremely rare entity we recommend intraoperative cholangiogram and thorough evaluation for other possible congenital anomalies.

Hepatobiliary/Pancreatic Surgery-P354

ASSURING COMPLETE LAPAROSCOPIC CLEARANCE OF THE BILE DUCT, INFLUENCE OF CHOLEDOCHOSCOPY AND LAPAROSCOPIC ULTRASOUND, H Noble BS, A D Hollowood PhD, S A Norton MD, M H Thompson MD, Southmead Hospital, Bristol. UK

Aim: To evaluate and compare the use of choledochoscopy (Sc), cholangiography (OC), and laparoscopic ultrasound (LUS) in ensuring bile duct clearance following laparoscopic exploration.

Methods: Details of 408 laparoscopic bile duct explorations between April 1994 and January 2005 were collected prospectively. 36 conversions and 6 failures were excluded. A missed stone was defined as one presenting within a year of surgery. Follow up was by postal questionnaire or via the family doctor if there was no response.

Results: To date 313/366 patients have completed 1 year follow up. There were 99 transcystic (TC) and 267 transductal (TD) explorations. There were 2 postoperative and 7 unrelated deaths during the first year. 98.4% of patients more than 1 year from their operation have been followed up and 5 (1.6%) have been lost. Duct clearance at operation was confirmed with Sc in all cases. In addition, OC and LUS were also used (see table). In 6 patients LUS revealed stones missed by Sc. Missed stones presenting within 1 year of surgery are shown below:

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* 11 patients had SC, OC and LUS and are included in this group

Conclusion: Imaging of the bile duct following choledochoscopy with LUS is beneficial but further cholangiography is not.

Hepatobiliary/Pancreatic Surgery-P355

HYPERAMYLASEMIA AND PANCREATITIS ASSOCIATED WITH LAPAROSCOPIC BILIARY SURGERY (LBS)., Sajid Mahmud MD, B Darmas MD, M Jameel, S Paravasta, A Nassar MD, monklands General Hospital, Airdrie, Scotland

Background: Postoperative pancreatitis is one of the serious complication of ERCP and upper abdominal surgery. 3 to 7% mortality rate has been reported in the literature in association with postoperative pancreatitis. Our aim was to evaluate the association and outcome of hyperamylasemia following LBS. Method: A prospectively collected computerised data was analysed on the patients undergoing LBS in a unit providing laparoscopic single-stage biliary surgery.

Results: 171 patients underwent LBS under the care of a single surgeon (AMHN) over the period of one year. 150 had early and delayed postoperative serum amylase levels checked. 118 female and 32 male, with the mean age of 53 years (range 20-86). 43(29%) were emergency admissions and 107(71%) elective procedures. Preoperative diagnosis was chronic calculous cholecystitis with or without acute biliary colic in 103 (69%), resolved pancreatitis 6 (4%), pancreatitis plus jaundice 4 (2.5%), Jaundice with suspected common bile duct (CBD) stones 10 (6.6%), acute cholecystitis 14 (9%), gallbladder polyps 3 (2%) and biliary dyskinesia 9 (6%). The patients were divided into three groups on the basis of procedure. Group A [n= 18 (12%)] had laparoscopic cholecystectomy (LC) only, Group B [n= 91 (61%)] had LC plus intraoperative cholangiogram (IOC) and Group C [n=40(27%)] had LC+IOC and laparoscopic common bile duct exploration (LCBDE). Following table shows the number of patients who had hyperamylasemia and developed pancreatitis.

Group A [n=18] Group B [n=91] Group C [n=40]

LC LC+ IOC LC+IOC+LCBDE
Hyperamylasemia 2(11%) 3(3.2%) 7(17.5%)
Pancreatitis None None 3(7.5%)

*12(8%) patients in a series of 150 cases had hyperamylasemia (normal<125 iu/l) only 3(2%) developed pancreatitis which settled quickly and uneventfully. Only one case was converted to open due to the Mirizzi Syndrome.

Conclusion: Postoperative hyperamylasemia secondary to LC and IOC is not of any clinical significance. There is only 2% risk of postoperative pancreatitis in association with LCBDE. It is recommended to measure postoperative serum amylase in patients undergoing LCBDE for early diagnosis and management of postoperative pancreatitis.

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HARTMANN'S POUCH STONES ENCOUNTERED (HPS) DURING LAPAROSCOPIC CHOLECYSTECTOMY: THE PROBLEMS AND THE SOLUTIONS., S Mahmud, B Darmas, S Paravastu, C V Rao, A Nassar, Monklands Hospital, Airdrie, Lanarkshire, Scotland.

HPS are occasionally encountered during laparoscopic cholecystectomy (LC). Although they can be dealt with easily they may pose difficulties in safe dissection of the pedicle either due to their pathological sequelae e.g. Mirizzi's Syndrome, Mucocoele and empyema or distortion of the anatomy, which may increase the risk of bile duct injury.

Aims to study the difficulties and the techniques in dealing with Hartmann's Pouch Stones during laparoscopic cholecystectomy. A prospectively collected computerised database of preoperative, operative and postoperative data of patients found to have HPSs was analysed.

62 cases (7%) were documented in a series 862 LC performed over a period of seven years. Preoperative risk factors in 39 cases (63%) were: recent severe acute biliary pain with and without derangement of liver function test (LFTs) in (30%), jaundice (8%), and current or recent acute cholecystitis (20%). There were 23 men, more than double the incidence in the whole series. Mucocoeles were found in 22 patients, acute cholecystitis in 11 and empyema in 2. Using our Difficulty Grading Classification, the LC was Graded II in 12cases (21%), Grade III in 13 (23%) and Grade IV in 20 (38%). The main cause of difficulty in cases is distortion of the pedicle and hampered anatomy due to the distension of the gallbladder. HP was adherent to the duodenum in 5 cases and more importantly to the common bile duct or common hepatic duct in 15cases (27%). Gallbladder perforation occurred in 35% of cases.

Dilated cystic ducts were encountered in 7 cases, required closure with endoloop in 6 and suture closure in one. In more than half the cases the stones were not very large and could be dislodged into the gallbladder to facilitate pedicle dissection. Opening the gallbladder and removing the stone was necessary in 8 cases(14%). Fundus-first dissection was carried out in 11cases to avoid bile duct injury and conversion. Two of the four converted cases were found to have Mirizzi's Syndrome and one had dense adhesions between HP and the duodenum with suspension of bilioenteric fistula. IOC was attempted in all cases with success rate through the cystic duct was only 76%. CBD stones were found in 5 cases, these were dealt with, during the same session.

HPS increase the difficulty in performing LC. Careful dissection, removing the stones and fundus-first dissection are useful measures to avoid ductal injury and reduce the conversion rate.

Hepatobiliary/Pancreatic Surgery-P357

PRIMARY CLOSURE VERSUS T-TUBE DRAINAGE AFTER LAPAROSCOPIC COMMON BILE DUCT EXPLORATION, Hyeon Kook Lee MD, Jae Jeong Park MD, Seog Ki Min MD, Department of Surgery Ewha Women's University College of Medicine, Seoul, Korea

INTRODUCTION - Laparoscopic common bile duct exploration (LCBDE) has traditionally been accompanied by T-tube drainage. However, the patients have to carry it for several weeks and suffer from some problem related to a T-tube. So



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primary closure of CBD with or without endobiliary stent placement has been proposed as a safe and effective alternative to T-tube placement.

METHODS AND PROCEDURES - Between January 2000 and July 2005, 62 patients suffering from choledocholithiasis underwent LCBDE through a choledochotomy. Stone clearance was achieved in all patients using choledochoscope.

RESULTS - There were three open conversion (4.8%). Of the 59 successful LCBDE, 26 (44.1%) had primary closure of the CBD and 33 (55.9%) had closure with T-tube drainage. The mean postoperative hospital stay (9.6 vs. 16.6 days, $p < 0.001$) was shorter in the primary closure group when compared with the T-tube group. The mean operation time (182 vs. 201 minutes, $p = 0.283$) and the incidence of postoperative complications (3/26 vs. 7/33, $p = 0.294$) between the two groups had no significant difference. The postoperative biliary complications were 2 (7.7%) in primary closure group and 2 (6.1%) in T-tube drainage group. There was no mortality in two groups.

CONCLUSIONS - Primary closure of the CBD after LCBDE avoids the problems of a T-tube, leading to a shorter postoperative hospital stay. This method is a feasible and safe alternative method after LCBDE.

Hepatobiliary/Pancreatic Surgery-P358

ANALYSIS OF THE OUTCOME OF LAPAROSCOPIC CHOLECYSTECTOMY FOR COMPLICATED ACUTE CHOLECYSTITIS,

Hyeon Kook Lee MD, Jae Jeong Park MD, Seog Ki Min MD, An Bok Lee MD, Department of Surgery Ewha Women's University College of Medicine, Seoul, Korea

INTRODUCTION - Gangrenous cholecystitis, empyema and pericholecystic abscess are life threatening complications of acute cholecystitis. These complicated acute cholecystitis was associated with increased morbidity and mortality. This study was aimed to investigate risk factors associated with complicated acute cholecystitis and to evaluate its outcome of Laparoscopic cholecystectomy.

METHODS AND PROCEDURES - 493 patients underwent laparoscopic cholecystectomy for acute cholecystitis between March 1997 and October 2004. The risk factors associated with the development of complicated acute cholecystitis was analyzed. Outcome of laparoscopic cholecystectomy was compared between complicated and uncomplicated acute cholecystitis.

RESULTS - There were 358 (72.6%) of uncomplicated acute cholecystitis and 135 (27.4%) of complicated acute cholecystitis. On multivariate analysis, male gender (odds ratio; 1.818 $p = 0.005$) and old age (> 60 , odds ratio; 2.28 $p < 0.001$) were predictive risk factors for complicated acute cholecystitis. The mean operation time (100 vs. 118 minutes, $p < 0.001$) and postoperative hospital stay (5.9 vs. 7.7 days, $p < 0.001$) were shorter in the uncomplicated acute cholecystitis group compared to the complicated acute cholecystitis group. There were no significant differences in open conversion rates (6.7% vs. 3.7% $p = 0.28$) and postoperative complications (7.5% vs. 10.4% $p = 0.31$) between two groups.

CONCLUSIONS - Male gender and old age (> 60) are risk factors associated with complicated acute cholecystitis. The outcome of laparoscopic cholecystectomy of complicated acute cholecystitis was not significantly different from that of uncomplicated acute cholecystitis in terms of safety and feasibility.

Hepatobiliary/Pancreatic Surgery-P359

HAND-ASSISTED LAPAROSCOPIC MANAGEMENT OF LIVER

TUMORS, George Poultsides MD, Rocco Orlando III MD, Department of Surgery, Connecticut Surgical Group, Hartford Hospital and University of Connecticut School of Medicine, Hartford, CT

INTRODUCTION: The hand-assisted laparoscopic technique can be a safe and successful addition to the management of liver tumors.

METHODS: Over a 7 year period (3/98-6/05), 27 patients with liver tumors underwent 30 hand-assisted laparoscopic operations at a tertiary care center. Charts were reviewed to define patient demographics, tumor characteristics, operative technique, resection margins, operative time, blood loss, complica-

tions, hospital stay, and survival outcomes.

RESULTS: Mean age was 64 years (range, 33-84). 19 patients had metastatic lesions (15 colorectal (CRC), 3 neuroendocrine and 1 squamous anal carcinoma), 3 had hepatocellular carcinoma (HCC), and 5 had symptomatic benign lesions (2 hemangiomas, 1 adenoma, 1 cyst, and 1 intrahepatic biliary stricture secondary to lithiasis). A total of 43 lesions were treated with an average size of 4.1 cm (range, 2-11). 29 lesions were cryoablated (max size 5 cm) and 14 were resected. There were 4 left lateral segmentectomies; the remaining resections involved segments VI and/or VII. All margins were negative. The hand port was applied through a right subcostal or paramedian incision. Mean operative time was 2.75 hrs (range, 1.75-6). Mean blood loss was 230 ml (range, < 50 -2200). The excessive blood loss in a single case resulted from an umbilical vein trocar injury in a cirrhotic patient. Two diaphragmatic injuries occurred during ablation of segment VIII lesions. The pneumothorax was evacuated with a suction catheter before laparoscopic repair. Two cases were converted to open secondary to adhesions. There were no bile leaks, CO2 embolism, or deaths. Mean hospital stay was 3.7 days (range, 1-6). At mean follow-up of 28 months for the 15 CRC patients, 3 (20%) are alive without disease, and 7 (46%) are alive with disease. Three patients with recurrent metastatic disease had additional ablations after an average interval of 11 months. All 3 HCC patients are alive without disease at mean follow-up of 36 months.

CONCLUSIONS: In selected patients, the hand-assisted technique can facilitate minimally invasive liver resection or ablation with survival outcomes comparable to the open technique. The assisting hand can provide tactile feedback, atraumatic and versatile retraction, finger-fracture parenchyma dissection, and more precise placement of probes and staplers. In addition, hand assistance allows hilar inflow occlusion to reduce blood loss during resection or heat-sink effect during ablation.

Hepatobiliary/Pancreatic Surgery-P360

POPULATION-BASED TRENDS IN THE RATE OF LAPAROSCOPIC CHOLECYSTECTOMY AND POST-OPERATIVE MORTALITY, B

Sharma BS, J Choi MD, S Lopushinsky MD, J Harnish BS, D R Urbach MD, Division of General Surgery, Toronto General Hospital

Objective: Laparoscopic cholecystectomy (LC) is the standard treatment for symptomatic gallstones. We sought to describe trends in the use of laparoscopic cholecystectomy (LC) in the province of Ontario. We were particularly interested in the use of LC in relation to the acuity of gallbladder disease, and in changes in the postoperative mortality rates of LC and open cholecystectomy (OC) over time.

Methods: We used population-based administrative health data from Ontario, Canada for the years 1990 to 2000. Odds ratios (OR) for death within 30-days of surgery, adjusted for age, gender, comorbidity, and acuity of admission, were estimated using multivariable logistic regression models.

Results: We analyzed 291,983 procedures. Although use of LC increased for elective, urgent and emergent cases throughout the study period, use of LC for elective cholecystectomy plateaued earlier than emergent and urgent cases. The proportion of elective cases done by LC was 92% in 1994 and 94% in 2000. In contrast, the proportion of emergent cases done by LC was 71% in 1994 and 85% in 2000. After adjustment for age, gender, comorbidity, and acuity, 30-day postoperative mortality was lower among patients who had LC as compared with OC (adjusted OR 0.30, 95% confidence interval [CI] 0.27 ? 0.34, $P < 0.001$). As compared with elective surgery, risk of 30-day postoperative mortality was greater for emergent (OR 2.64, 95% CI 2.33 ? 3.00, $P < 0.001$) and urgent (OR 2.28 95% CI 1.97 ? 2.63, $P < 0.001$) operations.

Conclusions: Use of LC for emergent cholecystectomy increased more slowly than for elective cholecystectomy. Higher 30-day postoperative mortality was independently associated with severe gallbladder disease and with open surgery.



Hepatobiliary/Pancreatic Surgery-P361

A STANDARD LAPAROSCOPIC LEFT LATERAL SEGMENTECTOMY OF THE LIVER, Mitsuo Shimada, MD, FACS, Masahiko Fujii, MD, Yuji Morine, MD, Satoru Imura, MD, Yuji Soejima, MD, Tetsuya Ikemoto, MD, Department of Digestive and Pediatric Surgery, The University of Tokushima Graduate School, Tokushima 770-8503, Japan

Introduction. Laparoscopic hepatectomy has been established as a feasible therapeutic option of hepatic tumors, including primary hepatic cancers [Shimada M, et al. Surg Endosc 2001]. A left lateral segmentectomy of the liver (LLSx) is the most suitable procedure for laparoscopic hepatectomy. To standardize a laparoscopic LLSx, we have achieved various kinds of refinements. Our recent refined techniques are herein introduced.

Techniques and Results. Preoperative surgical simulation using 3D-CT: surgical anatomy (hepatic artery, portal veins, and biliary trees) is easily understood, and more practical surgical simulation can be done. Intraoperative real-time 2D (or 3D)-US: this technique enables to better understand real-time special anatomy. Pringle's maneuver using endoscope: the hepatoduodenal ligament is easily and safely encircled using a cholangioscope to prepare the Pringle's maneuver. Tape hanging maneuver: a tape is passed under the lateral segment from the left side of hepatic vein to the umbilical portion, and is pulled up during the parenchymal division (hanging maneuver). Preceding small skin incision (5 cm in length): immediately before converting from CO2 pneumoperitoneum to wall lifting method, a small skin incision is made on the upper midline. Wall lifting method: that can prevent from gas (CO2) embolism from venous tributaries, furthermore, various types of surgical tools for open procedures can be used through the incision. Division of the liver new devices: an ultrasonic surgical aspirator and ultrasonic coagulation shears are used for parenchymal division, and an auto-suture device is routinely used for hepatic vein division. Those refinements brought better surgical results, including reduced operative time (371 min. vs. 272 min.), blood loss (1345 ml vs. 363 ml) and postoperative hospital stay (14.8 days vs. 8.4 days).

Conclusion. Our standardized technique of laparoscopic LLSx of the liver makes this type of systematic liver resection safer and faster.

Hepatobiliary/Pancreatic Surgery-P362

LAPAROSCOPIC CHOLECYSTECTOMY - IS THERE ANY CONTRAINDICATION? Kuldip Singh MS, Ashish Ohri MS, Manjinder Kaur, Dayanand Medical College and Hospital, India

Difficult Cholecystectomy likes acute cholecystitis, empyema gall bladder, Mirizzi syndrome, fistulas, cirrhotic and pancreatitis patients used to be contraindicated for laparoscopic approach in the beginning of the lap surgery. With the increasing experience of surgeons, these cases were taken up laparoscopically in the past decade but with increasing incidence of biliary complications and conversion rates. We have encountered 1415 cases of difficult gall bladder out of total of 6170 cases that underwent cholecystectomy since 1992 in a single center. The technical difficulties which were encountered: thick and fibrotic adhesions at the fundus, gall bladder not visible at the first instance due to bad adhesions, difficulty to hold the gall bladder, frozen up Callot's triangle, impacted stones in Hartman's pouch, fistulous track, Mirizzi syndrome, difficult gall bladder bed dissection and extraction. These all difficulties were managed by using all basic surgical techniques as we use in conventional surgery like blunt dissection using peanut gauze, water dissection, and using spatula and gauze piece for gall bladder bed dissection. We had only 1.7% conversion rate in Empyema gall bladder and Mirizzi syndrome with 3 bile duct injuries, which were managed during the same procedure. To conclude, we recommend all cases to be taken up for laparoscopic approach irrespective of their presentations and the results are comparable to conventional surgery.

Hepatobiliary/Pancreatic Surgery-P363

ANATOMICAL LANDMARKS FOR SAFE LAPAROSCOPIC CHOLECYSTECTOMY, Kuldip Singh MS, Ashish Ohri MS, Manjinder Kaur, Dayanand Medical College and Hospital

laparoscopic cholecystectomy (lc) in uncomplicated cases has now become the gold standard method but surgeons still face a formidable challenge in tackling difficult conditions like acute cholecystitis, empyema, gangrenous gall bladder, with cirrhosis and pancreatitis. Since 1992 we have encountered 1750 difficult cholecystectomies out of total of 6210 cases in single centre by a single surgeon. We have learnt through our long experience to adhere to the basic principles of surgery and identified various anatomical landmarks which facilitates a safe dissection in difficult situations, thus minimizing any major vascular or biliary injuries. Identifying the anatomical landmarks of such as: - identification of the gall bladder staying close to the liver margin in cases of hidden gall bladder with adhesions, defining gall bladder neck, gall bladder / cystic duct junction, demonstration of Calot's triangle and cholecystectomy triangle by proper retraction to infundibulum / Hartmann's pouch, cystic lymph node as a guide to cystic artery, keeping the dissection anterior to Rouviere's sulcus in which the portal vessels and right hepatic duct runs, identifying and lifting the gall bladder neck and Hartmann's pouch from liver bed and keeping a watch on the CBD going to the duodenum with the dissector by retracting the duodenum from time to time have enabled us to complete the last 4000 cases of cholecystectomy without a major biliary / vascular injury. In conclusion we can say that if these landmarks are followed during dissection, one can achieve results comparable to conventional cholecystectomy or even better.

Hepatobiliary/Pancreatic Surgery-P364

LONG-TERM RESULTS OF LAPAROSCOPIC UNROOFING OF SYMPTOMATIC NONPARASITIC HEPATIC CYSTS, Nobumi Tagaya MD, Junji Kita MD, Masato Kato MD, Keiichi Kubota MD, Second Department of Surgery, Dokkyo University School of Medicine

The long-term results of laparoscopic unroofing for symptomatic nonparasitic hepatic cysts have not been well-demonstrated. During the last 12 years, nine patients with symptomatic nonparasitic hepatic cysts underwent laparoscopic unroofing. Their symptoms were right upper quadrant pain in six patients, and epigastric pain in three. In addition, acute cholecystitis and adenomyomatosis of the gallbladder were diagnosed in one patient each. Perioperative results including operation time, estimated blood loss, complications, hospital stay and mortality rate were evaluated. There was one conversion to open laparotomy. Cysts were located in segments 4 & 5 in three patients, segment 8 in two, segment 7, segment 6 & 7, segment 3 in one and multiple segments in another, and the mean size of the cysts was 12 cm in diameter (range: 7-18 cm). In five cases cholecystectomy was performed simultaneously. Mean operation time, estimated blood loss and postoperative hospital stay were 153 min (range: 72-270), 125 ml (range: minimal-800 ml), and 10.5 days (range: 7-16 days), respectively. There were no mortality or major morbidity. During a mean follow-up period of 70 months (range: 3-141 months), one patient had a recurrent lesion requiring a re-operation. Laparoscopic unroofing is a feasible and safe procedure for the patients with symptomatic nonparasitic hepatic cysts. Strict patient selection, accurate location of the cyst within the liver and a sufficiently wide unroofing technique are needed to obtain a successful outcome.

Hepatobiliary/Pancreatic Surgery-P365

EXPERIENCE WITH NEEDLESCOPIC CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS, Nobumi Tagaya MD, Kyu Rokkaku MD, Keiichi Kubota MD, Second Department of Surgery, Dokkyo University School of Medicine

Needlescopic procedure has become widely accepted in the field of laparoscopic surgery, especially cholecystectomy. However, needlescopic procedure for acute cholecystitis is still challenging and has a high conversion rate compared to conventional procedure. We report our experience of needlescopic cholecystectomy for acute cholecystitis. Recent five years, ten



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needlescopic cholecystectomies were performed in eight males and two females. Their ages ranged from 39 to 78 years with a mean of 59 years. Preoperative associated diseases were diabetes mellitus, hypertension and angina in three patients, hemodialysis for chronic renal failure in two, and gastric ulcer and silicosis in one, respectively. Percutaneous gallbladder drainage was preoperatively performed in two patients. The duration from onset to operation ranged from 6 to 46 days (mean: 24 days). Four ports (12-3-3-3 mm) were inserted at the right upper quadrant. There were no conversions to open surgery. A 3-mm port at the epigastrium was converted to 5-mm port in one patient. Intraoperative cholangiography was performed in all patients. The operation time ranged from 90 to 237 min (mean: 154 min). Intraoperative complications were spillage of bile juice in 5 cases, the injury of cystic artery and spasm of coronary artery in one, respectively. Postoperative complication was intra-abdominal abscess requiring percutaneous drainage in one patient. The mean postoperative hospital stay was 10 days (range: 3-30 days). Needlescopic cholecystectomy for acute cholecystitis is feasible with the strict evaluation of the patients and the adequate control of associated diseases preoperatively.

Hepatobiliary/Pancreatic Surgery-P366

LAPAROSCOPIC BILE DUCT EXPLORATION. RESULTS OF 160 CONSECUTIVE CASES WITH 2 YEAR FOLLOW-UP.

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Introduction: Despite numerous reports demonstrating the advantages of laparoscopic common bile duct exploration (LCBDE), many general surgeons continue to use endoscopic retrograde cholangiography and sphincterotomy (ERC/S) to manage bile duct stones (BDS). We sought to investigate the medium-term performance of LCBDE when adopted by general surgeons in a regional setting.

Method: A retrospective review of LCBDE at a regional surgical unit was conducted. Data was gathered from in- and outpatient files, letters of correspondence, and by patient telephone follow-up. When BDS were encountered on routine intra-operative cholangiography, LCBDE was attempted by either transcystic or transcholedochal methods. Temporary antegrade biliary stents were frequently used. If unsuccessful, post-operative ERC/S was preferred over open exploration.

Results: One hundred and sixty consecutive patients underwent LCBDE over a 5-year period. The mean age was 66.9 years (range 21-96 years). Follow-up data was available on 87.5% of patients who were recontacted at a median of 2.5 years after discharge. BDS were suspected in 65% of patients and discovered incidentally in 35%. Fifty-five percent were admitted acutely. Overall, 81.8% of BDS were cleared laparoscopically (67% transcystically, 33% transcholedochally) with a morbidity of 13.8% and mortality of 0.6%.

Conclusion: LCBDE can be performed safely and effectively by general surgeons working in regional areas. Many BDS can be removed transcystically. Routine T-tube use is unnecessary following choledochotomy, but temporary internal stents should be considered. ERC/S as primary management should be restricted to acute cholangitis, severe gallstone pancreatitis, poor anaesthetic candidates, and as an alternative to open conversion if laparoscopic methods are unsuccessful.

Hepatobiliary/Pancreatic Surgery-P367

SINGLE HOLE CHOLECYSTECTOMY - HOW I DO IT AFTER 2700 CASES, MANMOHAN VARMA MS, PRIVATE - KANPUR, INDIA email: manmohanv@yahoo.com

OBJECTIVES: To achieve a minimally invasive surgery safer than laparoscopic cholecystectomy (LC). ?Laparoscopic assisted intraoperative ultrasound guided single hole cholecystectomy? has evolved with lesser chances of bile duct injury (BDI), it also does not have problems of indirect vision, hand eye coordination, pneumoperitoneum, trocar injuries and other complications unique to LC.

METHODS: Microlap cholecystectomy is performed through a small rectus splitting incision (3 ? 3.5 cms) in right hypochondrium. This is called ?Single hole?. Intraoperative ultrasound is

done using 6.5 MHz end firing sector probe to avoid BDI. Bile duct system is recognized by standard features on ultrasound. Cystic duct is hooked with suture and traction is given while intraoperative ultrasound is used to see that bile duct is secure and not kinked. 0°, 30° & 45° endoscopes or sinusscopes are used to assist in surgery if and when needed.

RESULTS: 2700 single hole cholecystectomies have been done from November 1991 to December 2004. Of these 2160 were from May 1996 to December 2004 using intraoperative ultrasound routinely & endoscopes when needed in later phase of study. Hemostasis is convenient due to direct 3D view enabling quick suction, precise pressure and cautery. After May 1996 only 10 (0.4%) were converted to laparotomy due to bleeding or adhesions. Other 2150 (99.6%) patients were discharged 6 to 24 hours after surgery, 4% had mild wound infection. 0% suffered BDI or other injury compared to 0.5% to 2.7% incidence of BDI quoted in LC (0.2% to 0.5% at tertiary centres). LC has an equal number of other injuries also.

CONCLUSION: Single hole cholecystectomy done this way is called ?Laparoscopic assisted-intraoperative ultrasound guided-single hole cholecystectomy (LAIUSC)?. It is a safe, minimally invasive surgery with advantages of being gas-less as well as having direct 3D view or laparoscopic view if needed. This technique has not been reported from elsewhere in the world.



LADY 106 Kg BY WEIGHT

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IMPACT OF 3D-CT(DIC-CT) ON LAPAROSCOPIC CHOLECYSTECTOMY,

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INTRODUCTION: Laparoscopic cholecystectomy (LC) has become widespread. Although LC is considered as the first step for laparoscopic surgeon, the risk of complications such as bleeding or bile duct injury still remains. Preoperative assessment of the biliary and vascular anatomy is important to avoid these complications. A recent advance in computed tomography (CT), multislice helical CT, has enabled production of useful three-dimensional (3D) CT cholangiography and angiography. We evaluated the effect of 3D-CT on the results of LC especially for young surgeons.

METHODS AND PROCEDURES: Four hundred sixty-five patients referred for LC to our department from 1991 to 2005 were included in this study. We investigated the impact of 3D-CT(DIC-CT) introduction on training of LC.

RESULTS: In principle, preoperative endoscopic retrograde cholangiography (ERC) was performed until 1995. Although Magnetic resonance cholangiopancreatography (MRCP) was the mainstream afterwards, after induction of multislice helical CT in 2003, 3D-CT cholangiography(DIC-CT) and angiography were performed for most cases. The advantages of 3D-CT(DIC-CT) were less invasiveness than ERCP and better understanding of the biliary and vascular anatomy than before. From beginning of LC to 1998, all operators were surgeons with 10 years or more experience, and from 1999 to 2003, half of operators was those with 5 years or over experience. Thereafter, most operators were young residents. Despite of this transition, no major complication was observed.

CONCLUSIONS: Preoperative 3D understanding of the biliary and vascular anatomy reduces the risk of complication, especially for young surgeons. Therefore, 3D-CT(DIC-CT) plays an important role on training young residents.



Hernia Surgery-P369

LAPAROSCOPIC TOTAL EXTRAPERITONEAL INGUINAL REPAIR FOR TREATING SPORTS HERNIA, TAREK I AL SAYED MD, SALEM ZAHRANY MD, ASHRAF ELKERSH MD, DALLAH HOSPITAL - RIYADH - K.S.A

INTRODUCTION: Chronic groin pain (inguinodynia) in athletes represents an important entity of sports injury. Sports hernia (SH) and inguinal canal injury had been thought by many authors to be the cause if the other causes ruled out. SH forms a major diagnostic and therapeutic challenge to the treating physician. This retrospective study aimed to evaluate the lap. TEP, as a modality of treatment, for SH. According to our knowledge very few studies had been conducted about this subject with little number of patients.

PATIENTS & METHODS: all patients referred with undiagnosed inguinodynia after exclusion of all other possible causes during the period from Aug.2002 to May 2005 included in the study. Bilateral lap. TEP repair done to all patients using a prolene mesh 10 x 15 cm. on each side, through two 5 mm. ports inserted in the midline subumbilically and a 10 mm. 0° telescope. The mesh fixed to the anterior abdominal wall using the least possible number of 5 mm.tucks. All patients followed up from 3 to 24 months postoperatively regarding pain, recurrence of symptoms, return to full activity and the overall results of surgery.

RESULTS: 14 patients (all males) with 28 groins had been operated upon during the period of the study. A small indirect sac was found in 4 groins, preperitoneal lipoma passing through the internal ring was found in 7 groins, wide internal ring was found in 9 groins, and no pathology was found in 8 groins. Pain completely disappeared in all patients within few days after surgery, return to full activity within 3 months postoperatively, no recurrence of symptoms occurred during the follow up period, and one case developed transient femoral neuritis.

CONCLUSION: TEP lap. Mesh repair has a satisfactory result in treating sports hernia. An occult inguinal hernia, lipoma of the cord, and wide internal ring should be put high in the list of differential diagnosis in undiagnosed chronic groin pain in athletes. However, further study is recommended for those cases where no pathology was found, despite that they get benefited from the operation.

Hernia Surgery-P370

DOES AGE MATTER? OUTCOMES AFTER LAPAROSCOPIC VENTRAL HERNIA REPAIR IN AN AGING POPULATION., Nechoi L Allen MD, C D Smith MD, Leena Khaitan MD, Emory Endosurgery Unit, Emory University School of Medicine

Background: Laparoscopic ventral hernia repair (LVHR) is now being performed more commonly in older patients and larger hernias. The purpose of this study is to determine if there is a difference in the perioperative morbidity and mortality in patients over age 60 and those younger than 60.

Methods: Data was collected retrospectively for all consecutive patients undergoing laparoscopic ventral hernia repair over a 12 month period, January 2004 and December 2004. Seventy nine patients underwent elective laparoscopic ventral hernia repair (age 56.5, SD 13.4 years, 57% female). Thirteen patients were lost to follow up. Results are reported as proportions or mean±SD and analysis done using Statistica software with t-test or chi square where appropriate.

Results: Forty five patients (58%) are under 60 yrs(Group 1) and 33 (42%) are 60 yrs or older (Group 2). Patients had 0.6 (range 0-7) prior hernia repairs. Fourteen patients had one previous repair (17.7%), and ten patients had 2 or more previous repairs (12.65%). The average BMI is 32.7 (SD 7.5 Kg/m²) (33% with BMI>35) with no difference between groups. Average area of mesh used was 446.5 cm² allowing for at least four cm circumferential coverage of the hernia defect no difference between groups, p=0.8). Major complications(death, multisystem organ failure, and respiratory distress) were more common in Group 1 (11%) than Group 2 (0.2%) (p =0.1525). In contrast, minor complications (seroma formation (25%), re-admission, wound infection, and abdominal wall hematoma) were more common in patients under 60 years old (p = 0.01).

Conclusion: Patients over 60 years are more likely to have

major complications resulting in ICU stays and death; whereas patients under 60 years have complications that are not life threatening and are more chronic in nature. Patients need to be counseled about the minor complications (seroma and wound infection) as much as the major complications since they are more common. Ventral hernias in patients over 60 should be approached with caution due to potential major complications and discussed carefully during the consent process.

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LAPAROSCOPIC INGUINAL HERNIA REPAIR IN GIRLS:COMPARISON OF INVERSION LIGATION AND AWL TECHNIQUES, Mark S Burke MD, Philip L Glick MD, Celeste M Hollands MD, Department of Surgery, University at Buffalo

Background: The purpose of this study is to compare the results of the inversion ligation and Awl techniques for laparoscopic inguinal hernia repair performed in girls. Inguinal hernia repair in pediatric patients has been described using several different laparoscopic techniques. Most commonly the Awl technique is used which focuses on suturing the ring closed. In our experience, however, this yielded an unacceptably high recurrence rate. In an effort to preserve the benefits of a laparoscopic procedure, we modified our technique to one we call laparoscopic inversion ligation (LIL), which was offered only to girls. This technique permits full mobilization of the hernia sac into the peritoneal cavity followed by a high ligation of the sac using Endoloops.

Methods: Charts for all girls undergoing inguinal hernia repair from September 2002 to April 2005 were reviewed for: patient demographics, operative procedure and recurrence rates. Patients undergoing the Awl or LIL techniques were included for study. Statistical analysis was performed using the student's t-test with significance defined as p<0.05.

Results: 112 patients underwent 120 operations (60 laparoscopic,60 open). The mean age was similar: laparoscopic (5.13+4.83 years [LIL], 4.92 + 3.09 years [Awl]); open (5.27 + 4.53 years), p=0.87. The laparoscopic group consisted of 46 patients (77%) in the LIL group and 14 (23%) in the Awl group. Results for the LIL group: 41 patients had 57 hernias repaired; 5 conversions to open (10%);1 recurrence (1.75%). Results for the Awl group: 13 patients had 19 hernias repaired; 1 conversion to open (7.1%), 5 recurrences (26.3%). The recurrence rate for the Awl repair (26.3%) was significantly higher than for the LIL repair (1.75%), p<0.001.

Conclusion: These results demonstrate that laparoscopic inversion ligation (LIL) is superior to the Awl technique for inguinal hernia repair in girls. Additionally, the LIL approach provides recurrence rates and operative principles that are comparable to open repair.

Hernia Surgery-P372

LAPAROSCOPIC REPAIR OF TRAM-RELATED ABDOMINAL WALL HERNIAS, Adrian G Dan MD, Mohammed Alghoul MD, Vadim Sherman MD, Sricharan Chalikonda MD, Stacy Brethauer MD, Valentine Nfonsam MD, Steven Rosenblatt MD, The Cleveland Clinic Foundation

Introduction: TRAM breast reconstruction is associated with a 5-7% risk of donor site hernia, which can be quite difficult to repair using the open technique. We present our early experience with the laparoscopic repair of this type of defect.

Methods and Procedures: Four consecutive patients (pts) with TRAM related abdominal wall defects were retrospectively studied. Their height, weight, operative dates, length of stay, ASA designations, comorbidities and risk factors (diabetes, asthma, COPD, other abdominal operations, tobacco use, EtOH use, steroid use), method of repair, defect and mesh dimensions were recorded. The BMI, average defect area, and average mesh area were calculated. Short term follow up (1 mo.) was performed and any complications were noted. The data were analyzed to assess the characteristics of the group and the early efficacy of the laparoscopic approach.

Results: Four female pts (mean age = 45 yrs.), who underwent TRAM breast reconstruction after mastectomy for malignancy, were studied. The average BMI was 28.2 m²/Kg. All repairs were performed electively. The average time between TRAM



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reconstruction and hernia repair was 25.5 months (range 8-41). All pts were relatively healthy (3 pts ASA = 2, and 1 pt ASA = 3). Associated risk factors only included previous abdominal operations in 2 of 4 pts (1 open ventral hernia repair and 1 duodenal switch). One pt's defect was closed primarily with prolene suture and a suture passer, and three with PTFE secured with tacks and transfixing sutures. The average defect size was 115 cm², while the average mesh size was 290 cm². The average length of stay was 1.75 days (range 0-3). Short term follow up did not reveal any complications or failures. **Conclusions:** TRAM donor site abdominal hernias can be safely and effectively repaired by laparoscopic means. This approach may allow these pts to benefit from the faster recovery, decreased postoperative pain and the shorter hospital length of stay associated with other laparoscopic procedures.

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HOW TO HAVE OPTIMAL RESULTS PERFORMING LAPAROSCOPIC INCISIONAL HERNIA REPAIR, Roeland den Boer MD, Katja Thijssens MD, Dep of Surgery; Groningen University Medical Center

Background: Many reports of laparoscopic incisional hernia repair have been published over the last decade reflecting the possibilities of a new and therefore possibly better technique. The aims of this study were to distinguish the tricks to get optimal results performing laparoscopic incisional hernia repair.

Method: Since 1998, 132 patients underwent a laparoscopic incisional hernia repair in the University Hospital in Groningen. The method with intraperitoneal technique of a PTFE-mesh fixated with tackers and transfascial sutures after argon lasering was used most frequently, after having tried several other techniques. The results were compared with the other laparoscopic incisional hernia repairs in this center as well as a they were compared with a group of 90 patients with an open repair. The patients were matched for age, sex, Body Mass Index, ASA classification, hernia size and previous hernia repairs.

Results: In the laparoscopic group the operation time was longer (90 versus 72 minutes; $p < 0.05$), the hospital stay was shorter (5.4 days versus 7.5 days; $p = 0.004$). There were less seromas and less recurrences ($p < 0.05$). The use of argon caused less seroma ($P < 0.05$). Inlay technique was superior over onlay in terms of recurrence. Meshes attached high up to the costal rim were prone to recurrences. Extra sutures tackers to resolve this problem, caused less recurrence though the complains of pain were significantly higher. In case of severe adhesions, the laparoscopic repair caused bowelwall damage in 3 cases. This serious complication was easier to avoid and therefore did not occur in the open series. There were less woundinfections in the laparoscopic group. Patients were more satisfied after the laparoscopic repair because of the minimal access used.

Conclusions: When severe intraabdominal adhesions and hernias up to the costal rim are excluded, laparoscopic incisional hernia repair using the intraperitoneal technique with a PTFE-mesh fixated with tackers and transfascial sutures and argon lasering, is the method of preference in this centre.

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LAPAROSCOPIC EXTRAPERITONEAL HERNIORRAPHY REMAINS AN OPTION OF THERAPY FOR RECURRENT AND BILATERAL INGUINAL HERNIA REPAIR, James P Dorman MD, Audie L Murphy VA Hospital, San Antonio

Laparoscopic hernia repair continues to occupy a place in the treatment of inguino-femoral hernia defects, despite recent criticism of another study which reported a 10% recurrence rate. The surgery, complications, and outcome of 116 veterans with 194 hernias is herein reported after treatment by total extraperitoneal approach for recurrent and bilateral inguinal hernias. Herniorraphy was accomplished by total extraperitoneal placement of 12x15cm polypropylene mesh after creation of the planes of dissection with a balloon device and blunt dissection. All potential sites for recurrence were thus covered in the femoral, indirect, and direct inguinal areas, and the mesh fixated with spiral tacks. Of the 64 patients with 75 hernias

recurrent from prior open surgery, 2 recurrent hernias have re-occurred, giving a rate of 2.6% (2/75). Complications in the total group of 116 patients with 194 hernias are as follows: seroma 14 patients, wound infection none, bowel injury none, bladder injury none, urinary retention/infection 3, chronic groin pain 2 patients with followup to as long as 8 years. One patient suffered postop bleeding requiring reexploration without clear recognition of the site of the bleed and hematoma formation. Recurrence of hernia in the entire experience of recurrent/ bilateral hernia is reported in 3 of 194 hernias, thus a recur rate of 1.5% per hernia. With increasing experience of the surgeon and proper selection of the patients for total extraperitoneal hernia repair of recurrent and bilateral inguino-femoral hernias, quite acceptable outcomes can be achieved.

Hernia Surgery-P375

THE BIOLOGIC HERNIA REPAIR, Arthur P Fine MD, Jefferson Regional Medical Center

Biologically active mesh (IHM) and fixation (fibrin tissue sealant) were used in the laparoscopic preperitoneal (TEP) repair of inguinal hernias as a sutureless means of repair utilizing tissue remodelling. Forty-five patients underwent fifty-one repairs and were followed an average of 18 months (5-36). There has been one recurrence (1.8%) and three instances of chronic discomfort (6%). The results suggest that a TEP repair utilizing biologic agents with an equivalent recurrence rate to that in large series of either open or laparoscopic repairs and with a lower incidence of chronic pain than either.

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USE OF PORCINE SMALL INTESTINAL SUBMUCOSA AS A PROSTHETIC MATERIAL FOR LAPAROSCOPIC HERNIA REPAIR IN INFECTED AND POTENTIALLY CONTAMINATED FIELDS: 5 YEARS FOLLOW-UP, Morris E Franklin MD, Itzel Vela MD, John J Gonzalez MD, Jorge M Trevino MD, Texas Endosurgery Institute

Introduction: The treatment of hernias remains controversial, several prosthetic meshes with variety in their characteristic, such as strength, biodegradability, susceptibility to infection and resistance to adhesion are available over 40 years. Still some problems with their use are reported such as postoperative pain, long-term discomfort, intestinal obstruction, fistulization and infections and not to mention that in the event of incarcerated/strangulated hernias and other potentially contaminated fields, placement of prosthetic material remains controversial because of increased risk of infection. The porcine small intestinal submucosa mesh, (Surgisis, Cook Bloomington, IN) has been demonstrated a safety and feasibility in laparoscopic hernia repairs in this scenario. We present our 5-year experience, with placement of Surgisis mesh in potentially or grossly contaminated fields.

Methods: From May 2000 - May 2005, 81 patients (30 male, 51 female) and a total of 90 procedures were performed. Patients underwent placement of Surgisis mesh for either incisional, umbilical, inguinal, femoral or paraestomal hernia repairs in an infected or potentially contaminated setting, and were studied in a prospective nonrandomized fashion.

Once the hernia was identified and reduce, its borders were cleared of any adhesion so as to allow the placement of mesh over the defect with at least a 3cm margin in all direction.

Results: All procedures were performed laparoscopically with different techniques (IPOM and two layered "Sandwich" technique). 14 in an infected field and 74 in a potentially contaminated field. Thirty two were done concurrently with a biliary procedure, 12 with colon surgery and 7 with appendectomy. 16 presented as intestinal obstruction, 11 were strangulated hernias and 11 required small bowel resection. 17 were inguinal hernias, 39 incisional, 25 umbilical. In 15 patient more than 2 different hernias was repair. In five years follow-up we identify 3 recurrences, 7 seromas that eventually resolved and 8 patients report mild pain. 4 second looks were performed and in all cases was observed that the mesh was totally integrated to the tissue with strong scar tissue corroborated macro and microscopically.

Conclusion: In our experience the use of small intestine sub-

mucosa mesh in contaminated or potentially contaminated fields is a safe and feasible alternative to hernia repair with minimal recurrence rate and satisfactory results in long term follow up

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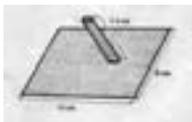
AN ATTEMPT TO AVOID FIXATION DURING LAPAROSCOPIC TOTALLY EXTRAPERITONEAL HERNIORRHAPHY FOR INDIRECT INGUINAL HERNIAS, Kyung Yul Hur MD, Gyu Young Jeong MD, Jae Young Jung MD, Sang Hwa Yu MD, Seung Han Kim MD, Yong Geul Joh MD, Choon Sik Chung MD, Dong Keun Lee MD, Laparoscopic Surgery Center, Department of Surgery, Hansol hospital, Seoul, Korea

Introduction: Recently there has been interest in performing laparoscopic totally extraperitoneal (TEP) repair without using staples or tacks to avoid possible complications for inguinal hernias. We report our experiences of laparoscopic TEP repair without fixation using predesigned mesh with central plug for indirect inguinal hernias.

Methods: Between December 2000 and January 2005, 260 laparoscopic hernia repairs were performed. Among them, recent 70 cases of unilateral indirect inguinal hernias were managed by laparoscopic TEP repair without fixation using predesigned mesh attached with central plug. Mesh size was 8 by 13 cm and the central plug was 3 to 4cm long. After complete dissection of preperitoneal space, the central plug was inserted into the inguinal canal through the internal opening and then the mesh was placed properly under the direct vision. Then the preperitoneal insufflation was evacuated without stapling. To evaluate mesh migration, two radiopaque metal clips were attached to the tip and base of central plug in selected 12 patients. The serial radiologic examinations were followed to investigate mesh migration or displacement in these patients.

Results: The operative time averaged 25.7 min (range, 17-49), and all patients were discharged within 23h. There was no complications except postoperative scrotal swelling in 3 patients. Average follow-up was 12.7 months (range 9-17), and no recurrences were observed. Radiologic evaluations were taken at 2 months after operation in selected patients who had radiopaque markers, and there was no evidence of mesh migration or displacement.

Conclusions: Our initial experience of this technique appeared promising. But long term follow-up is mandatory to access efficacy of this procedure for indirect inguinal hernias.



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TOTALLY ENDOSCOPIC EXTRAPERITONEAL INGUINAL HERNIA REPAIR: A SINGLE CENTRE EXPERIENCE WITH DIFFERENT MESHES., Daide Lomanto MD, Avinash Katara MS, Shridhar Iyer, Jeffrey Domino, Asim Shabbir, Wei-Keat Cheah, Minimally Invasive Surgical Centre (MISC), Department of Surgery, National University Hospital and NUS, Singapore
Laparoscopic hernia surgery is gaining its role because of the benefits to patients that are evident from many published RCT when compared laparoscopic to open hernia repair: less postop pain and analgesic consumption, earlier return to normal activities and work, less chronic pain and permanent paraesthesia.

A review of our experience was undertaken involving 280 consecutive patients who underwent 350 extraperitoneal inguinal hernia repair (1998-2003) at the National University Hospital, Singapore. We performed 234 unilateral repair and 116 bilateral repair. The hernia repair was performed using three different methods. In group 1: polypropylene mesh was anchored with spiral tacker (n=229); group B, polypropylene mesh was not anchored using staplers (n=51) and in group 3 a multifibre polyester anatomic mesh (Sofradim, Parientex ADP2) was utilized (n=70).

The mean age was 49 years (range 20-81) and 85% were men.

The overall mean operative time was 50 min (range: 35-180 min); bilateral repairs took 27% longer than unilateral repairs. Four pts had conversion to open surgery, and 20 pts (8%) developed minor complications (groin seroma). The recurrence rate was: 7.3% when the mesh was not anchored, 1.6 % when the mesh was anchored and no recurrence was recorded when anatomic mesh was utilized (mean follow-up: 13.1 months). There was no recurrence detected in the last 112 cases (70: anatomic mesh; 42: polypropylene mesh and tacker). The mean inpatient hospital stay was 1.4 days, and of the last 30 cases, 70% were performed as outpatient. Laparoscopic inguinal hernia repair is a relatively new approach in the long history of groin hernia repair. To achieve an acceptable recurrence and complication rate, surgical technique is very important. An adequate anatomical dissection together with a correct mesh placement, orientation and anchoring are the key factors. Data from our study showed that using anatomic mesh we can achieve the same recurrence and morbidity rate as using mesh plus fixation with tacker but with lesser cost and less post-operative chronic pain.

Laparoscopic approach remains an alternative and feasible method to open hernia surgery. In our 6 years experience, TEP hernia repair can be done with minimum morbidity and in the majority of cases can indeed be performed in the Day Surgery setting especially once learning curve has to be overcome, and the repair can be accomplished

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COMPARISON OF TOTALLY ENDOSCOPIC EXTRAPERITONEAL REPAIR VS OPEN REPAIR FOR BILATERAL INGUINAL HERNIA, Daide Lomanto MD, Avinash Katara MS, Shridhar Iyer, Jimmy So, Wei-Keat Cheah, Minimally Invasive Surgical Centre, Department of General Surgery, National University Hospital, Singapore

Simultaneous bilateral inguinal hernia repair have certain distinct advantages. Patient is saved the need for repeated admissions, two separate anesthetics, and extra total operating times. The safety of simultaneous bilateral open and laparoscopic inguinal hernia repair has been well established.

Aims: To compare the results of endoscopic totally extraperitoneal (TEP) repair and open hernia repair for patients with bilateral inguinal hernia. Between September 1999 to April 2002, 56 consecutive patient with bilateral inguinal hernia were included. 29 patients underwent TEP repair, while 27 patient underwent open lichtenstein repair. With the following outcomes, operative time, hospital stay, analgesic use and complication compared for both groups. The mean age was 54 yrs. The median follow up was 18 months. For recurrent hernia, 3 patients had open repair while 4 patients had TEP repair. The operative time for TEP group was 7.4% shorter compare to the open group (87 vs 94 mins.). The hospital stay was also 38% shorter in the TEP group (41 hrs vs 66 hrs.). The inpatient parenteral analgesic consumption was similar for both groups, but the oral analgesic used was less by 31% in the TEP group. There was no difference in complication for both groups. Endoscopic TEP repair is the method of choice when treating bilateral inguinal hernia. This technique combines the advantages of prosthetic mesh with the advantage of minimal access surgery and good cosmesis. The increase cost due to instrumentation is offset by the lesser hospital stay and earlier return to activity.

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LAPAROSCOPIC REPAIR FOR LARGE VENTRAL HERNIAS: FEASIBILITY AND RISK REDUCTION STRATEGIES., Daide Lomanto MD, Avinash Katara MS, Shridhar Iyer, Asim Shabbir, Wei-Keat Cheah, Jimmy So, Minimally Invasive Surgical Centre, MISC, Dept of Surgery, National University of Singapore, Singapore

Incisional hernia is the most common complication after abdominal surgery and despite ongoing research in wound closure and reparative techniques, abdominal incisional hernia remains an unresolved problem. There have been few operative challenges more vexing in the history of surgery than the incisional hernia, especially because the outcome of incisional hernia may have major social and economic implications.



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Some recently technical options as mesh repair has significantly reduced the recurrence rate compared with that of primary suture repair, but recurrence still remains in the ranges of 10% to 24%. Since its introduction in 1992, laparoscopic incisional hernia repair has revolutionized the management of ventral hernia. To date, the laparoscopic approach has achieved better outcomes than have the historical conventional approach. Analysis of outcomes for large ventral hernias (>100cm²) treated with laparoscopic repair. 25 patients (21 F / 4 M); with a mean age of 58 years (range 30-83 yrs) underwent laparoscopic repair of large ventral hernias (5 primary and 20 incisional). Laparoscopic repair was performed using three trocars placed laterally to the abdominal wall. Intraperitoneal onlay mesh (IPOM) technique was utilized with both transfascial suture and spiral staplers for fixation of composite mesh. For the hernia repairs, we used composite dual layer meshes: in 8 pts Gore-Tex DualMesh; WL Gore, USA and in 17 pts Parietex Composite; Sofradim, France: The mean duration of operation was 95 minutes (range: 35-180 min); post operative stay was 2.56 days (range: 1-5 days) The mean follow up was 24 months (95 % CI 17.7 to 28.8 months) and one recurrence (4 %) was observed in the follow-up period. There were no deaths and one major complication of bowel injury. There were 3 seromas (12%), one wound infection (4%). No patient required removal of mesh. Risk reduction strategies to prevent complications was utilized accordingly (adequate preop evaluation and preparation; open entry; careful adhesiolysis using ultrasound shears; use of composite mesh; double methods fixations; postop pressure dressing and abdominal binder). In conclusion laparoscopic seems to be feasible, safe and effective method for treatment of large ventral hernias in our experience

Hernia Surgery-P381

LAPAROSCOPIC VENTRAL HERNIA REPAIR FOLLOWING ORGAN TRANSPLANT, Peter T Kennealey MD, Cynthia Johnson MS, A. Joseph Tector, III MD, Don J Selzer MD, Indiana University School of Medicine

Objective: Laparoscopic incisional hernia repair is safe and effective in the general surgical population. It is unknown if this procedure is equally efficacious in immunocompromised patients following solid organ transplant. In addition, concerns have been raised over the use of mesh and of laparoscopy with pneumoperitoneum in this immunosuppressed population.

Methods: Twenty transplant patients underwent laparoscopic incisional hernia repair between July 2004 and June 2005. A univariate analysis was performed using the Fisher's exact test and two-sample t-test.

Results: Mean age was 49.6 ± 8.4 years with a median follow-up of 53 days (range, 12-292 days). Average mesh size was 547.9 ± 279.5 cm² and average hospital stay was 4 ± 2 days. Eleven patients developed complications (55%) with self limited seroma formation accounting for eight of these complications. One patient required operative drainage of the seroma, one patient developed postoperative tacrolimus toxicity, and one patient had prolonged gastroparesis. There were no bowel injuries. Seroma formation was not associated with prior open hernia repair, diabetes mellitus or steroid use. There was no statistically significant relationship between the transplanted organ and seroma development. In patients who did not develop a seroma, mean mesh size was 442.9 ± 228.9 cm² compared to 676.3 ± 293.7 cm² in those who did develop seroma. This size difference approached statistical significance (p=0.06).

Conclusion: Laparoscopic incisional hernia repair is associated with minimal, self-limited morbidity, and zero short-term recurrences in transplant patients. These results suggest laparoscopic hernia repair is a safe and effective alternative to open incisional hernia repair in solid organ transplant patients.

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THE INCIDENCE OF OCCULT FASCIAL DEFECTS DISCOVERED IN LAPAROSCOPIC VENTRAL HERNIA REPAIRS IN 200 PATIENTS, Ikram U Kureshi MD, Ibrahim Daoud MD, University of Connecticut School of Medicine Department of Surgery, Saint Francis Hospital Health Care System, Hartford, Connecticut

Objective: One aspect unique to laparoscopic ventral hernia repairs (LVHR) is the visualization and repair of occult fascial defects not recognized during open repairs. This study reviews the incidence of such fascial defects. Recent retrospective reviews of LVHR have been multi-surgeon studies looking at operative outcomes. This study analyzes a single surgeon's experience at a single institution in 200 patients. The single surgeon experience eliminates the variability of operative technique and postoperative management inherent in other multi-surgeon studies.

Methods and Procedures: The short term outcomes of LVHR were analyzed by retrospectively reviewing the records of all patients who underwent this procedure by a single surgeon in a single institution from January 2000 to March 2005. Patient demographics, history of ventral hernia repairs, number of occult fascial defects, operative details, and postoperative outcomes were recorded.

Results: 203 patients were scheduled to undergo LVHR of which only 3 were converted to open procedures. The study was comprised of 200 patients (94 men and 109 women; mean age 50 years) who underwent LVHR with mesh over a 5-year period. 26% of patients had previous ventral hernia repairs. The average fascial defect size was 45 cm². A composite mesh was used in 78% of cases. 55% of patients were noted to have more defects in the fascia seen laparoscopically than suspected on preoperative examination. The average operative time was 63 minutes with a mean estimated blood loss of 12.5 cc. The patients' average length of stay was 1.1 days. There was a 10% complication rate including one enterotomy, one postoperative bowel obstruction, 3 patients with postoperative ileus, and 14 seromas. There were no deaths in this series.

Conclusions: There was a 55% incidence of occult fascial defects detected and repaired in 200 LVHR. This single surgeon experience showed less operative time, less blood loss, shorter length of stay, and fewer complications than reported in previous multi-surgeon, single institution studies. LVHR offers the advantage of recognizing and repairing occult fascial defects not detected in open repairs with minimal complications.

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SPIGELIAN HERNIA: A CASE SERIES, Jay C Long MD, Sheilendra S Mehta MD, Pratibha B Lal MD, Garth B Davis MD, Robert Davis MD, Patrick R Reardon MD, The Methodist Hospital

INTRODUCTION: Spigelian hernias are rare defects of the anterior abdominal wall that occur through the Spigelian fascia. The incidence of Spigelian hernias is approximately 2% of all abdominal wall hernias, and many surgeons have limited or no experience with Spigelian hernias secondary to the rarity of their occurrence. We report a single surgeon's experience with Spigelian hernias over the past 9 years.

METHODS: A retrospective study of patient records from February 1996 to May 2005 revealed 8 patients that had undergone repair of a Spigelian hernia.

RESULTS: Average age was 63 years (range 44-80), and the male to female ratio was 1:1. Eight patients were found to have a Spigelian hernia. Six patients had a unilateral, primary hernia; one patient had a recurrent unilateral hernia; and one patient had bilateral recurrent hernias. Four hernia repairs were performed using an open preperitoneal approach with placement of polypropylene mesh. The bilateral recurrent Spigelian hernia repair was performed laparoscopically with placement of a 20x12 cm piece of Gore-Tex DualMesh on the intra-abdominal side of the peritoneum. The remaining three repairs were performed using a totally extraperitoneal laparoscopic approach with placement of Gore-Tex DualMesh or polypropylene mesh in the preperitoneal space. Average length of surgery was 104.5 minutes, and there were no intra-operative complications. Post-operatively, one patient had urinary retention, but otherwise there were no additional complications. Length of stay post-operatively was less than 24 hours in seven patients and approximately 48 hours for one patient that also underwent abdominoplasty at the same time as the Spigelian hernia repair.

CONCLUSION: Spigelian hernias are rare abdominal wall defects that a surgeon may never see in his/her career.



However, if a surgeon encounters such a defect, he/she must be able to recognize and treat the hernia using any one of the multiple techniques described for repair.

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INCIDENCE OF UNDIAGNOSED CONTRALATERAL INGUINAL HERNIA DETERMINED AT THE TIME OF LAPAROSCOPIC INGUINAL HERNIORRHAPHY IN ADULTS, Jay C Long MD,

Leslie A Long RN, Sheilendra S Mehta MD, Pratibha B Lal MD, Garth Davis MD, Robert Davis MD, Patrick R Reardon MD, The Methodist Hospital

INTRODUCTION: Contralateral inguinal exploration (CIE) of the asymptomatic side is routine practice for pediatric hernia repairs secondary to the high incidence of bilateral inguinal hernias. In adults, CIE is not common practice secondary to the presumed low incidence of asymptomatic contralateral inguinal hernias and the increased morbidity from open CIE. However, laparoscopic inguinal herniorrhaphy offers the advantage of CIE without additional incisions or significant morbidity. This study was undertaken to determine the incidence of undiagnosed contralateral inguinal hernia (CIH) determined at the time of laparoscopic inguinal herniorrhaphy in adults performed by a single surgeon.

METHODS: A retrospective review of patient records from June 1992 to December 1999 revealed 276 patients that underwent laparoscopic inguinal herniorrhaphy. One hundred seventy nine unilateral repairs were performed, and 97 bilateral repairs were performed.

RESULTS: Average age was 50 yrs (range 14 to 83), and the male to female ratio was 19:1. Fifty-one patients in the unilateral repair group did not have a CIE and were therefore excluded. Of the 225 patients that underwent bilateral inguinal exploration, 208 were repaired using a totally extraperitoneal approach, and 17 repairs were performed using a transabdominal approach. Sixty-two patients that underwent bilateral repair had a pre-operative diagnosis of bilateral inguinal hernia; therefore, 35 bilateral repairs were performed for an undiagnosed asymptomatic contralateral inguinal hernia. Of the 163 patients that had a pre-operative diagnosis of unilateral inguinal hernia, 21.5% (35/163) had an undiagnosed asymptomatic CIH.

DISCUSSION: The results of this study revealed a 21.5% incidence of undiagnosed CIH, which is consistent with prior reports of 10-25%. Furthermore, Thumbe and Evans reported in a randomized control trial that 28.6% of incipient inguinal defects developed into symptomatic hernias requiring repair within 12 months. Therefore, in the present study, 10 patients (6%) would have required a second operation within 12 months had the incipient hernias not been identified and repaired at the time of the first surgery.

CONCLUSION: The incidence of undiagnosed asymptomatic CIH is much higher than most surgeons appreciate. Laparoscopic inguinal herniorrhaphy offers the advantage of visualizing both inguinal regions with minimal morbidity and minimal extra operating time.

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IMPACT OF LAPAROSCOPIC ADHESIOLYSIS AND RECURRENT INCISIONAL HERNIA REPAIR WITH MESH ON GASTROINTESTINAL QUALITY OF LIFE, D Ignjatovic MD, L Ludwig DO, G Vasic MD, B Salehi MD, S Uranues MD, R Bergamaschi MD, Lehigh Valley Hospital, Allentown, Pennsylvania

Introduction: To establish the impact of laparoscopic adhesiolysis and hernia repair with mesh (LAHR) on gastrointestinal quality of life index (GIQLI) in patients with large recurrent incisional hernia (RIH).

Methods and Procedures: Data were collected prospectively on consecutive patients. RIH was defined as a large abdominal wall hernia recurring after surgical repair. LAHR was performed through 3 to 4 ports with intraperitoneal mesh placement. GIQLI included symptoms, emotions, physical status, social functioning, and effects of medical treatment and ranges from 1 to 5. GIQLI was evaluated prior to surgery and at 12-month follow-up. Adhesions were classified intraoperatively according to Mueller's classification (0, none; 1, avascular; 2, vascular with moderate extent; 3, vascular with severe extent).

The required sample size was 60 RIH patients with Mueller 2 or 3 adhesions (80% CI z value = 1.282, type I error = 0.05). Statistical analysis was performed with analysis of variance on SPSS 8.0 software.

Results: 85 patients underwent LAHR with neither mortality nor re-operations. There were 15 RIH patients with Mueller 1 adhesions and 60 with Mueller 2-3 adhesions. All patients were available at 12-month follow-up. With the exception of medical treatment (3 vs 3.05, $p > 0.05$), symptoms (2.76 vs 3.21, $p < 0.01$), emotions (2.88 vs 3.4, $p < 0.01$), physical status (2.92 vs 3.48, $p < 0.01$), and social functioning (3.05 vs 3.25, $p < 0.01$) were improved at follow-up as compared to preoperative GIQLI. A subgroup analysis showed that symptoms (1.46 vs 1.5, $p < 0.01$), emotions (1.2 vs 1.5, $p < 0.01$), physical status (1.22 vs 1.54, $p < 0.01$), and social functioning (1.32 vs 1.47, $p < 0.01$) were also improved at follow-up in Mueller 2-3 patients. However, GIQLI did not improve in Mueller 1 patients.

Conclusion: GIQLI was significantly improved at 12-month follow-up after LAHR in RIH patients with vascular adhesions of moderate to severe extent.

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LAPAROSCOPIC VENTRAL HERNIA REPAIR -WHAT MAKES

THE OUTCOME BETTER?-, Hitoshi Idani MD, Masanobu Maruyama MD, Hitoshi Kin MD, Masahiko Muro MD, Takashi Ishikawa MD, Tatsuaki Ishii MD, Shinya Asami MD, Shinichiro Kubo MD, Hiroki Nojima MD, Shinichiro Watanabe MD, Department of Surgery, Fukuyama City Hospital

Objectives: Laparoscopic ventral hernia repair has been reported to have a better outcome compared to open mesh repair. However, the factors which make the outcome better have not been well investigated. The aim of this study was to clarify those factors.

Methods and Procedures: Between April 2002 and August 2005, 20 patients with ventral hernia underwent laparoscopic repair in our hospital. The patients consisted of 5 men and 15 women with a mean age of 69.7 years. There were 17 midline hernias and 3 right lower quadrant hernias. Ultrasonography was performed on all patients to map the adhesion area. After the general anesthesia was induced, the initial port was inserted at the left upper abdomen with minilaparotomy followed by the additional insertion of two trocars at the left lateral abdomen. The size of the hernia defect was measured extracorporeally before the adhesiolysis and re-measured laparoscopically after the adhesiolysis. Composix E/X mesh™ was fashioned so that the defect was overlapped in all dimensions by 3-5 cm. The mesh was fixed intracorporeally on the anterior abdominal wall by O nonabsorbable suture materials and tucks. The outcome of the operation was evaluated.

Results: There was no intraoperative complication and no conversion to an open repair. There was no mortality. Mean operation time and the length of hospital stay was 127 min and 7.5 days, respectively. The size of hernia defect measured laparoscopically after the adhesiolysis was significantly larger than that measured extracorporeally before the adhesiolysis (56.1 +/- 9.8 cm² vs 20.1 +/- 4.3 cm², $p = 0.00013$). Other hernia defects which had not been detected before adhesiolysis were found in five patients (25%) after adhesiolysis and were successfully repaired together with the extracorporeally detected hernia defects. Intestinal obstruction occurred in one patient, which was well treated with re-do laparoscopic adhesiolysis. Seroma occurred in three patients (14.3%), one of whom required continuous drainage for two days. There was no mesh infection but one port site infection. During a median follow up period of 16 months, there has been no recurrence.

Conclusion: Laparoscopic ventral hernia repair had an excellent outcome with very low morbidity. Laparoscopic view after adhesiolysis has a great advantage of detecting and measuring the hernia defect correctly, which makes the outcome of laparoscopic ventral hernia repair better than that of open repair.



POSTER ABSTRACTS

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THE ROLE OF ANTIBIOTIC PROPHYLAXIS IN PREVENTION OF WOUND INFECTION AFTER OPEN MESH REPAIR OF PRIMARY INGUINAL HERNIA BY PROLENE HERNIA SYSTEM: A RANDOMIZED CONTROLLED TRIAL, SUDHIR K JAIN MS, Mayank Jain MS, Choden Norbu MD, Tarun Mittal MD, MAULANA AZAD MEDICAL COLLEGE, NEW DELHI, INDIA

Objective: To determine whether the use of prophylactic antibiotics is necessary in the prevention of postoperative wound infection after open mesh inguinal hernia repair by Prolene Hernia System

Basis of Study: Cochrane meta-analysis (2003) concluded that antibiotic prophylaxis for elective inguinal hernia repair cannot be firmly recommended or discarded.

Methods: 100 Consecutive patients who underwent open mesh repair of primary inguinal by Prolene Hernia System (PHS) were randomized to either preoperative 1.2 gm of Amoxicillin & Clavulanic combination intravenously as antibiotic prophylaxis or a placebo. Exclusion criteria included patients more than 60 years of age, diabetic or immunosuppressive patients, bilateral or recurrent hernias & patients allergic with given antibiotics. Infection was defined using the Centers for Disease Control and Prevention criteria.

Results: We included 100 patients in the study between June 2004 and July 2005. There were 1 infection in the antibiotic prophylaxis group and 1 infection in the placebo group.

Conclusions: A low percentage (2 percent) of wound infection after open mesh inguinal (primary) hernia repair by Prolene Hernia System. Was found, and there was no difference between the antibiotic prophylaxis or placebo group. The results show that, in Prolene Hernia System inguinal primary hernia repair, antibiotic prophylaxis is not indicated in low-risk patients.

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VENTRAL HERNIA REPAIR WITH SURGISIS GOLD. THREE YEARS EXPERIENCE, Valentine N Nfonsam MD, Stacy Brethauer MD, Adrian Dan MD, Adheesh Sabnis MD, Alan Siperstein MD, Bipan Chand MD, Steven Rosenblatt MD, Cleveland Clinic Foundation, Cleveland, Ohio

INTRODUCTION: An ideal prosthetic material for difficult ventral hernia repair has not yet been developed. However, Surgisis Gold may be beneficial in hostile or non-ideal situations such as contaminated cases. Surgisis Gold is a four- or eight-ply acellular, bioactive prosthetic mesh that is derived from porcine small intestine submucosa. We review our experience with the use of Surgisis in ventral hernia repair and compare its effectiveness in clean and contaminated cases.

MATERIALS AND METHOD: Retrospective analysis of patients who underwent laparoscopic or open repair of ventral hernias with Surgisis mesh was performed. In the laparoscopic group, the mesh was secured with tacks and four transfixation sutures. In the open group, the mesh was sewn to the edges of the fascial defect. Patients were classified by wound: clean (Group A), clean contaminated (Group B) and contaminated (Group C). Patients presented with primary, incisional or recurrent hernias.

RESULTS: From October 2001 to March 2005, 34 patients underwent ventral hernia repair with Surgisis mesh. There were 16 females (52.9%) with an average age of 54 years (34-79). Fifteen patients (44.1%) were operated on for recurrent ventral hernia. Classification according to groups is as follows: Group A, 13 patients (38.2%), Group B, 13 patients (38.2%) and group C, 8 patients (23.5%). Sixteen patients (47.1%) underwent an open procedure and 18 (52.9%) had a laparoscopic repair. Post operative findings include seroma in 30 patients (88%) and recurrence in 4 patients (11.8%). All recurrences were in group C and all had an open hernia repair. One of the four patients had ongoing sepsis and had the mesh removed. The median follow up period was 16 months (3-36 months).

CONCLUSION: Surgisis mesh can be safely utilized in clean contaminated and contaminated cases. In contaminated cases, the recurrence rate was found to be 50%, yet this still offered a permanent repair in difficult, high risk cases.

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LAPAROSCOPIC VENTRAL HERNIA REPAIR, Alan A Saber MD, Arun Rao MD, Edward Itawi MD, Michael Boros MD, Michigan State University - Kalamazoo Center for Medical Studies

Introduction: Since its initial description in 1993, laparoscopic ventral hernia repair has steadily gained recognition as an alternative to open procedure. This attributed to the high recurrence rate of open repair (25-52% for suture repair and 12-19% for mesh repair). We are presenting our experience with 102 procedures.

Material and Methods: From July 2001 to June 2005, 102 patients with ventral hernias were repaired laparoscopically. Demographic data, BMI, hernia distribution, size and number of hernia defects, type and size of mesh used in repair, operative time, hospital stay, and postoperative complications were collected.

Results: Of 102 patients, there were 59 males and 43 females with a mean age of 50.05±17.7 years. 44 patients had incision hernias, 19 epigastric hernias, and 31 umbilical and 8 Spigelian hernias. Mean operative time was 95.8 minutes (range 24- 296 minutes). Mean hospital stay was 44.1 hours with a median of 23 hours. There were no deaths. Conversion to open repair was required in a morbidly obese patient with multiple recurrent ventral hernia with failure to gain abdominal access. Eight patients developed minor complications (seroma in 4, ileus in one, port site hematoma in one, and suture site pain in one patient). A mean follow up was 21 months. Two morbidly obese patients developed recurrence early in our experience, since then we added more transabdominal sutures for permanent mesh fixation.

Conclusion: Laparoscopic ventral hernia repair is a safe, feasible, and effective alternative to open technique. This approach offers all the advantages of minimally invasive surgery in addition to a low rate of recurrence.

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VENTRAL HERNIA REPAIR IN THE OBESE PATIENTS: LAPAROSCOPIC VS OPEN TECHNIQUE, Yariv Salit MD, David Hazzan MD, Eitan Shiloni MD, Carmel Medical center, Department of Surgery B, Haifa, Israel

Background: Incisional hernia (IH) is a common problem for general surgeons, occurring in up to 20 % of patients who undergo major abdominal surgery. In the United States more than 100,000 IH repairs are performed each year. Obese patients (OP) are considered poor surgical candidates for open repair because of their associated morbidities and risk of postoperative wound infection and recurrence.

In our study we evaluated our experience with Laparoscopic and open ventral hernia repair in this particular population.

Methods: Between May 2004 and April 2005, 73 patients who underwent ventral hernia repair were entered prospectively into data base. Of those patients, 37(50.7%) were obese (BMI > 30).

Results: Twenty four patients (65 %) underwent open repair and 13 (35%) patients were operated laparoscopically.

There were no significant differences in terms of BMI, age, gender, ASA, and hernia size between both groups.

The mean operative time was longer in the laparoscopic group (106 vs 67 minutes). P< 0.05

The mean postoperative length of stay was longer in the open group (mean 3.5 vs 2.8 days).

Five (20%) wound infections occurred in the open group and only one (7.6%) in the laparoscopic group. P<0.05

One patient (7.6%) in the laparoscopic group was re-operated due to small bowel incarceration between the mesh and skin.

One patient (4%) in the open group underwent wound debridement due to severe wound infection.

Conclusions: Laparoscopic repair of ventral hernias in OP is both safe and feasible, and can be performed with minimal morbidity. At this writing, there have been no recurrences, but long term follow up evaluation is required.



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HERNIA SAC LAPAROSCOPY UNDER SPINAL ANESTHESIA FOR EVALUATION OF REDUCED INCARCERATED INGUINAL HERNIA, Kazuaki Takabe MD, Department of Surgery, University of California San Diego

Hernia sac laparoscopy (laparoscopy through an inguinal hernia sac) is a useful method to evaluate the viability of the self-reduced bowel of incarcerated inguinal hernia that is suspected for strangulation, and avoid unnecessary exploratory laparotomy. On the other hand, peritoneal insufflation for laparoscopy is best avoided in patients with severe chronic obstructive pulmonary disease or poor cardiac output. Here, we describe a 78-year-old male with chronic obstructive pulmonary disease and congestive heart failure, whose incarcerated inguinal hernia self-reduced when he was given spinal anesthesia. Bowel viability was in question, so hernia sac laparoscopy without gas was performed, which allowed us adequate evaluation of the reduced bowel by positioning alone, avoiding both exploratory laparotomy and peritoneal insufflation. To our knowledge, this is the first report of hernia sac laparoscopy without pneumoperitoneum. In our case, hernia sac laparoscopy under spinal anesthesia was sufficient to obtain necessary information with minimal surgical stress.



Hernia Surgery–P392

LAPAROSCOPIC REPAIR FOR INGUINAL HERNIA IN CHILDREN: OUTCOME OF 582 LPEC (LAPAROSCOPIC PERCUTANEOUS EXTRAPERITONEAL CLOSURE), Hiroo TAKEHARA MD, Hiroki ISHIBASHI MD, Masaki OHSHITA MD, Kouzo Yoshikawa MD, Mitsuo Shimada MD, Department of Pediatric Surgery and Pediatric Endosurgery, Tokushima University Hospital, Department of Digestive and Pediatric Surgery, University of Tokushima, School of Medicine, Tokushima, JAPAN

This study was designed to evaluate the safety, efficacy and reliability of our strategy (LPEC) for inguinal hernia in children. A total of 582 LPEC were performed on 426 children (280 boys and 146 girls), ranging in age from 18 days to 19 years. A 4.5 mm laparoscope was placed through an umbilical incision, and 2 mm grasping forceps and 19-Gage LPEC needle with a suture material were inserted on the left side of the umbilicus and a midpoint of the right or left inguinal line, respectively. The orifice of hernia sac was closed extraperitoneally with high circuit-suturing around the internal inguinal ring by using the LPEC needle. Among the 280 boys, 378 internal inguinal rings were closed (182 unilateral, 196 bilateral including 43 contralateral large PPV). In the 146 girls, 204 internal inguinal rings were closed (88 unilateral, 58 bilateral including 27 contralateral large PPV). The operation time for LPEC for uni- or bilateral inguinal hernia ranged from 20 to 30 minutes. No complication occurred during surgery. The recurrence rate was 1.1 % (4 with using an absorbable suture material, one with a huge scrotal hernia) during follow-up time ranged from one month to 10 years. There were no occurrences of hydrocele after surgery. The advantages of this procedure are not only cosmetic and minimally invasive repair, but also a lower risk of injury to the spermatic duct or vessels. These results suggest laparoscopic percutaneous extraperitoneal closure for inguinal hernia in children was evaluated to be safe, effective and reliable.

Hernia Surgery–P393

LAPAROSCOPIC REPAIR OF INCISIONAL HERNIA: A PROSPECTIVE ANALYSIS, Ajay Upadhyay MD, Steven Stanten MD, George Kazantsev MD, Rakhee Shah MD, Rupert Horoupan MD, Arthur Stanten MD, Department of Surgery, Alta Bates Summit Medical Center, California

Objective: Accumulating evidence show that laparoscopic surgery for ventral and incisional hernia has several advantages unlike open surgical repair that results in large incision, extensive tissue dissection and higher wound complications. With refinement in technique, laparoscopic repair is increasing opted as a treatment of choice for incisional and ventral hernia, including very large hernia defects.

Methods and Procedures: Data was collected prospectively for 128 consecutive patients undergoing laparoscopic repair of ventral/incisional hernia between July 1999 and December 2003. Laparoscopic approach was attempted in all patients deemed likely to need a mesh, irrespective of the size of the hernia.

Results: 128 consecutive patients were included in this study, 67% were female and 33% male. Average age was 54.3 years. 125 patients (97.6%) were successfully treated using a laparoscopic approach; three patients (2.3%) had to be converted to open surgery. The mean operative time required was 68 minutes (26-247 min). A composix (PTFE-e/ prolene) mesh was used in all cases and was fixed to the fascia with titanium tackers and transfascial sutures. The average mesh size was 274.5 square cm. The largest mesh used was 891 sq cm (33 cm X 27 cm). The average length of stay was three days (1-12 days). The major complications seen in our series were one death, 1 small bowel injury, 2 small bowel fistula, 3 recurrences, 1 removal of mesh, 4 seromas and 2 patients developed post-operative intra abdominal bleeding.

Conclusion: Laparoscopic incisional hernia repair is a compelling innovation in the realm of advanced laparoscopic surgery. Laparoscopic incisional hernia repair has several benefits of minimally invasive surgery as well as low medium term recurrence rate, an acceptable low complication rate, a low rate of conversion and can be easily performed even in very large hernias with multiple defects.

Minimally Invasive Other–P394

ROLE OF SUBFASCIAL ENDOSCOPIC PERFORATOR SURGERY(SEPS) BY HARMONIC SCALPEL IN MANAGEMENT OF CHRONIC VENOUS INSUFFICIENCY OF LOWER LIMBS, SUDHIR K JAIN, P N AGARWAL, MAULANA AZAD MEDICAL COLLEGE, NEW DELHI, INDIA

This study was conducted in Dept of Surgery, Maulana Azad medical College, New Delhi. 30 male patients suffering from chronic venous insufficiency of lower limbs were selected for this study. All the patients gave informed consent before entering in to this study. All patients were suffering from class 3 to class 5 disease according to CEAPS classification .10 patients had only skin changes , 8 patients had skin changes plus healed venous ulcers & 12 patients had active venous ulcers.

All patients had evaluation of venous system of both lower limbs by color Doppler study to look for perforators & incompetence of sapheno-femoral or sapheno-popliteal junction. All these patients under went subfascial endoscopic perforator surgery (SEPS) by two port technique. Perforators were taken care by harmonic scalpel. SEPS was combined with flush ligation of sapheno-femoral junction & stripping of long saphenous vein up to knee joint.

All these patients were followed in the surgical clinic on monthly basis for 12 months.

All these patients had repeat colour doppler study of lower limbs for veins after one month of surgery to look for any residual perforators.

In the follow up ,these patients were monitored for healing of ulcers & reversal of skin changes. A note was also made for cosmetic outcome & return to activity.

Results:- Our results are very encouraging . We reccomond SEPS as proceedure of choice for management of chronic venous disease of lower limbs.We want to presnt these results in the forthcoming conference.

Minimally Invasive Other-P395

DOES OPEN SURGERY STILL HAVE A ROLE IN ELECTIVE SPLENECTOMY?, A P Boddy BM BCh, D Mahon MD, M Rhodes MD, Department of Surgery, Norfolk and Norwich University Hospital, Norwich, UK

Introduction: Since it was first reported in 1991, laparoscopic splenectomy has become the procedure of choice for elective splenectomy. However, doubts have been raised regarding the suitability of patients with splenomegaly (>1 kg) for laparoscopic resection, as there have been reports of greater morbidity and higher conversion rates in this group of patients. Since 2000, patients referred to this centre for splenectomy with an estimated spleen weight of >1 kg have had a splenectomy by the open approach.

Methods: Between September 1995 and April 2005, 95 elective splenectomies were performed by a single surgeon. Operative data was collected prospectively.

Results: Comparing the operations that took place prior to 2001 (n=47) with those after 2000 (n=48) for all sizes of spleen, there were significant reductions in conversion rate, operative time and hospital stay in the later group. When laparoscopic splenectomy (n=11) was compared to open splenectomy (n=18) for cases of splenomegaly, open surgery resulted in a significantly shorter operative time with a lower operative blood loss and no significant difference in hospital stay.

Conclusion: Although laparoscopic splenectomy is the treatment of choice for the majority of patients requiring elective splenectomy, the procedure for patients with significant splenomegaly requires caution and common sense. We have found that performing an open splenectomy in these patients significantly reduces operative time and blood loss without increasing morbidity or hospital stay.

Minimally Invasive Other-P396

LAPAROSCOPIC REVISION OF FAILED PERITONEAL DIALYSIS CATHETERS, Stacy Brethauer MD, Carolina Goncalves MD, Adrian Dan MD, Sri Chalikonda MD, Valentine Nfonsam MD, Steven Rosenblatt MD, Cleveland Clinic Foundation, Cleveland OH

INTRODUCTION: Peritoneal dialysis catheters (PDC) frequently require revisions. The aim of this study was to review our experience with laparoscopically-placed PDCs, identify factors associated with catheter malfunction, and assess the utility of laparoscopic PDC revision.

METHODS: Between 02/02 and 07/05 103 catheters were placed in 67 patients. Patient age, prior abdominal surgery, adhesions, time to catheter failure and reasons for malfunction were analyzed. Laparoscopy was performed to evaluate the non-functioning PDCs. Causative factors for failure were identified and subsequent revision, replacement, or removal of the PDCs was completed. Preperitoneal tunneling of the PDC with or without omentopexy was performed in our most recent 31 cases.

RESULTS: 51 PDCs required revision or removal in 27 patients. 13 patients underwent one procedure and 14 patients had multiple revisions (up to 4). PDC?s failed an average of 140 days after placement (range 1-660). The most common reasons for revision or removal were non-function (67%), peritonitis (16%), and exit site leak or cuff erosion (8%). Overall, 18 catheters were replaced laparoscopically, 12 were repositioned, 17 were removed, and there were 4 exit site revisions to preserve the catheter. Laparoscopic findings for the 34 non-functioning PDC?s were migration/adhesions (10), omental wrapping of the catheter (8), fibrin clot (2), and subcutaneous kinking (2). Four patients had normal findings at the time of revision. 26/34 (76%) non-functioning PDC?s were salvaged laparoscopically, ultimately allowing continuation of PD in 14/21 (67%) of these patients. Previous abdominal surgery and lysis of adhesions at the time of placement did not correlate with catheter failure. Preperitoneal tunneling of PDC in the last 31 cases resulted in only one catheter failure (5 month f/u, p=ns).

CONCLUSION: Laparoscopy is a valuable tool in preserving PDC function. Advanced techniques of PDC placement, including catheter tunneling and omentopexy may reduce the need for laparoscopic revisions.

Minimally Invasive Other-P397

LOW COST CLIPLESS MINILAPAROSCOPIC CHOLECYSTECTOMY? A STUDY OF 528 CASES, Gustavo L Carvalho PhD, Thiago G Vilaça, Mauro C Luna MD, Daniel G Araújo, Frederico W Silva MD, Carlos H Ramos MD, Gilvan Loureiro MD, Pernambuco State University, School of Medicine, Recife, Brazil; Gustavo Carvalho Surgical Clinic

INTRODUCTION: With the recent advances in minimally invasive surgery, it has been possible to use more accurate items of equipment with a reduced diameter, which has led to state-of-the-art 2-mm instruments (needle trocars). Nevertheless, 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 mini-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.

METHOD: From Jan 2000 to Aug 2005, 528 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 intra-operative cholangiography. **Technique -** After performing the pneumoperitoneum at the umbilical site, four trocars are inserted; two of 2-mm (support trocars), one of 3-mm (work trocar) and one 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 528 patients (80.9% females; 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 18 hours (96% were discharged within 24 h). There was no conversion to open surgery; 2.3% of patients (underwent conversion to standard (5-mm) lap-chole because of difficulty with the procedure; there were 1.1% minor umbilical site infections and 0.75% incisional herniations. There was no mortality, no bowel injury, no reoperation, no bile leakage, no bile duct injury and no postoperative hemorrhage.

CONCLUSION: Mini-lap chole 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.

Minimally Invasive Other-P398

LAPAROSCOPIC PARTIAL ADRENALECTOMY AND CYST RESECTION FOR A SYMPTOMATIC ADRENAL CYST, Kuo-Hsin Chen MD, Heng-Fu Lin MD, Jiann-Ming Wu MD, Shih-Horng Huang MD, Li-Ming Tseng MD, Far-Eastern Memorial Hospital, Taipei, Taiwan

Symptomatic adrenal cyst is rare. Reasonable treatments include marsupialization of the cyst or resection. However, traditional open surgery mandated a large flank incision. Along with the accumulation of experience on laparoscopic adrenalectomy, we applied this approach to a 40 y/o woman with a large symptomatic left adrenal cyst.

This 40 y/o woman was admitted for progressive left flank pain and subsequent image studies revealed a retroperitoneal cystic lesion in left upper abdomen. Laparoscopic transabdominal exploration was done through standard setting for laparoscopic adrenalectomy. Left adrenal cyst was found during the procedure. Partial adrenalectomy and total excision of the cyst were completed laparoscopically. The patient recovered uneventfully and remained symptom free at follow-up of 9 months. Follow-up image did not reveal recurrent disease.

Laparoscopic management of the retroperitoneal cyst is feasible with potential benefits of minimally invasive surgery. Total resection of the cyst with or without partial adrenalectomy is possible. The surgical approach is quite similar to that of laparoscopic adrenalectomy.



Minimally Invasive Other-P399

THE ROLE OF LAPAROSCOPY IN THE MANAGEMENT OF THE PATIENTS OF UPPER GASTROINTESTINAL CAUSTIC INJURY, Yi-Chen Chang MD, Chung-Wei Chen MD, Department of Surgery, Far Eastern Memorial Hospital, Taipei, Taiwan

Objective: Panendoscopy (PES) is recommended for the patients of caustic injury to evaluate the depth of injury and helps to make decision. However, the PES findings can not accurately measure the depth of injury. Overestimation of the injury and unnecessary laparotomy maybe a problem. We do laparoscopy for the patients of the third degree injury without evidence of perforation to avoid unnecessary laparotomy.

Material and method: For the patients of UGI caustic injuries, PES were done within 24 hours after the episode. The endoscopic grading system of corrosive burns of esophagus and stomach was proposed by Estrera A in 1986. For the patients of grade III injury, surgical intervention is indicated. If there is evidence of perforation, emergent laparotomy will be done. If there is no evidence of perforation, laparoscopy will be applied. The final operative procedures depends on the laparoscopic findings.

Results: From July 2004 to June 2005, there were 8 patients of UGI caustic injuries diagnosed as grade III injuries by PES findings. Five patients had evidence of stomach perforation clinically, and emergent laparotomy were done. The other three patients were diagnosed as grade three injuries, but the clinical symptom and signs did not suggest perforation.

Laparoscopy were applied to these three patients. One patient received total gastrectomy and subtotal esophagectomy because of serosa necrosis although there was no perforation. The other 2 patients received feeding jejunostomy only. These two patients had late complications as pyloric stenosis, and received gastrojejunostomy 4 months post injury.

Conclusion: Panendoscopy findings can not accurately measure the depth of caustic injury. For the patients of grade III injury without evidence of perforation, laparoscopy is a good method to clarify the extent of injury and avoid unnecessary laparotomy.

Minimally Invasive Other-P400

FACTORS RELATED TO PROVISION OF LAPAROSCOPIC APPROACH FOR APPENDECTOMY: SURGEON OR TIMINGS?, Sajid Mahmud MD, B Darmas, J Paniker, J K Pye MD, A L Baker, Wrexham Maelor Hospital

Background: Laparoscopic appendectomy (LA) has show better cosmetic and early if recovery benefits. Still all patients with clinical diagnosis of Acute Appendicitis (AA) will not be offered laparoscopic approach.

The aim of this study is to identify the factors determining availability of laparoscopic approach for patients with clinical diagnosis of AA.

Methods: Retrospectively collected data was analysed on 1079 cases of appendectomies during the five years period between 1999 and 2004. Theatre computer data was used to study the timing and availability of surgeons.

Results: Total of 1079 cases of appendectomies were identified. 1034 (95%) open approach and 55 (5%) were LA. 15 male and 40 female. Age range 15 to 70 years, 45 (81%) under the age of 40 and 10 (19%) over the age of 40. Emergency operation was carried out in 49 (89%), elective 4 (7%) and 2 as interval appendectomies. Histology reported to be acute appendicitis in 29 (52%), normal in 23(41%), adenocarcinoma 1, carcinoma 1 and endometriosis in 1. 80% LA were carried out before 6 p.m. and 18 % between 6 p.m. and midnight. Only 1 case was done after midnight. Out of seven Consultants only 2 performed 18 (32%) cases, 37 (67%) were done by only three trainees. The surgeons having interest in laparoscopic surgery carried out all the operations.

Conclusion: Timing of the day and the surgeon on call either consultant or registrars are the major factors determining whether a patient will have laparoscopic or open appendectomy.

Minimally Invasive Other-P401

EFFICACY OF LAPAROSCOPIC MESENTERIC/ RETROPERITONEAL LYMPH NODE BIOPSY, Lewis A Diulus MD, Sricharan Chalikonda MD, Stephen Rosenblatt MD, Cleveland Clinic Foundation

Objectives: To determine the efficacy of laparoscopic mesenteric and retroperitoneal lymph node biopsy.

Methods and Procedures: Retrospective review of all patients who underwent laparoscopic mesenteric biopsy at a single institution between September of 2001 and May 2005. Patient charts were reviewed and data was collected including demographics, conversion rates, ability to obtain adequate tissue for pathologic evaluation and treatment based on biopsy results.

Results: 18 patients underwent laparoscopic evaluation of mesenteric and retroperitoneal adenopathy identified radiologically. None of the patients in our series were candidates for percutaneous biopsy. Laparoscopic lymph node biopsy was completed successfully in 14(78%) patients. Four patients were converted to laparotomy. Two patients were converted due to difficulty indentifying the mass laparoscopically, one patient was converted for inability to obtain adequate tissue laparoscopically and one for uncontrolled bleeding.

Eleven patients (61%) had a change in management based on results of tissue obtained at laparoscopic lymph node biopsy. Four patients were found to have lymphoma, two patients had granulomatous inflammation which ruled out lymphoma, two patients were diagnosed with Castleman's disease, one had metastatic adenocarcinoma, one patient had a peritoneal inclusion cyst, and one had benign lymphoid hyperplasia. In four patients additional studies were required to secure a diagnosis. One patient required mediastinoscopy, and in three patients superficial masses later developed which were biopsied to establish a diagnosis.

Conclusion: Laparoscopic biopsy of retroperitoneal and mesenteric lymph nodes can be employed when percutaneous biopsy is not possible. Although feasible the procedure is limited by the inability to obtain adequate volume of tissue and difficulty in locating the tissue of interest laparoscopically.

Minimally Invasive Other-P402

LAPAROSCOPIC TREATMENT OF CONCURRENT ECTOPIC PREGNANCY AND ACUTE APPENDICITIS, H. Elhassan MD, J. Erkins MD, N. Ahmed MD, Huron Hospital, CCHS Cleveland

Objective: To evaluate the role of laparoscopy in identifying concurrent appendiceal pathology during ectopic pregnancy treatment.

Method: This is a case report of 25-year-old female who presented with tubal pregnancy. Diagnostic laparoscopy revealed right tubal pregnancy growing into the appendix with evidence of appendicitis. Both appendix and ectopic pregnancy were treated through laparoscopic approach. A review of the literature has been conducted to specifically identify the role of laparoscopy in the management of tubal pregnancy and appendicitis.

Conclusion: As laparoscopic management of tubal pregnancy has become a standard form of treatment; more cases of concurrent appendiceal pathology were identified and treated. Pictures and radiologic films are available to be submitted when requested

Minimally Invasive Other-P403

LAPAROSCOPIC TREATMENT OF INTESTINAL MALROTATION, H. Elhassan MD, S. Thekkeurumbil MD, J. Yuh MD, Robinson Memorial hospital, Huron hospital CCHS

Objective: Evaluate the role of Laparoscopy in the management of intestinal malrotation in adults.

Method: Case report of a 19-year-old female with long term intermittent vague abdominal pain and constipation. CT abdomen was suggestive of malrotation. Further workup with barium studies confirmed intestinal malrotation, specifically non-rotation. No volvulus suspected clinically and radiographically. Diagnostic laparoscopy revealed membranous (Ladd) bands extending from 3rd portion of duodenum to the cecum forming a sac with the entire small bowel within it.

Laparoscopic opening of the sac and lysis of the bands was performed. Patient had previous appendectomy. Patient recov-



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ered uneventfully.

Conclusion: Laparoscopic management of intestinal malrotation has been performed in few cases with significantly less operative morbidity and comparable outcome to open approach.

Pictures and radiographs available to be submitted on request

Minimally Invasive Other-P404

LONG TERM FOLLOW UP OF A NOVEL TECHNIQUE FOR LAPAROSCOPIC INCISIONAL HERNIA REPAIR, Alec H Engledow MD, Clare Medhurst MD, Stephen J Warren MS, Roger W Motson MS, Colchester Hospital, Turner road, Colchester, Essex, CO4 5JL UK

Introduction: Open incisional hernia repair is associated with high morbidity and recurrence rates. Laparoscopic approaches offer improved long term results with low complication rates.

Method: Laparoscopic repair was attempted in 117 consecutive patients (median age 68, range 31-91, 50 male) undergoing 122 operations. Patient data recorded prospectively included age, sex, number and size of ports, additional clinically undetected defects, mesh size, operative time, conversion, inadvertent enterotomy, inpatient hospital stay and the type of original incision. Early and late postoperative complications were recorded. All operations were performed or supervised by a single consultant surgeon (RWM). Follow up was by clinical review or telephone consultation. A novel mesh centralisation technique was employed. This involved placing a suture with a straight needle in the centre of the mesh prior to inserting the rolled mesh into the abdomen via one of the laparoscopic ports. The mesh was then unrolled in the abdomen and the needle passed through the centre of the defect through the anterior abdominal wall. This allows for easy centralisation of the mesh over the defect. The mesh can then be stapled in place with at least a 3cm overlap on all sides.

Results: 118 procedures were completed laparoscopically (97%), four required conversion. 34 (28%) were recurrent hernia repairs. 41 (35%) patients had additional, unsuspected defects. Median mesh size 225cm². Median operating time was 45 minutes (range 15-210). Median hospital stay was 1 day. Median follow up was 42 months. Enterotomy occurred in 6 patients. All were repaired and mesh inserted. In 3 patients the mesh became infected and was subsequently removed. 14 postoperative seromas were successfully aspirated. Recurrence was detected in 9 patients. 1 patient was readmitted with small bowel obstruction that settled conservatively. There were no enterocutaneous fistulae. The original incisions were 51 mid-line, 18 Pfannenstiel, 16 transverse, 10 paramedian, 7 Kochers, 6 Lanz and 1 port site. 9 patients were lost to follow up. There was one postoperative death.

Conclusions: Self-centered laparoscopic incisional hernia repair provides good long-term results with low complication rates. The use of the self-centering suture has considerably simplified the technique and contributed greatly to the short operating time for the majority of cases. If an enterotomy occurs mesh should not be inserted.

Minimally Invasive Other-P405

FAST-TRACK ADVANCED LAPAROSCOPIC SURGERY IN AN AMBULATORY SURGERY CENTER. A FOUR-HOUR STAY, Jean-Pierre Gagné MD, Omar Al-Obeed MD, Shaheer Tadro MD, Vijay Moonje Moonje MD, Jean-Denis Yelle MD, Eric C Poulin MD, Ottawa Hospital, Ottawa, Ontario, Canada

Objectives: This is a review of advanced laparoscopic procedures performed on an outpatient basis in the ambulatory campus an Academic Health Sciences Center.

Methods: Charts and the follow-up call log by nursing were reviewed.

Results: Over three years, 55 patients, (71% male; median age 41 years, range 18-72) underwent 50 Nissen fundoplication (NF) and 5 adrenalectomies (ADR). Selection criteria included absence of significant co-morbidities and patients' presence in town for 48 hours post-op. Co-morbidities were present in 18 patients (32%) and 13% had previous upper abdominal surgery. Discharge criteria were based on hemodynamic stability, ability to ambulate and absence of nausea, pain or bleeding. Median operative time was 85 min (NF, 80 min; ADR, 140 min).

There were two intraoperative complication (partial splenic infarction, bleeding). There was no mortality or conversion to open surgery.

The median postoperative stay was 4.5 hr (range 2.4-7.5). Two patients (3.6%) were transferred to an in-patient site for admission (see intraoperative complications above). Five patients (9%) visited the Emergency Department of the in-patient sites in the month following their surgery. Four needed admission (dysphagia, slipped Nissen, dehydration, pain). Readmission rate at one month was thus 11%. One patient (1.8%) needed remedial surgery for a slipped Nissen.

Data on the day-one nursing postoperative telephone follow-up was available for 50 patients (91%); 34 were successfully contacted. Twenty-four (70.5%) had no complaint. Symptoms reported were: pain (7), dysphagia (1), dysuria (1), sore throat (1), hiccup (1) and nausea (1).

Conclusion: Successful fast-track outpatient surgery for some advanced laparoscopic procedures is achievable. Precise selection and discharge criteria combined with appropriate follow-up should decrease readmission rate and patient discomfort.

Minimally Invasive Other-P406

THERAPEUTIC LAPAROSCOPY FOR PENETRATING AND BLUNT ABDOMINAL TRAUMA, Nissim Geron MD, David Hazzan MD, Poriah Medical Center, Department of Surgery Tiberias, Israel and Carmel Medical Center, Department of Surgery B, Haifa, Israel

Background: At present, Laparoscopy is used mainly as a diagnostic tool in patients with abdominal trauma. The purpose of this study was to evaluate the role of therapeutic laparoscopy in the management of trauma patients with penetrating and blunt abdominal injuries.

Patients and Methods: All patients with abdominal trauma who were treated with laparoscopy were identified. Results: A total of six patients were included in the study. Five patients with penetrating abdominal trauma and one patient with blunt trauma.

All patients were hemodynamically stable, and all of them underwent exploratory laparoscopy. During the exploration a total of 7 intra-abdominal injuries were identified and treated. Three stomach lacerations were sutured primarily in two layers. One diaphragmatic hernia was repaired using interrupted 0- silk sutures. One jejunal perforation was repaired using a two layers 2-0 silk running suture; two liver lacerations and one spleen laceration were treated with conservative surgical tools.

Mean length of stay was 3 days. The mortality and morbidity rates were Zero.

Conclusions: Laparoscopy can avoid a number of unnecessary laparotomies and can treat most of the lesions found in hemodynamically stable patients in penetrating and blunt abdominal trauma.

Minimally Invasive Other-P407

LAPAROSCOPY VS MINI-LAPAROTOMY PERITONEAL DIALYSIS CATHETER INSERTION, Ghassan Hadi MD, Mark Borgaonkar MD, David Pace MD, Dept. of Surgery, Memorial University of Newfoundland

Introduction: End stage renal failure can be effectively treated with peritoneal dialysis. The peritoneal dialysis (PD) catheter can be placed by either a mini-laparotomy or by laparoscopy.

Objectives: To compare the outcome of the two PD catheter insertion techniques.

Methods: A retrospective audit of a prospectively collected database of 56 cases performed from 2002 to 2004.

Results: 42 patients underwent laparoscopy and 14 patients had a mini-laparotomy. The mean age and sex of the two groups was similar. The mean operative time for the laparoscopic procedure was less than the open technique (31.3 ± 8.9 vs. 56.8 ± 22.1 min; p<0.05). There was no significant difference in mean length of stay (1.23 ± 1.54 vs. 1.33 ± 0.78; p=0.76) or median length of stay. Laparoscopy was used in 3 of the mini-laparotomy cases to reposition the catheter because of poor flow noted at the time of surgery. There were no intraoperative complications. Post operatively, with a mean follow-up of 14 months, there were no statistically significant



differences in complications between groups. Interestingly, the infection rate was numerically higher in the laparoscopy group (12% vs. 0%) while the rate of catheter dysfunction/blockage tended to be higher in the mini-laparotomy group (21% vs. 10%). Four of the seven catheters in the laparoscopy group that failed to work were either rescued or reinserted laparoscopically.

Conclusion: Complications following the insertion of a peritoneal dialysis catheter are not uncommon. Laparoscopy is a reasonable alternative for catheter insertion and appears faster to perform than mini-laparotomy.

Minimally Invasive Other-P408

PROSPECTIVE ANALYSIS OF SHOULDER PAIN FOLLOWING LAPAROSCOPY, Shalini Kanneganti MD, Guido Sclabas MD, Yashodhan Khajanchee MD, Klaus Thaler MD, Merrilee Alexander, Lee Swanstrom MD, Minimally Invasive Surgery Department, Legacy Health System, Portland, OR.

Objective: One of the major benefits of laparoscopic surgery is a decrease in the patient's pain post op. Unfortunately a percentage of patients have referred shoulder pain which can decrease the early benefits of this approach such as shorter hospital stay and less need for postoperative analgesia. The objective of our study is to establish the incidence and to identify patient or operative factors that are predictive for postop shoulder pain.

Methods: A total of 44 consecutive patients (mean age 52.7 (SD14.8), male 22.7%) undergoing various laparoscopic procedures at our institution from July 1- Aug 31, 2005 were included in the study. Complete pre and postoperative pain assessment and QOL were recorded. Patient demographics, operative procedure, length of procedure, complications and length of hospital stay were collected prospectively as well. Univariate and multiple logistic regression analysis were performed to identify factors significant for postop shoulder pain and comparisons were done using appropriate tests. P-values of <0.05 were considered significant.

Results: 30(68.1%) patients underwent laparoscopic upper abd surgery and 14 (31.9%) had laparoscopic lower abd surgery. Mean hospital stay was 2.8 days. A total of 22 (50%) patients had postoperative shoulder pain. 12/22 (54.5 %) patients had moderate to severe pain (mean analog pain score = 3.8, SD 0.7). The mean analog pain score for incisional site pain in these patients was 1.7 (SD 1.2). There was no difference in the incisional pain score between the patients having shoulder pain vs no shoulder pain (p=0.8). Mean duration of shoulder pain was 7.6 days (SD 4.6) vs 6.5 days (SD 5.4) for non shoulder pain patients. Patients undergoing upper abd procedures had significantly greater odds of having postoperative shoulder pain (OR 6.3, CI 1.4-27.7, p=0.01). Odds also increased in male patients (OR 1.6, CI 0.4-7.1), younger patients (OR 4.3, CI 1.0-19.3) and in patients where duration of procedure was longer than 2 hrs (OR 1.6, CI 0.4-7.3), none of these were significant.

Conclusion: We have found that referred shoulder pain is present in over half of post laparoscopy patients. The severity of this pain exceeds the pain from the abdominal incisions by a factor of 2.1. Risk factors include upper abd surgery, young males and long surgeries. This indicates the need for significant investigations into the causes and treatments of referred shoulder pain and its effect on length of hospital stay.

Minimally Invasive Other-P409

SUBFASCIAL ENDOSCOPIC PERFORATOR VEIN SURGERY: A PROSPECTIVE STUDY., Davide Lomanto MD, Avinash Katara, Wei-Keat Cheah, Jimmy So, Minimally Invasive Surgical Centre, Department of General Surgery, National University Hospital.

[AIMS]Subfascial endoscopic perforator surgery (SEPS) for ligation of incompetent perforator veins is a surgical option for patients with ulcers resulting from incompetence of superficial and perforating veins, with or without deep vein incompetence.

[METHODS] 21 patients (16F:5M) (42-82 yrs, means 60) with chronic venous insufficiency underwent SEPS procedure. Preoperative assessment of the limb's vascular status consist-

ed of color-flow duplex ultrasound imaging, ascending and descending phlebography, with venous mapping.

[RESULTS] A total of 34 limbs (13 bilateral and 8 unilateral) underwent SEPS procedure. According to CEAP classification for venous limb disease, 16 limbs belonged to group C5 (skin changes, pigmentation, venous eczema, lipodermatosclerosis, healed ulcer) and 5 limbs to group C6 (skin changes and active ulceration). SEPS was performed utilizing two trocars (12mm, 5mm). The subfascial space was dissected upto the medial malleolus and all perforator veins encountered were isolated and transected, using clips (n=11) or ultracision (n=10)(Ethicon Endosurgery, USA). There was no significant morbidity: 2 wound infections, 1 hematoma. Intraoperatively a mean of 5 perforator veins (range: 3-8) were detected and ligated. Sapheno-femoral ligation was also performed in 32 limbs (94%). Of the 5 limbs in class C6 all showed ulcer healing within the follow-up period of 12 weeks.

[CONCLUSIONS] This study demonstrated the effectiveness of the SEPS procedure for patients with chronic venous insufficiency. Minimal postoperative complications accompanied by ulcer healing and relief of lower extremity symptoms were achieved for all patients, underscoring the important role of incompetent perforator veins in the formation of chronic venous insufficiency.

Minimally Invasive Other-P410

USAGE OF THE LAPAROSCOPIC SURGERY FOR FITZ-HUGH-CURTIS SYNDROME., Yoshio Kobayashi MD, Hideaki Andoh MD, Tasturu Akashi MD, Yuichi Tanaka MD, Takao Hanaoka MD, Division of Surgery, Nakadori General Hospital

Purpose: Fitz-Hugh-Curtis syndrome shows the varied symptoms, such as sharp right hypo-chondralgia, fever, lower abdominal pain, etc, with the circumference liver flame accompanying female Chlamydia or Gonococcal infection, we performed laparoscopic surgery for the purpose of diagnosis and treatment.

Patients: Five patients who were diagnosed as pelvic peritonitis and presented the strong abdominal symptom at our hospital.

Methods: Conducting diagnosis on the pelvic peritonitis by history taking, gynecological examination and Abdominal CT, laparoscopy was performed under general anesthesia to narrow the differential diagnosis of peritonitis and acute abdomen. The three ports are inserted in the navel lower part and a right-and-left side abdomen, 10, 5, 5mm indiameter respectively. Peritoneal lavage from the pelvis to the bottom of a both-sides diaphragm after observation and pus extraction were performed under laparoscopy. We gave Tetracycline or Levofloxacin for these patients.

Results: One of five patients made an incision in the abdomen as acute abdomen and another one got better in preservation. Peritoneal lavage in under laparoscopy was carried out for three cases. Four had Chlamydia infection and one had Gonococcal infection. With the peritoneal lavage, pain got better in the early stage, and they passed favorably. There were no complications by laparoscopic surgery.

Conclusion: Laparoscopic surgery was useful for diagnosis and treatment for these cases to conduct diagnosis on pelvic peritonitis and acute abdomen.

Minimally Invasive Other-P411

MINIMALLY INVASIVE TOTAL/NEAR TOTAL THYROIDECTOMY: THE LENGTH OF THE INCISION, Andreas Kiriakopoulos MD, Dimitrios Tsakayannis MD, Dimitrios Linos PhD, Department of Surgery, "Hygeia" Hospital, Athens, Greece

Introduction: The length of the cervical incision has been the key component for total or near total thyroidectomy to be considered as minimally invasive. We analyze the variables influencing the length of the incision in total or near total thyroidectomy for benign and malignant thyroid diseases

Materials and Methods: One hundred ninety seven consecutive patients (159 females and 38 males, mean age 43.2yrs (range14-75) with various thyroid diseases operated on between January 2004 and December 2004. Univariate and multivariate analysis was performed to distinguish variables affecting length of incision. The examined variables included



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the thyroid pathology, thyroid specimen volume, patient age, BMI, anatomic cervical characteristics (thyroid-mandible distance, chin span). Each thyroidectomy started with a pre-measured skin incision of 3 cm that was extended if necessary

Results: Mean length of incision for total or near total thyroidectomy was 3.5 cm (range 3.0-4.5) for the whole series. There were one hundred forty one patients with multinodular goiter, 40 patients with malignant disease (34 papillary/follicular carcinomas, 3 medullary, 2 C-cell hyperplasias, 1 anaplastic carcinoma) and 16 patients with hyperthyroidism (13 Grave's disease and 3 toxic adenomas). By multiple regression analysis thyroid specimen volume and anatomic cervical factors were independent factors for the incision length in thyroidectomy. BMI was not found to be a predictive factor for the length of the incision.

Conclusion: Shorter cervical incision is feasible and contributes to the minimally invasive nature of the total/ near-total thyroidectomy

Minimally Invasive Other-P412

LAPAROSCOPIC MANAGEMENT OF STUMP APPENDICITIS, Jonathan C Liu MD, Jack Needham MD, Glenn Parker MD, Monmouth Medical Center

Introduction: Stump appendicitis is an exceedingly rare disorder. A search of the literature reveals that the number of reported cases is on the order of approximately three dozen. The scenarios range from status post open and laparoscopic appendicitis and months to decades after the primary operation. It is believed that since the advent of the laparoscopic approach for appendectomy that the incidence has risen. Unfortunately the rarity of the disorder combined with the possibilities of underreporting precludes a formal review. We present our laparoscopic management and treatment of a stump appendicitis from a previous laparoscopic appendectomy.

Method: This is 39 year old male who underwent laparoscopic appendectomy in 1996 for acute nonperforated appendicitis. The appendix was removed using a linear stapler under direct visualization. In 2005 the patient presented to the ER with right lower quadrant pain and a CT scan demonstrating a 3 cm tubular structure at the cecum. The patient was operated on laparoscopically for presumptive stump appendicitis versus duplication of the appendix.

Result: A retrocecal appendix was identified. Laparoscopic appendectomy was performed using a 45-mm GIA 3.5 stapler after the base of appendix was clearly identified. The patient tolerated procedure well and was discharged home day after surgery. Surgical specimen revealed two staple lines on the appendix, one from the most recent surgery and one from the first surgery.

Conclusion: Stump appendicitis can occur in both open and laparoscopic appendectomy. With the advent of laparoscopic surgery for appendectomy, careful attention not to leave a long appendiceal stump is the only mean to avoid this occurrence.

Minimally Invasive Other-P413

LAPAROSCOPIC MANAGEMENT OF LARGE LIVER CYST: A CASE REPORT, Jonathan C Liu MD, Jack Needham MD, Adam Kopelan MD, Newark Beth Israel Medical Center and Monmouth Medical Center

Introduction: Cystic lesions of the liver are known to have various etiologies. The most significant of which are the simple cysts, hydatid cysts, polycystic liver disease, cystadenoma and cystadenocarcinoma. The majority of which are simple asymptomatic cysts found incidentally on radiographic studies. As these cysts become symptomatic the risks of significant morbidity as well as mortality has been known to occur usually from mass effect within the liver parenchyma and adjacent structures. We report our laparoscopic management of a large liver cyst.

Method: Laparoscopic unroofing has been considered a viable alternative to open procedures for a giant symptomatic liver cyst. Here we present a case of a 45 year old female with a giant symptomatic liver cyst. Treatment was via laparoscopic unroofing (figure 1) after the cyst was revealed by a CT Scan.

Result: The patient had an uneventful hospital course and was discharged from the hospital 2 days postoperatively. There was no perioperative or postoperative morbidity, and the patient's discomfort was relieved from the pressure of the liver cyst. To this day the patient remains asymptomatic and without recurrence at 12 months follow up.

Conclusion: Laparoscopic management and treatment of simple liver cyst can be practical and definitive way in comparison with percutaneous aspiration and sclerotherapy. Laparoscopic surgery can be a safe and definitive treatment for giant liver cyst.

Minimally Invasive Other-P414

LAPAROSCOPIC MANAGEMENT OF SPLENIC CYSTS: MARSUPIALIZATION, CAVITY LINING WITH SURGICEL AND OMENTOPEXY, Ryan J McColl BS, Dave Hochman MD, Clifford Sample MD, Grey Nuns Hospital, Department of Surgery, University of Alberta, Edmonton, Alberta, Canada

Introduction: Benign, non-parasitic splenic cysts are rare clinical entities. Open total splenectomy, once the treatment of choice, has largely been replaced by laparoscopic, splenic preserving procedures. This has resulted in improvements in post-operative pain scores and reduced hospital stays.

Additionally, the preservation of splenic function and immunity against encapsulated bacteria removes the risk of overwhelming post-splenectomy infection. We report two cases of laparoscopic management of large, symptomatic, benign splenic cysts with 6-month follow up.

Methods: Two female patients, ages 24 and 32, presented with symptomatic splenic cysts measuring 11x10x9cm and 14x12x11cm respectively. The first was a simple cyst by history, the second a post-traumatic cyst. Both patients were successfully treated by laparoscopic cyst drainage and marsupialization followed by lining the cavity with Surgicel (Ethicon, Somerville, NJ) and performance of an omentopexy.

Results: Both procedures were performed without intra-operative or peri-operative complications and the patients were discharged home on post-operative days 1 and 2 respectively. At 6-months, both patients showed complete resolution of symptoms with no radiologic evidence of recurrence. Pathologic examination of the cysts confirmed the preoperative diagnoses.

Conclusion: Laparoscopic marsupialization of splenic cysts in combination with lining the cyst cavity with Surgicel and omentopexy is a safe, feasible, and efficacious method of management with excellent results at 6 month follow-up.

Minimally Invasive Other-P415

LAPAROSCOPIC MANAGEMENT OF DISTAL VENTRICULOPERITONEAL (VP) SHUNT COMPLICATIONS, Valentine N Nfonsam MD, Raymond Turner MD, Mark Luciano MD, Bipan Chand MD, Steven Rosenblatt MD, Cleveland Clinic Foundation, Cleveland, Ohio

INTRODUCTION: The traditional management of hydrocephalus remains the placement of VP shunts. However, the majority of patients will require one or more revisions over their lifetime. Revisions may be required for infections, proximal site malfunction or distal catheter complications. We present our experience with distal catheter complications managed laparoscopically.

METHODS AND PROCEDURE: Patients with recurrent symptoms of increased intracranial pressure or abdominal complaints were evaluated for shunt malfunction. Dedicated radiographic imaging was performed based on patient's symptoms and included computed tomography of the head and abdomen, shunt series and ultrasound of the distal catheter.

RESULTS: From April 2003 to July 2005, 13 patients with distal VP shunt complications were managed laparoscopically. All patients were determined preoperatively not to have an infection based on CSF cultures. These patients were found to have distal catheter failures by radiographic imaging. Preoperatively, 5 abdominal CT scans, 6 shunt series and 4 abdominal ultrasounds were obtained. All studies singly and positively identified the appropriate abdominal catheter defect except in three patients that required multiple sequential radiographic studies to finally come up with a diagnosis. Four



patients (30.8%) had malpositioning of the catheter in the extraperitoneal space. Another four (30.8%) had intraabdominal CSF pseudocysts. Five patients (38.4%) had intra-abdominal catheter malposition; 4 sub-diaphragmatic and one above the bladder. Laparoscopic repositioning was successful in all 13 patients.

CONCLUSIONS: Depending on patient's presenting symptoms, appropriate imaging studies should be obtained preoperatively in a sequential manner. Distal VP shunt complications can be safely and effectively managed laparoscopically. This approach allows for assessment of the intra-abdominal portion of the catheter, as well as treatment of the problems, therefore salvaging the existing shunt and avoiding the potential morbidity associated with additional VP shunt placement.

Minimally Invasive Other-P416

PERCUTANEOUS TRANS-ESOPHAGEAL GASTRO-TUBING (PTEG); A NON-SURGICAL APPROACH FOR ENTERAL FEEDING AND DECOMPRESSION., Valentine N Nfonsam MD, Suthep Udomsawaengsup MD, Bipan Chand MD, Cleveland Clinic Foundation, Cleveland, Ohio

INTRODUCTION: Enteral feeding and gastric decompression devices are common in critical, terminal and chronically ill patients. PTEG is a nonsurgical technique that creates an esophagostomy and allows enteral access in patients with a hostile abdomen, altered proximal gastric anatomy, massive ascites and carcinomatosis. We review our indications, technical experience, complications and short and long term quality of life (QOL) in patients that underwent the PTEG procedure.

METHODS AND PROCEDURE: Patients were terminally ill from advanced cancer requiring gastrointestinal decompression or had hostile abdomens in need for long term feeding access. The procedure requires advanced ultrasound and fluoroscopic skills. The procedure is carried out by inserting a rupture free balloon (RFB) into the cervical esophagus and utilizing transcutaneous ultrasound to puncture the balloon. A guide wire is passed through the needle into the balloon, followed by a dilator and sheath. The in-dwelling catheter is inserted through the sheath, which exits the esophagus, and resides in the stomach. Proper placement is confirmed by fluoroscopy.

RESULTS: From December 2003 to August 2005, 12 patients were treated with PTEG. All patients had advanced metastatic disease except for one patient with chronic pancreatitis. Presenting symptoms were nausea, vomiting and dysphagia. Average age was 60 years old with eight (66.6%) men. Placement was successful in all 12 patients. There were no major complications. Two patients had the minor complication of esophageal leak at the catheter site, which subsided with antibiotic therapy and complete cessation of oral intake. All patients were discharged from the hospital and had resolution of their presenting symptoms. 5 patients (38.5%) died 2 to 3 days after the procedure from their preexisting conditions.

CONCLUSION: PTEG is as safe and effective method of enteral feeding and decompression in patients that have contraindications to standard enteral access. PTEG allows patients with terminal illnesses and gastrointestinal obstruction to have better quality of life in the end stage of their disease. Appropriate patient selection and timing of PTEG placement is crucial for optimum benefit.

Minimally Invasive Other-P417

INTRACORPOREAL AND EXTRACORPOREAL LAPAROSCOPIC APPENDECTOMY: FEASIBILITY AND OUTCOME., Sajid Mahmud MD, B Darmas, S Paravastu, M Jameel, V Rao, Wrexham Maelor Hospital, Wrexham, LL13 7TD, UK

Background: Proponents of laparoscopic appendectomy (LA) emphasize the advantages in term reduced postoperative pain, early discharge, wound complications, paralytic ileus and cosmesis. Extraction of specimen can some time increase the operative time and may lead to increase port site infection rate.

The aim of our study is to assess the technique, feasibility and out come of extra-corporeal laparoscopic appendectomy (ECA) in comparison with intra-corporeal appendectomy (ICA).

Methods: Prospectively data on the patient who had laparoscopic appendectomy by a single operator was analyzed. Data

included preoperative clinical diagnosis, operative technique, operative and postoperative complication, hospital stay and histology.

Results: Total of 42 patients had LA, 31 intra-corporeal and 11 extra-corporeal. 16 male and 26 female. Age range 15 to 54 years. Mean operation time was 62 min for ICA and 50 min for ECA cases. All the patients who had ECA were thin males. Abdominal veins were easily demonstrated by endoscopic light through the abdominal wall. Right abdominal 10 mm port was places after the decision was made for ECA and was places just above the appendix base. 80% of ECA cases were done in where the appendix was well mobiles and ceecal pole was not retroperitoneal. The postoperative analgesia need was same in both groups. Mean hospital stay was similar in both groups. Five complications in groups, 2 wound infections one in each group, 1 intra abdominal collection. Urinary retention and a chest infection. Histology related to naked eye appearance and 7 out of 12 ECA were normal appendix.

Conclusion: ECA is feasible in thin males and is quicker than ICA. There is no difference in post operative recovery time and complication rate.

Minimally Invasive Other-P418

OUTPATIENT AND SHORT STAY APPENDECTOMY FOR ACUTE APPENDICITIS, Stephen R Rakower MD, Private Practice

Orange County, California

OBJECTIVE: This report confirms the validity of the treatment for nonperforated acute appendicitis on an outpatient or 23 hour hold basis.

METHODS AND PROCEDURES: Forty consecutive patients with nonperforated acute appendicitis treated by the author are the subject of this report. All patients were treated by laparoscopic appendectomy.

RESULTS: All patients were discharged within 24 hours of the surgery, eating a regular diet, with oral pain medications. Where feasible, patients were brought directly to the operating room from the emergency room and discharged home thereafter from the recovery room. If late at night, or if the patient had already been admitted to an inpatient unit, patients were returned to the hospital inpatient unit before discharge.

CONCLUSIONS: Minimal stay treatments (less than 24 hours) for acute nonperforated appendicitis is easily and safely accomplished. In many instances the entire process from emergency room visit, through diagnosis, surgical treatment and discharge to home can be accomplished without admission to a hospital inpatient unit.

Minimally Invasive Other-P419

MINIMALLY INVASIVE APPROACH FOR MANAGEMENT OF URACHAL CYST, Alan A Saber MD, Brandon M Helbling MD, Earl Norman MD, Robert Osmer MD, Michigan State University - Kalamazoo Center for Medical Studies

Introduction: Urachal abnormalities resulting from failure of the urachal structure to regress are uncommon and usually present early in childhood. Such abnormalities include the urachal cyst, vesicourachal diverticulum, umbilical sinus, alternating sinus, and the patent urachus. Traditional treatment for urachal cysts has been open surgical excision. We report a case of an urachal cyst in an adult that was managed laparoscopically.

Methods and Procedures: A 25 year-old female presented with a one day history of abdominal pain and low-grade fever. Computed tomography (CT) showed a 2 cm cystic structure deep to the umbilicus with surrounding inflammatory change. The patient was admitted with the presumptive diagnosis of infected urachal cyst and was started on intravenous antibiotics. A CT guided aspiration of the cyst was performed, yielding 4 ml of purulent material. The patient improved clinically and was discharged. The patient returned with symptoms one month later. A CT scan revealed a persistent 1.8 cm subumbilical cyst, but previously seen inflammatory changes appeared to have resolved. Due to the persistence of the symptomatic cyst, surgery was offered for definitive treatment. The patient was taken to the operating room for diagnostic laparoscopy laparoscopic urachal cyst excision. The urachal cyst was excised and the resulting umbilical fascial defect was closed



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using Gore-Tex suture. A laparotomy was avoided and the patient had an uneventful postoperative course.

Conclusion: This report illustrates the utility of laparoscopy as a safe and effective minimally invasive modality for both diagnosis and treatment of such a rare clinical entity. Our complete manuscript will illustrate the management of this patient. The figures include a preoperative CT scan, intraoperative laparoscopic view of the urachal cyst, the resulting defect after excision and the repair, and postoperative picture.

Minimally Invasive Other-P420

USE OF INTRAOPERATIVE ULTRASOUND IN LAPAROSCOPIC CHOLECYSTECTOMY - A BOON FOR SURGEONS NOT DOING INTRAOPERATIVE CHOLANGIOGRAPHY., MANMOHAN VARMA * MS, RAJESH C SHAH ** MS, * PRIVATE - KANPUR, INDIA email: manmohanv@yahoo.com ** ASSOCIATE PROFESSOR OF SURGERY, Smt. NHL MUNICIPAL MEDICAL COLLEGE, AHMEDABAD, INDIA email: drrcshah@gmail.com

OBJECTIVES: Intraoperative cholangiography (IOC) requires radiation, takes time & sometimes fails. Laparoscopic ultrasonography (LUS) is comparatively quick, safe & non-invasive. This study aims to bring forth recent literature on LUS to assess its potential as an alternative to IOC.

METHODS: Internet search was done for literature on LUS available from year 2000 to 2005; findings are presented here. **RESULTS:** LUS is a relative latecomer due to need for development of specialized transducers that could fit through trocars. Quality, reliability & ease of use have evolved rapidly, so that LUS may now be performed routinely. It looks into the tissues being operated upon, thus compensating for inability to palpate tissues. Hence it has helped to mimic open surgery & also refined techniques of laparoscopic surgeries. With increasing availability of equipment, as well as training in this modality, it is quickly becoming an essential tool for laparoscopic surgeons. For detecting CBD stones during laparoscopic cholecystectomy (LC) results are comparable to IOC.

Sensitivity is 92 - 96% for LUS & 86 ? 95% for IOC. The specificities are 100% & 99% respectively. The false-negative rate of both is <1%. Though LUS & IOC are complementary, as combination of both maximizes results; LUS is noninvasive, fast, repeatable & can corroborate real-time visualization of operative field. LUS requires less time than IOC: 10.2 minutes versus 17.9 minutes (P=0.0001). Post-clipping LUS can confirm that clips are applied to cystic duct & not to the hepatic duct or common bile duct. LC with LUS is associated with fewer CBD injuries, bile leaks & retained CBD stones than LC without adjunctive imaging. LUS can be performed in all cases but some say that anatomical anomalies are often missed. Individual training is necessary to optimize efficacy as there are considerable learning curves. Success rate of LC in cases of acute cholecystitis is slightly higher when LUS is used. It is recommended to routinely use LUS when performing LC, particularly in acute cholecystitis. Reports go on to state that LUS of the bile duct is superior to IOC & could replace it. As experience with ultrasound cholangiography increases, there may be little indication for IOC except for rare questions concerning anatomy & during therapeutic maneuvers for CBD stones.

CONCLUSION: LUS with LC is important for patient's safety if IOC is not being done. With LUS there are considerable learning curves.

Minimally Invasive Other-P421

HOW ARE DECISIONS TO IMPLEMENT NEW SURGICAL TECHNOLOGIES MADE? ? A CASE STUDY DESCRIBING ADOPTION OF ADVANCED LAPAROSCOPIC SURGERY AT A CANADIAN COMMUNITY HOSPITAL, B Sharma BS, N Danjoux MS, J Harnish BS, D R Urbach MD, Division of General Surgery, Toronto General Hospital

Objective: While many surgical technologies have improved patient care by reducing morbidity, mortality and complication rates, they pose economic, educational and logistical challenges to the health care system. The process by which new surgical technologies are adopted in Canadian hospitals is not well understood. We sought to describe the decision making process around how one new surgical technology, advanced laparoscopic surgery, was adopted at a community based hos-

pital.

Methods: We used qualitative case study methods, consisting of semi-structured interviews of key respondents and document analysis, to study the decision making process surrounding the adoption of advanced laparoscopic surgery at a community based hospital. Interviews were tape recorded, transcribed, and analyzed using NVivo software.

Results: The acquisition and implementation of laparoscopic surgery in a community hospital depended on five key factors: (1) the vision or goal of the institution, (2) the enthusiasm of the surgeons or other practitioners regarding the new technology, (3) the learning curve of allied health providers (nursing staff) and other physicians (anesthetists), (4) the short- and long-term economic costs of the new technology, and (5) the perceived benefit the new technology conferred on patients. Surgeons, anesthetists, nurse educators, operation room managers, program directors and vendors all played a vital role in the adoption and implementation of laparoscopic surgery at this hospital.

Conclusions: We identified five key factors that affected the decision to adopt a new surgical technology in a community hospital setting. These empirical observations will inform our ongoing research goal of developing a fair and legitimate process for making decisions about the adoption of new health technologies in Canadian hospitals.

Minimally Invasive Other-P422

LAPAROSCOPIC EXPOSURE FOR ANTERIOR FUSION OF PELVIC AND ACETABULAR FRACTURES, W R Silliman MD, B Ramshaw MD, D Kolder MD, P Kasmier MD, University of Missouri-Columbia

Introduction: Pelvic fractures are commonly encountered in the trauma population. Operative fixation with plating is often required by the orthopedic surgeon with anterior exposure provided by the general/trauma surgeon. Our experience using preperitoneal balloon dissection with total extraperitoneal inguinal hernia repairs affords excellent exposure of this region. This report describes our experience with laparoscopic assisted exposure for the anterior fusion of pelvic and acetabular fractures.

Materials and Methods: We have employed the laparoscopic guided balloon dissection of the preperitoneal space to obtain exposure for the orthopedic fixation of the fractured pelvis. We describe our technique and results.

Results: Our case report involves a 20 year old female who suffered significant pelvic fractures secondary to a motor vehicle collision. The procedure was performed successfully without complications. Blood loss was minimal. Operative time was 1 hour.

Conclusions: The laparoscopic preperitoneal approach provides wide, direct visualization of the area to undergo fixation. In selected patients, preperitoneal laparoscopic dissection is a safe and efficient method of exposure of the bony pelvis for orthopedic fixation following traumatic fracture.

Minimally Invasive Other-P423

LAPAROSCOPIC CHOLECYSTECTOMY IN ACUTE CHOLECYSTITIS, Dragos Stojanovic PhD, Mirjana Stojanovic MD, Djordje Lalosevic PhD, Surgical Clinic Dr Dragisa Misovic, Belgrade, Serbia and Montenegro

INTRODUCTION: Acute cholecystitis is classified as a special category due to specific symptoms of inflammatory process in organism, need for adequate and timely surgical intervention.

METHODS AND PROCEDURES: From January 2000 till December 2004, 1536 laparoscopic cholecystectomies (LC) were performed in our Department. All patients had uniform preoperative diagnostics (ultrasound, laboratory and contrast imaging) and in some cases with evident or suspected stones in bile ducts endoscopic evaluation and cleaning were performed (ERCP/EST). Patients with acute calculous cholecystitis were divided in two groups according to severity and progress of symptoms: 1. operated within the first 48 hrs and 2. operated 4 ? 6 weeks after the first attack. Analyzing data for patients operated in elective operative program, the third group was formed ? operated with unexpected acute cholecystitis.

RESULTS: 116 (7.55% of all LC) was with finding of calculous



acute cholecystitis. Conversion rate was 16.37% (19 cases). There was no cases of iatrogenic injuries nor lethal outcome. In I group there were 39 cases (33.62%) with conversion rate of 23.07% (9 cases). Mean duration of stay in hospital was 4.5 days. In II group there were 52 cases (44.82%) with conversion rate of 11.53% (6 cases). In 2 cases (3.84%) cholecysto-duodenal communications were found and treated surgically. Mean total stay in hospital (two hospitalizations) was 8.5 days. In III group there were 25 cases (21.55%) with conversion rate of 16.00% (4 cases) and average stay in hospital of 2.5 days.

CONCLUSION: According to findings of our study, applied diagnostic protocol and laparoscopic procedure can be considered as the golden standard in treatment of acute calculous cholecystitis in all three groups of the patients.

Minimally Invasive Other-P424

DIFFICULT GALL BLADDER, Ashok Sundararaman MS, Ramya Ramakrishnan MS, Naveen Alexander MS, Sri Ramachandra Medical College & Research Institute

Laparoscopic Cholecystectomy has now been the established procedure for calculus Cholelithiasis worldwide. Though Cholecystectomy can be performed laparoscopically safely in most of the cases, in few cases it could be a difficult task due to anatomical variations, pathological processes e.g. Mirrizze's even for an experted laparoscopic surgeon.

From out of experience of 14 years, more than 7000 cholecystectomies performed laparoscopically. We have performed few difficult Cholecystectomies. Anatomy due to inflammation, abnormal right hepatic artery (some times in gall bladder bed) Pathological Viz. Mirrizis, stone impacted in cystic duct, involvement by CBD, chronically inflamed thick walled gall bladder. (Fibrosis)

In most of the difficult cases Cholecystectomy could be completed laparoscopically with exercising extreme patience & meticulous technique. Conversion rate was very less. Subtotal Cholecystectomies were done in few cases. Postoperative complications like Bile leak & infection were minimal & were self-limiting. No mortality reported.

Minimally Invasive Other-P425

RETROPERITONEAL ENDOSCOPIC ADRENALECTOMY VS. CONVENTIONAL ADRENALECTOMY IN TREATMENT OF BENIGN ADRENAL LESIONS ? COMPARATIVE ANALYSIS, George T Todorov PhD, Nikolay K Yaramov MSc, Radoslav S Petkov PhD, Tsonka V Lukanova MD, II-nd Department of Surgery, "Alexandrovska" University Hospital, Sofia, Bulgaria

BACKGROUND: Miniinvasive adrenalectomy is considered to be the standard of care for the surgical treatment of the adrenal gland's pathology. Since the initial report of laparoscopic adrenalectomy in 1992 and of retroperitoneal endoscopic adrenalectomy in 1994, it has evolved into a feasible and safe minimally invasive procedure for benign adrenal tumors.

METHODS: Clinical characteristics and outcomes of 63 retroperitoneal endoscopic adrenalectomies (REAs) and 45 conventional adrenalectomies (CAs) from 1996 to 2004 were evaluated.

RESULTS: 61 patients underwent 63 REAs. Tumor size varied from 2 to 8 cm. Median age was 48.6 years. Mean operative time was 135 min (45-240), mean intraoperative blood loss ? 85 ml (30-550). The complication rate was 17.77%. Median postoperative hospital stay was 5 days (2-10).

44 patients underwent 45 conventional adrenalectomies. Median age was 44.5 years (16-71). Intraoperative complication rate was 17.77%, postoperative - 22.22 %, Mean operative time was 120 min (75 -240). Median postoperative hospital stay was 10 days (6-21).

CONCLUSION: No statistically significant difference was established between mean operative times of REA- and CA-groups ($p=0.91$). Conventional adrenalectomy was associated with a significantly increased complication rate ($p= 0.009$). Hospitalization was also longer after the open technique ($\delta < 0.0001$).

Introduced in 1994 and displaying all advantages of minimal access surgery REA has become the standart of care for benign adrenal tumors.

Minimally Invasive Other-P426

ENDOSCOPIC THYROIDECTOMY: CHEST WALL OR AXILLARY FOR THE FIRST EXPERIENCE?, Suthep Udomsawaengsup MD, Jirawat Pattana-arun MD, Tanwa Tansatit MD, Suppa_ut Pungpapong MD, Chadin Tharavej MD, Patpong Navichareern MD, Yoshifumi Ikeda MD, Chulalongkorn University, Bangkok, Thailand. Teikyo University School of Medicine, Tokyo, Japan.

Introduction: Several approaches for endoscopic thyroidectomy have been performed during the past 10 years. In selected patients the endoscopic techniques provide excellent results. Each technique has advantages and limitations. The aim of this study is to assess technical aspects, as well as challenges and different approach preferences in surgeons with no experience in endoscopic thyroidectomy.

Methods and procedures: 14 surgeons from 5 countries with no previous experience with endoscopic thyroidectomy attended a workshop of endoscopic thyroidectomy in soft cadaver. They performed both chest wall and axillary approaches. After performing both operations a questionnaire was answered for evaluation of technical aspects and personal experience with the two approaches

Results: Chest wall had a better score than axillary regarding endoscopic cervical anatomy. (4.21 vs. 3.17) Both operations had similar score in exposure, dissection and recurrent laryngeal nerve identification. 6/9(66.7%) will start doing chest wall, 8/11(72.7%) choose axillary as their favorite.

Conclusion: Chest wall approach is the preferred technique to getting start with the endoscopic thyroidectomy approach possible due to the similar anatomy as conventional thyroidectomy.

Minimally Invasive Other-P427

IS LAPAROSCOPY REPLACING IMAGE GUIDED BIOPSY FOR THE DIAGNOSIS OF RETROPERITONEAL LYMPHADENOPATHY?, Rebecca Warburton MD, Gordie K Kaban MD, University of Saskatchewan, Department of Surgery, Regina General Hospital, Regina, Saskatchewan, Canada

Objective: Establishing the etiology of isolated retroperitoneal adenopathy has traditionally been performed via image guided fine needle aspiration (FNA). We aimed to determine the efficacy of laparoscopy for the diagnosis of retroperitoneal adenopathy compared to image guided FNA.

Patients and methods: The medical records of consecutive patients with abnormal retroperitoneal adenopathy undergoing laparoscopy or image guided biopsy in the Regina Qu?Appelle health district between January 2003 and August 2005 were identified. Demographic, operative and pathologic data were reviewed and compared. Results: A total of 20 consecutive patients undergoing diagnostic procedures for retroperitoneal adenopathy were identified. Eleven (11) patients underwent laparoscopy to establish the etiology of retroperitoneal adenopathy and 9 underwent FNA. The mean age was 66yrs. Eight (8/11) patients (72%) had a diagnostic laparoscopic node biopsy. Laparoscopy was non-diagnostic in two cases (18%) and one procedure resulted in a false negative result. The majority of the procedures were performed by one surgeon. One conversion was necessary for hemorrhage. There were no major operative or post-operative complications. There was no mortality. The diagnostic cases were comprised of lymphoma (8), metastatic squamous cell carcinoma (1) and metachronous metastatic colon cancer (1). Median length of hospital stay was 1 day. Diagnostic biopsy in all cases of lymphoma was able to establish specific subtype based on histology and flow cytometry. FNA was diagnostic in 4 of 9 patients (44%). There was no major morbidity or mortality. Two biopsies were diagnostic for lymphoma. Subtyping of the lymphoma was not possible in either case. Conclusion: In contrast to FNA, laparoscopy provides a safe and efficacious method of obtaining tissue for the diagnosis of retroperitoneal adenopathy. In cases of lymphoma, laparoscopy is superior to FNA as tissue obtained allows specific subtyping of the lymphoma with significant implications for treatment. Laparoscopic node biopsy has become a robust modality for establishing the etiology of retroperitoneal adenopathy.



POSTER ABSTRACTS

New Techniques-P428

RADIOFREQUENCY TISSUE FUSION ? TWO SEALS ARE EQUIVALENT TO ONE, Ashok N Babu MD, Thomas N Robinson MD, Sagar Damle MD, Katherine Pavlovsky MS, Alison Rogers BS, Francis T McGreevy BS, University of Colorado

Introduction: There is no benefit to applying a second seal with a radiofrequency (RF) tissue fusion device. Double applications of RF tissue fusion seals are commonplace in the operating room. No data exists to recommend single or double seal applications for fusing blood vessels.

Methods: RF fusion was performed on 175 porcine arteries and veins *in vivo*; 16 vessels (9%) were excluded due to technical issues. Of the remaining vessels, 75 (47%) were veins. Vessel size ranged from 1.0-7.9 mm in arteries and 1.4-11.0 mm in veins. Burst pressures were measured by infusing air with continuous pressure transduction. Statistical analysis was performed using students t-Test and chi-square; significance set at $p < .05$. Results reported as mean value \pm standard error mean.

Results:

	Single Seal*	Double Seal*	p value
Arteries (Total)	602 \pm 39	599 \pm 49	$p=0.96$
Arteries < 4mm	656 \pm 47	628 \pm 55	$p=0.70$
Arteries > 4mm	506 \pm 64	515 \pm 97	$p=0.94$
Veins (Total)	240 \pm 32	236 \pm 40	$p=0.94$
Veins < 4mm	251 \pm 46	241 \pm 44	$p=0.98$
Veins > 4mm	226 \pm 46	233 \pm 62	$p=0.93$

*Seals are burst pressures in mmHg. There was no significant difference in burst pressure between small and large vessels: arteries (small 656 \pm 47 vs. large 506 \pm 64 $p=0.07$) and veins (small 251 \pm 46 vs. large 226 \pm 46 $p=0.71$).

Immediate bleeding occurred in 15 (9%) vessels; veins had a higher bleeding rate than arteries (16% versus 2% $p=0.01$).

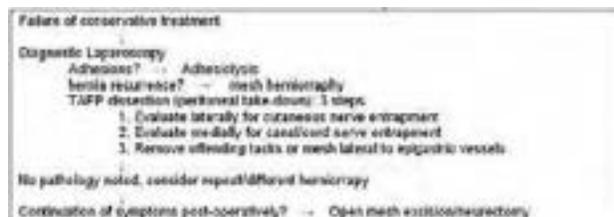
Conclusions: After applying an initial seal with an RF energy tissue fusion device, there is no benefit to application of a second seal. Immediate bleeding complications occurred more frequently with veins than arteries.

New Techniques-P429

POST-HERNIORRAPHY INGUINODYNIA: A TREATMENT ALGORITHM FEATURING DIAGNOSTIC LAPAROSCOPY, Sharon L Bachman MD, Mercedeh Baghai MD, Gregory J Mancini MD, Bruce J Ramshaw MD, Missouri Center for Advanced Techniques in Surgery, Department of Surgery, University of Missouri-Columbia

Objective: Inguinodynia remains a significant complication of all types of inguinal herniorrhaphy, and can be frustrating for both patient and surgeon. We present a treatment algorithm utilizing initial diagnostic laparoscopy (DL) for patients with inguinodynia.

Description: One surgeon's database of hernia repairs was reviewed. Patients identified with inguinodynia were selected and treatment and follow-up data were evaluated. The following algorithm was utilized:



Preliminary Results: 10 patients with inguinodynia had DL performed between 1/1/2003 and 7/31/2005. 4 had complete resolution of all pain, 5 had significant improvement of pain and required no narcotics and 1 had persistent pain without change. DL led to the identification of recurrent hernia in 1 (10%), mesh contraction or migration with possible nerve entrapment in 8 (80%), 2 patients (20%) had tacks causing neuralgia and one patient (10%) had developed a suture granuloma. **Conclusion:** Mesh contraction and displacement is the most frequent finding during DL performed for persistent groin pain.

DL improved or resolved pain in 90% patients with chronic inguinodynia, and is an effective first step in a treatment algorithm for this difficult problem.

New Techniques-P430

EXPERIMENTAL AND PRELIMINARY CLINICAL RESULTS OF A NEW SUTURING SYSTEM WITH ALL DEGREES OF FREEDOM & #8730; RADIUS SURGICAL SYSTEM, Gerhard Buess PhD, Niriuyuki Inaki MD, Masahiro Wseda MD, Jens Burghardt MD, Section for Minimally Invasive Surgery, Eberhard Karls University Tuebingen, University Hospital Tuebingen, Germany /Section for Minimally Invasive Surgery, Helios Hospital Muellheim, Germany

Radius Surgical System is a manual manipulator with six degrees of freedom, which allows controlled needle guidance. The development of this system was based on our experience with the development of an electronic manipulators together with the research center in Karlsruhe.

Methods and procedures: To evaluate the preciseness of the Radius Surgical System in comparison to conventional instruments we tested in two different working directions (frontal and sagittal) and three different planes (horizontal, diagonal and vertical plane). A second trial focussed on the strength of mesh fixation. In a clinical trial we sutured mesh in large inguinal hernias to the inguinal ligament.

Results: The Radius Surgical System enables us to place the stitches significantly more precise than conventional instruments. The fixation using Radius was significantly stronger compared to stapler or suture by conventional needle holder. In the clinical setting we have performed 40 operations in inguinal hernia. In no case we could find a recurrence.

New Techniques-P431

LAPAROSCOPIC EVALUATION OF A POORLY FUNCTIONING OSTOMY, Cynthia Burnham MD, Matthew Mancini MD, University of Tennessee Graduate School of Medicine, Knoxville, TN, Department of Surgery

Purpose: To determine the efficacy of a minimally invasive approach in evaluating a poorly functional ostomy.

Description: A twenty-one year-old white female with an ileostomy presented on multiple occasions with decreased ostomy output. Retrograde small bowel endoscopy suggested a mechanical obstruction for which laparoscopic visualization versus the traditional laparotomy approach was chosen. The anatomical abnormality of the ostomy was clearly seen: volvulus of the ostomy. The mechanical volvulus was treated by untwisting the bowel and suturing it several centimeters from the ostomy to the adjacent abdominal wall. This succeeded in improving ostomy function.

Conclusions: Laparoscopy can be utilized to evaluate and repair a poorly functional ostomy in an attempt to reduce the morbidity of a laparotomy.

New Techniques-P432

SIPHON SYSTEM IRRIGATION TUBE - THE DEVICE FOR LAPAROSCOPIC INTRA-ABDOMINAL IRRIGATION, Yuzoh Hirata MD, Kazunori Uchida MD, Masazumi Okajima MD, Yasuhiro Imaoka MD, Keiji Yamanaka MD, Chiaki Inokuchi MD, Inokuchi Hospital

Background: Irrigation procedure is the one of weak points of laparoscopic surgery. It is easy and enough for open surgery to wash the abdominal cavity but it is difficult for suction under laparoscopically. I report my new divided for laparoscopic intra-abdominal irrigation.

Materials: Clear Soft rubber tube 10mm in diameter about 2m length and large caliber three way stopcock are enough for make this device. Cut the tube for 40~50cm length. Make four or five side holes within 5~7cm length from the tip of the suction tube.

Results: The suction tube is possessed the deepest part in abdomen. Irrigation is start automatically according to the law of siphon.

Discussion: This siphon drainage tube is useful, the cost is quite low and no special item need. But the effect of irrigation is good enough. The fear for insufficient and unsatisfactory leavage would be disappear for using this tube.



New Techniques—P433

THE TUEBINGEN TRAINER - A SYSTEM WITH REALISTIC HUMAN ANATOMY FOR LAPAROSCOPIC TRAINING USING ANIMAL ORGANS, Gerhard Buess PhD, Masahiro Waseda MD, Noriyuki Inaki MD, Lilo Mailaender BA, Section for MIS in University Hospital Tuebingen

Introduction: Based on the experience of 14 years in education we designed in 2004, together with Richard Wolf Company, a new surgical training model, with realistic anatomical dimensions.

Methods and procedures : The construction of a metal mesh was used to give optimal condition for the anatomical correct fixation of animal organs by suture. Training courses focus on the following procedures: cholezystectomy, appendectomy, fundoplicatio, colorectal surgery, transanal endoscopic microsurgery.

For simulation of bleeding the complete block can be perfused using red liquid.

Results: The continuous use of the new Tuebingen trainer at the Tuebingen center and the training center in Havana, Cuba, which we support, gives experience in more than 20 courses: the access which is given to the abdominal cavity is identical to the human anatomy. The integration of the organs is easy and resembles normal human anatomy. Training of fundoplicatio and colonic resection is much closer to the needs of human anatomy than courses performed on living pigs.

Conclusions: The relatively low cost by using animal organs allows us to generate extensive operative routine during 3 or 5 day courses.

New Techniques—P434

THE USE OF ACELLULAR DERMIS IN THE REPAIR OF PARAESOPHAGEAL HERNIA FOLLOWING FUNDOPLICATION IN CHILDREN., Stephanie A Kapfer MD, Michael D Rollins MD, Tamir H Keshen MD, Washington University School of Medicine, St. Louis Children's Hospital

Objective: To develop a reinforced diaphragmatic crural closure utilizing a biologic graft material for the repair of recurrent gastroesophageal reflux with paraesophageal hernia in children.

Methods: Two neurologically impaired children, ages 13 and 14 months, with recurrent gastroesophageal reflux and retching, underwent redo laparoscopic Nissen fundoplication and repair of large paraesophageal hernia. Following hernia reduction, excision of the sac, and cruraplasty, an onlay patch of acellular dermis (Alloderm®) was placed as reinforcement over the crural repair. The patch was fashioned to recreate the arc of the crura around the esophagus and was secured with multiple interrupted sutures. The fundoplication was then completed and anchored to the esophagus and diaphragm.

Results: The operations were accomplished laparoscopically, despite a history of previous laparoscopic fundoplication and gastrostomy button placement in both children. The Alloderm® handled well in the laparoscopic setting. It stretched over the crura and around the esophagus, holding the suture well and remaining stationary during the anchoring process. Enteral feedings were started on postoperative day one, and the patients were discharged home on postoperative days two and three. Neither child has had recurrence of symptoms.

Conclusions: Recurrent reflux due to cruraplasty failure and paraesophageal herniation is a significant problem in children, especially those that are neurologically impaired. Alloderm® has been used with excellent results in the pediatric population in the treatment of abdominal wall defects and diaphragmatic hernia. As a biologic graft material that is incorporated into the surrounding tissues, Alloderm® has many potential advantages including low infectious risk, minimal adhesion formation, low migratory potential, and strengths comparable to synthetic materials. Its use in reoperative surgery for gastroesophageal reflux disease and paraesophageal hernias in children appears promising and warrants further investigation.

New Techniques—P435

LAPAROSCOPIC SURGERY FOR ULCERATIVE COLITIS THAT LEAVES NO INCISIONAL WOUND, Yukihito Kokuba PhD, Takeo Satou MD, Heita Ozawa MD, Kazuhiko Hatate MD, Takatosi Nakamura MD, Wataru Onozato MD, Atushi Ihara MD, Masahiko Watanabe PhD, Kitasato University East Hospital
Surgery for ulcerative colitis (UC) is highly invasive due to the poor general condition of most UC patients and the large section of the colon excised. Studies have been performed to develop a surgical method with minimal invasiveness. We have applied these techniques to UC surgery to establish minimally invasive standard surgery that does not leave an incisional wound. [Surgical procedures] A 5-mm flexible laparoscope is used. A small incision of about 3 cm is made at the marking for the stoma site. Under laparoscopic guidance, five 5-mm trocars and two 12-mm trocars are inserted. For intestinal mobilization, the omental sac is first opened, and the splenic flexure with marked inflammation where dissection is difficult is mobilized. To minimize the time required for surgery, the right and left sides of the colon are mobilized by rolling the mesentery from the caudal to the cephalic direction. A 5-mm vessel sealing system is used to handle vessels. For rectal dissection, a proper dissection layer is maintained to the levator muscle of the anus without damaging the autonomic nerve. The colon is removed from the body through a small incision. A "J"-shaped ileoanal pouch is formed, and an anvil head is inserted to establish a pneumoperitoneum once again and then to perform ileoanal anastomosis. Surgery is completed by performing an ileostomy at the small incisional wound.

[Results and Discussion] Laparoscopic surgery was performed on 46 patients with UC. With previous methods, the intestine was mobilized under laparoscopic guidance from the cecum to the sigmoid colon. All UC patients are surgically treated laparoscopically today. The median time of surgery for the entire patient population was 362 minutes, and oral intake was initiated after an average of 13.2 days. After the introduction of the present method, the median time of surgery for the entire patient population was 302 minutes, and oral intake was initiated after an average of 5.3 days. While this low-invasive method that eliminates even small incisional wounds has been performed on only five patients, it has been associated with less pain from the wound, earlier postoperative recovery, earlier postoperative oral intake, and easier management of the artificial anus in these patients.

New Techniques—P436

COMPARISON OF PORT-SITE CLOSURE TECHNIQUES: INITIAL IN VIVO ASSESSMENT OF A NOVEL AUTOMATIC PORT-SITE CLOSURE DEVICE, Gad Lotan MD, Asi Dekel MD, Thom E Lobe MD, *Department of Pediatric Surgery, Assaf Harofeh Hospital, Tel Aviv, Israel

Introduction: To assess the efficacy of a novel port-site closure device, the NeatStitch (NS) (NeatStitch Ltd; Tel Aviv, Israel) was compared with currently used devices in a pig model.

Methods: Two pigs were anesthetized and using standard laparoscopic techniques, 10mm trocars were inserted to create 8 port sites in each animal. Sites were then closed with either: 1) the NS, 2) an Carter-Thompson (CT) device (Inlet Medical) 3) an Endoclose (EC) device (Tyco), 4) a Richard Wolf device, or 5) they were closed by hand. Closure was graded on its success, duration, ease of performance and safety. Histology and complications were assessed after the wounds healed.

Results: All closures were successful. The average time of closure was: 25 seconds for the NS, 93 seconds for the EC, 65 seconds for the CT and 177 seconds for the Richard Wolf device. The NS requires only its insertion into the trocar and the squeezing of a trigger to place the suture and thus was graded as the easiest to use. The multiple steps required to place the sutures by the other devices made their use more cumbersome in each instance. The NS and hand suturing were assessed as the safest techniques. There is no exposed needle with the NS device until it engages with the fascia and muscle, after which the needle passes back into the shaft of the device, thus this device appears the safest to use. The other devices all exposed the underlying bowel and viscera to some risk of injury and required greater attention to assure their safe use.



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NS closures were perfect in each case with no adhesions. Richard Wolf closures were incomplete. EC and CT closures resulted in adhesions.

Conclusions: The NS automatic port-site closure device appears quicker and safer and had fewer complications in this pig model than did any of the conventional devices currently in use. This NS closure device shows promise as a superior alternative to port-site closures in the clinical setting.

New Techniques–P437

TOTALLY LAPAROSCOPIC LOW ANTERIOR RESECTION, TRANS-PERINEAL COLONIC J-POUCH, AND POUCH-ANAL ANASTOMOSIS FOR LOWER THIRD RECTAL TUMORS, Benjamin Person MD, David Vivas MD, Susan Cera MD, Steven D Wexner MD, Cleveland Clinic Florida

Introduction: This novel technique consists of a totally laparoscopic total mesorectal excision of the rectum with a transperineal extraction of the specimen, transperineal construction of a stapled colonic J-pouch, and a hand-sewn pouch-anal anastomosis.

Methods: Six consecutive non-obese patients with lower third, non-fixed rectal tumors underwent a proctectomy with this new technique. In all patients a laparoscopic loop ileostomy was constructed.

Results: Six patients (5 females) of an average age of 63.3 years (range 50-76) were included in this series. Five patients had rectal cancer and one patient had a large (12cm) rectal polyp. The average body mass index (BMI) was 21.7km/m² (range 18.7-27.6). In one patient a straight, handsewn coloanal anastomosis was performed, whereas a stapled colonic J-pouch was fashioned in the other five patients. The average operating time was 240 minutes (range 180-260); there was no intraoperative or postoperative mortality or significant morbidity. The mean length of stay was 6.5 (range 4-12) days. There were two minor postoperative complications: one urinary retention and one patient had high ileostomy output, both successfully treated.

Conclusions: This new technique is a feasible and safe procedure that follows the trend of "natural orifice" laparoscopic surgery. Although the functional and oncological outcomes still remain to be determined, the feasibility and safety in non-obese patients has been established.

New Techniques–P438

NEW "SUTURELESS" TECHNIQUE OF ILEOSTOMY AND COLOSTOMY, Madhav V Phadke MD, WAKEMED, RALEIGH, NC. AFFILIATED WITH UNC CHAPEL HILL, NC

INTRODUCTION: The objective is to prevent infection and subsequent complications of Ileostomy and Colostomy. The study is based on the principle of angiogenesis and delayed-primary wound closure.

METHODS & PROCEDURES: The procedure was discovered in 1986 by serendipity during a Brooke Ileostomy. It is applicable to both, Ileostomy and Colostomy. It is founded on established scientific principles. The stapled stoma is fixed to the opening in rectus sheath. The stoma is covered with an appliance having a transparent pouch. The intentional obstruction is continued during the period of paralytic ileus. Angiogenesis develops on the surface of serosa. The bulging stoma confirms return of peristalsis. Stoma is opened with electrocautery as a bedside procedure. The mucosal cuff protrudes, everts and advances with each peristaltic wave. The cuff 'grafts' itself on the bed of angiogenesis over a single layer of serosa. The margin of the cuff fuses with the circumference of the opening in dermis. The stoma matures naturally and on its own. Absence of sutures reduced the tissue trauma and foreign body reaction resulting in a better wound healing. This new procedure was named

"DELAYED-PRIMARY SELF-MATURATION" (DPSM).

RESULTS: 17 colostomies and 3 ileostomies were performed using DPSM. Infection in the stomal and/or main wound and subsequent complications were prevented.

CONCLUSIONS: DPSM is scientific and easier to do than a conventional stoma and is recommended for all types of stomas.

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New Techniques–P439

A NOVEL TRANS-COLONIC ENDOSCOPIC APPROACH TO INTRA-ABDOMINAL SURGERY IN THE PORCINE MODEL, Marvin Ryou MD, Benjamin Merrifield MD, David W Rattner MD, Mihir Wagh MD, Christopher C Thompson MD, Brigham & Women's Hospital, Boston, MA; Massachusetts General Hospital, Boston, MA

Objective: Our lab previously reported scarless per-oral, trans-gastric oophorectomy and hysterectomy in the porcine model. However, we found this approach to be difficult for successfully visualizing and engaging organs of the upper abdomen. We hypothesized that a per-anal, trans-colonic approach would instead provide better endoscopic access to the upper abdomen.

Methods: Two adult Yorkshire pigs were prepped with a per-oral Colyte prep and tap water enema. The colonoscope was introduced through the anus and advanced through a 2 cm, anterior, trans-colonic incision made by needle knife at approximately 20 cm from the anal verge. Intra-abdominal endoscopic exploration was conducted, and both partial splenectomy and cholecystectomy were performed. The specimen was sacked immediately following surgery, and necropsy was performed.

Results: The trans-colonic approach provided for full visualization and manipulation of the upper abdominal organs?in particular, the various hepatic lobes, the gallbladder, and the entire spleen. The partial splenectomy and cholecystectomy were performed successfully.

Conclusions / Expectations: Since the trans-colonic approach provides a "straight shot" to the upper abdomen, it obviates the need for awkward retroflexion required with a trans-gastric approach. The trans-colonic incision may also prove easier to close than gastrotomies, as the colonic wall is thinner, and endoscopic closure devices for colonic perforations already exist. Animal survival studies need to be performed to demonstrate safety of this novel technique. The trans-colonic and trans-gastric techniques may potentially be combined to enhance organ manipulation.

New Techniques–P440

SLIC TECHNIQUE: A NOVEL APPROACH TO PERCUTANEOUS GASTROSTOMY, Adheesh A Sabnis MD, Rockson C Liu MD, Bipan Chand MD, Jeffrey Ponsky MD, George Washington University, Cleveland Clinic Foundation, and University Hospitals of Cleveland

Percutaneous endoscopic gastrostomy (PEG) has been an invaluable method for obtaining long-term enteral access and represents one of the first forays in the field of minimally invasive surgery. However, the traditional "pull" method for PEG tube placement continues to have some disadvantages especially in patients with near-obstructive head and neck cancers. We describe a new "SLiC" technique for establishing percutaneous gastrostomy using a radially expandable trocar. The SLiC technique can be done safely and efficiently with a pediatric sized gastroscope and avoids the need for radiation from fluoroscopy. It is a good alternative for obtaining enteral access in patients who would otherwise not be well suited for a traditional PEG tube.

New Techniques–P441

LAPAROSCOPIC-ASSISTED TRANSGASTRIC ERCP: A NEW TECHNIQUE, Ali Tavakkolizadeh MD, Christopher C Thompson MD, Cesar E Escareno MD, Kerri A Clancy RN, David B Lautz MD, Brigham and Women's Hospital, Boston, MA

OBJECTIVE: ERCP is a diagnostic and therapeutic tool for disorders of the pancreaticobiliary tree. In the subgroup of patients who have undergone a Roux-en-Y gastric bypass surgery (RYGB), endoscopic access to the duodenum becomes difficult. We describe a novel approach for laparoscopic trans-gastric ERCP.



POSTER ABSTRACTS

DESCRIPTION OF THE TECHNIQUE: Pneumoperitoneum is established. A Hassan trocar is placed at the umbilicus followed by a 12mm LUQ, 5mm LUQ, and 5mm RUQ ports. The greater curve of the gastric remnant is identified and dissected free. A pursestring suture is placed along the greater curve of the stomach through which a gastrostomy is made. A 12mm ballooned BTT trocar (AutoSuture, Norwalk, CT) is placed in the RUQ and advanced into the gastric lumen through the pursestring. The pursestring is tightened and the trocar's balloon is expanded to create a seal. The proximal jejunum is clamped beyond the ligament of Treitz to prevent small bowel insufflation. An endoscope is passed through the trocar into the stomach and an ERCP is performed. After completion of the ERCP, the balloon trocar is deflated and removed. The gastrostomy is sutured closed. The gastric wall is sutured to the anterior abdominal wall and the site marked with metal clips. This provides a radiological marking for the gastric remnant and will allow for future percutaneous wire-guided access to the pouch.

PRELIMINARY RESULTS: This procedure was performed under an IRB approval. A patient with a past history of sphincter of Oddi dysfunction who had undergone a successful RYGB one year earlier, presented with recurrent attacks of epigastric pain due to pancreatitis. Following a failed transoral attempt, a transgastric ERCP was performed. A large pancreatic duct stone was identified and removed.

CONCLUSIONS: The increasing prevalence of patients with RYGB necessitates novel approaches for accessing the duodenum. Previous reports have described similar transgastric approaches, but this method offers several unique advantages. The patient does not need to have a gastrostomy tube, eliminating the associated morbidity of an indwelling catheter. The use of a ballooned trocar allows an excellent seal for passage of the endoscope and simultaneous maintenance of pneumoperitoneum and gastric insufflation. This allows for multiple intra-operative passages of the endoscope, continuous laparoscopic visualization and assistance during the procedure, and minimal peritoneal spillage of gastric contents.

New Techniques-P442

A NEW PERFORMANCE ASSESSMENT TOOL FOR A COMPLEX LAPAROSCOPIC TASK, Renee E Thompson MD, David B Earle MD, Jay N kuhn MD, John R Romanelli MD, Neal E Seymour MD, Department of Surgery, Baystate Medical Center, Springfield, MA

Introduction: The difficulties of objective assessment of surgical task performance are increased with greater task complexity. This study is intended to validate a method of assessment of a complex but vital surgical skill under operative conditions.

Methods: PGY-1 and 2 surgical residents (novices; n = 10) and expert attending laparoscopists (experts; n = 5) observed a tutorial on a standard technique of laparoscopic suturing and intracorporeal knot-tying. All subjects then performed 3 iterations of this task in a live anesthetized pig under highly standardized conditions. The final iteration was timed and videotaped. Observable performance events defined during a period of task analysis were used in a survey tool designed to detect deviation from optimal task performance. Surveyed events included: Number needle manipulations, tissue penetrations, tissue grasps, dropped or twisted needles, thread wrap attempts, thread damage, and achievement of functional needle position and square throws. A cumulative performance score was derived from all surveyed events, higher score reflecting poorer performance. Study videotapes were viewed independently and in a blinded fashion by 2 attending surgeons trained on survey event definitions. Time and performance score data were compared for the expert and novice groups by Mann Whitney U test.

Results: Novice laparoscopists took significantly longer (343 ± 45 vs 76 ± 11 seconds; $p < 0.05$) and had higher survey scores (41 ± 5 vs 16 ± 2 ; $p < 0.01$) than experts. Mean inter-rater agreement for the entire course of the study was $87 \pm 4\%$.

Conclusion: The present study demonstrates construct validity for this assessment tool, and that high inter-rater agreement for carefully-defined and observable performance events associated with a complex laparoscopic task can be achieved. This

analysis tool can be used to define performance and to assess improvement for laparoscopic suturing and knot-tying, and may be adapted to other surgical tasks.

New Techniques-P443

MAPPING CHANGES IN CALOT'S TRIANGLE DURING CHOLECYSTECTOMY: A SWINE MODEL, Daniel Tseng MD, Gwen Crevensten MS, Gregory Andersen PhD, Brett C Sheppard MD, John G Hunter MD, Oregon Health and Sciences University

BACKGROUND: Frameless stereotactic guidance in surgery has been utilized extensively in other surgical disciplines, but not in general surgery. The guidance system provides enhanced ability to map and locate structures in real time. To begin applying this technology to common issues in general surgery, we have chosen to perform detailed mapping of Calot's Triangle during the maneuvers in laparoscopic cholecystectomy. This report represents the first known application of StealthStation (Medtronic Sofamor Danek, Memphis, TN) technology to general surgery reported in the literature.

METHODS: After obtaining institutional animal care unit approval, we placed eight swine under general anesthesia. A bilateral subcostal laparotomy was performed, exposing Calot's triangle as defined by the cystic duct, common hepatic duct, and liver edge. The reference arc was optimally placed surrounding Calot's triangle in a manner able to be seen by the StealthStation camera. Initially cephalad retraction was performed and Calot's triangle was mapped at six separate points along the border. These same points were recorded again after lateral retraction and medial peritoneal dissection. The 3-dimensional coordinate data was then analyzed in Microsoft Excel and Softworks.

RESULTS: After plotting the coordinate data obtained, a visual representation of a triangle was created to confirm accuracy. Calculation of the surface area of the triangle demonstrated a mean increase in surface area of 7.5% after lateral retraction. The addition of medial peritoneal dissection yields a total mean increase in surface area of 14%.

CONCLUSIONS: We conclude that the StealthStation can provide accurate and reliable mapping in abdominal structures. Principles of lateral retraction and medial peritoneal dissection used during laparoscopic cholecystectomy do increase the surface and exposure of Calot's triangle.

New Techniques-P444

LAPAROSCOPIC KNOT TYING IN THE LIMITED OPERATIVE FIELD. - HOW CAN WE MAKE IT EASY - , KAZUNORI UCHIDA MD, HIDEHIRO TANJI MD, NAOKI HARUTA MD, MASAZUMI OKAJIMA, Takanoashi Central Hospital, Endoscopic Surgery Center

INTRODUCTION: The environments for laparoscopic knot tying are provided with the cooperation of surgeons, operative field, monitor, target organs and instruments. Laparoscopic knot tying comes easier if such environments are well organized, however, it is not always obtained during the actual operation. Especially, knot tying in the limited operative field is very stressful and time consuming even other factors have no problems. To solve the problems for knot tying, we developed a new laparoscopic needle holder called the Excalibur.

TECHNIQUE: The Excalibur differs from the other conventional forceps in that the hinge is designed to stick out. The suture is easily controlled by hooked on the projected hinge. The knot tying with the Excalibur is very simple and does not require complicated hand coordination.

CONCLUSIONS: In this presentation, we introduce the characteristics of the Excalibur and actual knot tying procedure in the small limited operative field. The laparoscopic knot tying will become a piece of cake once you draw out the benefits of the Excalibur.





POSTER ABSTRACTS

Robotics–P445

REMOTE STEREOSCOPIC ROBOTIC TELESURGERY USING THE PUBLIC INTERNET, Eric J Hanly MD, Brian E Miller PhD, Barry C Herman MSc, Michael R Marohn DO, Timothy J Broderick MD, Samuel P Shih MD, Joseph Sterbis MD, Charles Doarn BA, Brett R Harnett BS, Christopher J Hasser PhD, Mark A Talamini MD, Ozanan Meireles MD, Gerry R Moses PhD, Ron Marchessault BA, Noah S Schenkman MD, Walter Reed Army Medical Center, Johns Hopkins University, University of Cincinnati, Intuitive Surgical, Telemedicine and Advanced Technology Research Center

INTRODUCTION: Providing surgeons the ability to mentor and perform procedures from remote locations will have a profound impact on the quality and type of care that rural patients receive in their towns and that soldiers receive on the battlefield. Remote telesurgery using monoscopic vision has been performed clinically with the Zeus surgical robot, but at a great financial cost (>\$1M). Because of its complexity, the daVinci Surgical System—an advanced surgical robot with stereoscopic vision—has never been used for remote surgical applications.

METHODS: The daVinci Surgical System was modified to enable network communication between multiple Surgeon's consoles and a single patient-side cart (the robot). Two low latency video CODECs were used at each site to enable stereoscopic video streaming. Unlike previous telesurgery models, Internet-based connectivity was used to establish a cost-effective solution applicable to a wide variety of clinical settings (cost to lease for 6 months the telecommunications equipment and bandwidth used in this study is <\$100K). The utility of the system to facilitate remote collaborative stereoscopic telesurgery was evaluated through a combination of dry lab exercises and animal lab surgery.

RESULTS: Surgeons located in Cincinnati, Ohio, and in Denver, Colorado, successfully operated with residents in Sunnyvale, California (approximate distances of 2,400 and 1,300 miles, respectively) to perform nephrectomies in six Californian swine. The modified daVinci system was capable of shared control between the remote surgeon and the local resident. Remote surgical task performance data is presented in detail. Round-trip latency was high (~550-980 ms), but remote surgeons quickly adapted and performed telesurgical nephrectomies in the pigs without complication.

CONCLUSIONS: This low-cost, proof-of-concept study represents a number of surgical and telemedicine milestones including the first U.S.-based telesurgery, the first telesurgery using the daVinci Surgical System, the first use of stereoscopic (3D) surgical video streaming, the first robotic collaborative telesurgery (two consoles), and the first telesurgery over the Internet using non-dedicated lines. In this configuration, the daVinci Surgical System offers a unique opportunity to develop a network of machines at various remote locations which may all be used to extend the reach of expert specialty surgeons.

Robotics–P446

THE BENEFITS OF A HOSPITAL DEVELOPING ROBOTIC SURGERY PROGRAM, Sandip T Maru MD, Adam Silverman MD, Adam Kopelan MD, Dennis Bordan MD, Monmouth Medical Center, Newark Beth Israel Medical Center

Robotic surgery allows surgeons to perform minimally invasive surgeries with all the control, range of motion, and 3-D visualization of traditional open surgery—but with significantly less pain, scarring and recovery time for patients. And for surgeons, the computer-enhanced technology and robotic precision ensure steadier hands, improved dexterity, and a level of surgical precision never before possible. The former has been well documented and discussed in the literature extensively. This is a huge undertaking for a hospital requiring a large allocation of resources and a financial commitment. We would like to discuss the additional benefits we discovered as a robotic program is introduced to a hospital. First, responding to patients desire to have procedures in a less invasive manner. Also, allowing surgeons to treat the patient in the most effective way possible. This leads to more media coverage, as newer technology is introduced. This causes

more notoriety and a greater number of referrals. It also causes further interaction between departments such as Urology, OB/Gyn, general surgery, cardiac surgery, and thoracic surgery. This also allows for resident development in minimally invasive techniques. So, one can see the additional benefits that a robotic surgery program may bring to a hospital.

Robotics–P447

A TEAM BASED APPROACH TO THE ACQUISITION OF SKILLS FOR TELE-ROBOTIC SURGERY, E Mayer MD, M Winkler MD, S Undre MD, R Aggarwal MD, P Sains MD, A Darzi MD, J Vale MD, 1Department of Urology, St. Mary's Hospital, London, U.K. and 2Department of Biosurgery & Surgical Technology, Imperial College London, U.K.

Introduction: Tele-robotic surgery has enabled patients to benefit from the advantages of minimally invasive techniques, with surgeons retaining three-dimensional vision and an ergonomic operating position. Nonetheless, acquisition of skills for tele-robotic procedures entails a learning curve. In the case of radical prostatectomy, we adopted an innovative, team-based approach to the development of procedural proficiency.

Methods: The procedure was divided into eight anatomically defined stages. A team of four experienced urological surgeons completed two stages as primary operator per procedure. The remainder of the time was spent assisting or observing the procedure. Data was prospectively collected on intra-operative (total operative time, blood loss, transfusion rate, conversion to open procedure) and post-operative (length of hospital stay, in-hospital complication rates) variables.

Results: Of the 23 procedures performed to date, operative time (median 415 minutes, range 330 ? 510) blood loss (median 600mls, range 50 ? 4400) and transfusion rates (16.5% of patients) were within acceptable limits. Three patients (13.0%) underwent conversion to open operation, due to failure of progression. Median hospital stay was 4 days (range 2 ? 18) with a total complication rate of 37.5% (minor, 22%; moderate, 18%), all of which were managed conservatively. A comparison between the first 12 and next 11 patients revealed a decrease in number of complications (58.3% to 18.2%, p<0.05). Pathological examination of resected specimens revealed four (17.4%) patients with positive surgical margins.

Conclusion: The results of our team-based approach to acquisition of skills for robotic procedures are comparable to those of published series. This model has enabled us to provide operative exposure to four surgeons in a concurrent manner. The surgeons assisted and learnt from each other, possibly shortening the learning curve when compared to a one-surgeon approach to achieve procedural proficiency.

Robotics–P448

A COMPUTERIZED ANALYSIS OF ROBOTIC VERSUS LAPAROSCOPIC TASK PERFORMANCE V K Narula MD, W C Watson MD, S S Davis MD, K Hinshaw BS, B J Needleman MD, D J Mikami MD, J W Hazey MD, J H Winston MD, P Muscarella MD, M Rubin, V Patel MD, W S Melvin MD, The Ohio State University. CMIS. Columbus, OH

Introduction: Robotic technology has been postulated to improve performance in advanced surgical skills. We utilized a novel computerized assessment system to objectively describe the technical enhancement in task performance comparing robotic and laparoscopic instrumentation.

Methods and Procedures: Advanced laparoscopic surgeons (2-10 yrs experience) performed 3 unique task modules using laparoscopic and Telerobotic Surgical Instrumentation (Intuitive Surgical, Sunnyvale, CA). Performance was evaluated using a computerized assessment system (ProMIS, Dublin, Ireland) and results were recorded as time (sec), total 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: 10 surgeons completed the study. Objective assessment of the data is presented in the table below. 8/10 surgeons had significant technical enhancement utilizing robotic technology



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Laparoscopic vs Robotic

	Time (sec)	Total Path(mm)	Precision
Module 1	210 vs 161 #	11649 vs 5571 *	1434 vs 933 *
Module 2	119 vs 68 *	5573 vs 1949 *	853 vs 406 *
Module 3	77 vs 55 *	4488 vs 2390 *	552 vs 358 *

= p < 0.009 * = p<0.001

Conclusions: The ProMIS computerized assessment system can be modified to objectively obtain task performance data with robotic instrumentation. All the tasks were performed faster and with more precision using the robotic technology than standard laparoscopy.

Robotics-P449

ROBOTIC ASSISTED BILIARY PANCREATIC DIVERSION WITH DUODENAL SWITCH: PRELIMINARY EXPERIENCE, R. Sudan MD, V. Puri MD, D Sudan MD, Department of Surgery, Creighton University Medical Center, Omaha, NE.

Introduction: Minimally invasive (MI) surgical techniques decrease length of hospitalization and morbidity for general surgery procedures. Application of MI techniques to obesity surgery had previously been limited to stapled techniques and primarily for the roux-en-y gastric bypass. We present the initial series of totally intracorporeal robotic assisted biliary pancreatic diversion with duodenal switch (BPD/DS) using 5 ports.

Methods: Forty-seven patients underwent robotic assisted BPD/DS between October 2000 and July 2004. Their demographic, anthropometric, operative and follow-up data were maintained in a prospective fashion and reviewed retrospectively. The mean age of patients was 38 ± 10 years. The mean preoperative body weight was 126.1 ± 14.7 kg with a mean BMI of 45 ± 3.6 kg/m². Surgical patients had a minimum of 4 co-morbid conditions.

Results: Forty-four of the 47 procedures were completed intracorporeally with a mean operative time of 542 ± 61617; 135 minutes (range 378-800 min). Mean loss of excess body weight at 1 year is 74% with a mean follow-up of 19 months. Seventy-five percent of co-morbidities have resolved. The incidence of gastrointestinal leaks was 12% and postoperative small bowel obstruction 8%. The metabolic and liver function tests at one year were satisfactory.

Conclusions: Minimally invasive robotic surgery can be applied to complex abdominal operations like BPD/DS. The da Vinci™ (Intuitive Surgical, Inc., Sunnyville, CA) surgical robot allows for hand-sewn bowel anastomosis similar to the open technique. The short-term weight loss and metabolic results are comparable to the open operation.

Robotics-P450

THREE YEARS OF ROBOTIC SURGERY: 109 CASES, ONE SURGEON., Arthur L Rawlings MD, Jay H Woodland MD, James D Hursey RN, David L Crawford MD, University of Illinois College of Medicine at Peoria

This study describes 109 consecutive cases and the evolution of case selection using the DaVinci Robotic System by one MIS fellowship trained surgeon at a tertiary hospital. This study is based on information prospectively collected in an Excel database from 9/2002 to 8/2005. The data consists of type of case, port setup time, robot time, and total case time. The procedures were: Nissen (36), Right Colectomy (19), Sigmoid Colectomy (15), Heller Myotomy (13), Hiatal Hernia (7), Splenectomy (5), Gastric Tumor (4), Adrenalectomy (3), Pyloroplasty (3), Cholecystectomy (2), and Toupet (2). Average port setup time was 30.3 ± 8.7 [14-53] minutes. Average robot time was 113.3 ± 49.2 [31-306] minutes. Average case time was 188.2 ± 57.0 [94-380] minutes. Advantages were: 1) Enhanced view of the operative field; 2) Wristed instruments facilitate dissection; 3) Surgeon controlled camera; 4) Reduced surgeon fatigue; 5) Increased marketability of surgeon as regional MIS expert. Disadvantages were: 1) Inconvenience of altering camera/instrument placement during case; 2) Difficulty working in far lateral extensions of operative field; 3) Difficulty changing table position during case; 4) Loss of tactile sensation; 5) Need for additional ports in some cases. The DaVinci has been in use at this institution for three years. Case diversity accounts for the wide range in robot and total case time.

Port setup time is most consistent from case to case. Of the six operations, three are no longer done. Two cholecystectomies were done in the first month to become familiar with the equipment. The last splenectomy was done at six months and the last adrenalectomy was done nineteen months into the system's use. These last two procedures were dropped because they required an additional port and held little advantage over standard laparoscopy. The robot is still used for three operations. Funduplications have proven to be good cases on which to train residents in the use of the system. Colectomies are still being performed as part of an on going research project. Heller myotomy best utilizes the robot's enhanced visualization and dexterity during the delicate esophagomyotomy. Over three years, case diversity has narrowed to those with specific advantages for our training program, research interests, and patients. Increased utilization of the DaVinci system in general surgery is less likely than in other fields where minimally invasive approaches are less common.

Robotics-P451

ROBOTIC VS LAPAROSCOPIC COLECTOMY, Arthur L Rawlings MD, Jay H Woodland MD, Prakash Gatta MD, Ravindra Vegunta MD, David L Crawford MD, University of Illinois College of Medicine at Peoria

This study compares thirty robotic colectomies with twenty-seven laparoscopic colectomies done by one MIS fellowship trained surgeon at a tertiary institution. Since the introduction of the DaVinci Robotic System, minimally invasive surgeons have explored its use for a variety of procedures. This study is based on information that was prospectively collected from 9/2002 to the present. Data analyzed (SPSS 12.0 for Windows) included indications for surgery, gender, age, BMI, EBL, length of operation, length of stay (LOS), complications, and average OR cost of operation. Male to female ratios, patient age, BMI and EBL were similar between the groups (p>0.05). Operations included 13 robotic and 12 lap sigmoid colectomies and 17 robotic and 15 lap right colectomies. Preop diagnosis for robot: Cancer (5); Diverticulitis (8); Polyp (16); Carcinoid (1). Preop diagnosis for lap: Cancer (9); Diverticulitis (12); Polyp (5); Crohns (1). Total right colectomy case time (minutes): Robot 218.9 vs Lap 169.2 (p=0.002). Total sigmoid colectomy case time (minutes): Robot 225.2 vs Lap 199.4 (p=0.128). LOS right colectomy (days): Robot 5.2 vs Lap 5.5 (p=0.8). LOS sigmoid colectomy (days): Robot 6.0 vs Lap 6.6 (p=0.9). Robotic complications: 1) Patient slid off OR table to floor after the robotic portion of the procedure; 2) Persistent left hip paresis; 3) Transverse colon injury from ultrasound shears; 4) Cecal injury from cautery; 5) Anastomotic leak; 6) Urinary retention beginning POD 5. Laparoscopic complications: 1) Anastomotic leak; 2) Partial small bowel obstruction. Two robotic and two lap cases were converted to open. Average OR cost for lap was \$6,464 (OR time \$1,131, personnel \$249, supplies \$5,084). The average OR cost for robotic was \$8,117 (OR time \$1,378, personnel \$485, supplies \$6,254), a difference of \$1,653 per case. Conclusions: Indications for surgery, gender, age, BMI, EBL, length of hospital stay, and number of conversions to open were statistically similar between the groups. The difference in the length of operation was statistically significant only in the right colectomy group. The reason for this is the completely intracorporeal anastomosis performed in a robotic right colectomy. Complications in the robot group were more numerous but not attributable to equipment. The average OR cost of robotic colectomy at our institution is \$1,653 (25.5%) higher than when done laparoscopically.

Robotics-P452

ROBOTS IN GENERAL SURGERY: DOES THE PAST PREDICT THE FUTURE?, J M Snow MD, B J Ramshaw MD, Department of Surgery, University of Missouri-Columbia

INTRO: The objective of this study is to analyze trends in the number of cases reported using robots to perform common general surgical procedures which include laparoscopic fundoplication, cholecystectomy, Heller myotomy, adrenalectomy, splenectomy and pancreatectomy.

MATERIALS AND METHODS: A review of published literature was executed in order to identify uses of the surgical robot in



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laparoscopic fundoplication, cholecystectomy, Heller myotomy, adrenalectomy, splenectomy and pancreatectomy from the time of FDA approval in the year 2000 until the end of 2004. PubMed, OVID and the Cochrane databases were systematically searched using the truncated search term ?robo*?. The search was then limited to institutions within the USA with humans as subjects. Further references were sought via cross-referencing citations of each individual paper.

RESULTS: Table 1 below lists the number of procedures published by year.

Table 1: Number of reported surgeries using surgical robots.

Procedure	2001	2002	2003	2004	TOTAL
Fundoplication	26	67	5	32	130
Cholecystectomy	34	19	46	21	120
Heller Myotomy	10	14	27	46	97
Adrenalectomy	11	4	6	30	51
Splenectomy	0	7	7	16	30
Pancreatectomy	0	1	2	1	4

CONCLUSIONS: Despite the potential of robotic surgery, it remains an infrequently reported technique in the field of general surgery. Evolution of robotic instrumentation and decreased costs may allow increased utilization of surgical robots in the future.

Robotics-P453

ROBOTIC ASSISTANCE IMPROVES INTRACORPOREAL SUTURING PERFORMANCE AND SAFETY IN THE OR WHILE DECREASING SURGEON WORKLOAD, Stefanidis D.

Korndorffer Jr JR, Wang F, Dunne JB, Touchard CL, Scott DJ., Tulane University School of Medicine, New Orleans, LA

Background: Intracorporeal suturing is one of the most difficult advanced laparoscopic tasks to accomplish. The purpose of this study was to assess the impact of robotic assistance on novice suturing performance, safety and workload in the OR.

Methods: Medical students (n=34), without prior laparoscopic suturing experience were enrolled in an IRB-approved, randomized protocol. After viewing an instructional video, subjects were tested in intracorporeal suturing on two identical live porcine Nissen fundoplication models; they placed three gastrogastric sutures using conventional laparoscopic instruments on one model and robotic assistance (da Vinci) on the other. The order of the suturing method used first was random. Each knot was objectively scored based on time, accuracy and security errors. Injuries to surrounding structures (i.e. liver, esophagus, etc) were recorded. Workload was assessed using the validated NASA-TLX questionnaire which measures the subjects' self-reported performance, effort and frustration as well as mental, physical, and temporal demands of the task. Analysis was by paired t-test; p < 0.05 was considered significant.

Results: Mean subject age was 25 ± 3 years, 73% were men and 94% right hand dominant. Results (mean ± s.d.) are summarized in the following table:

	Laparoscopic Suturing	Robotic Suturing	p value
Task duration (seconds) *	595 ± 22	459 ± 137	<0.001
Overall Score†	0 ± 1	95 ± 128	<0.001
Injuries / knot*	1.15 ± 1.35	0.05 ± 0.26	<0.001
Workload (NASA-TLX score)*	99 ± 15	57 ± 23	<0.001

* lower scores indicate superior performance

† higher scores indicate superior performance

Subjects' overall score did not improve between the first and third repetition for laparoscopic suturing (0 ± 0 vs. 0 ± 0; p=n.s.) but improved significantly for robotic suturing (49 ± 100 vs. 141 ± 152; p<0.001).

Conclusions: Compared to standard laparoscopy, robotic assistance significantly improves intracorporeal suturing perform-

ance and safety of novices in the OR while decreasing their workload. Moreover, the robot significantly shortens the learning curve of this difficult task. Further study is needed to assess the value of robotic assisted suturing for surgeons of variable skill and validated robotic training curricula need to be developed.

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Robotics-P454

THE EFFECT OF NETWORK JITTER ON TELESURGERY PERFORMANCE, A van Wynsberghe, S Smith, S Peterson BS, S Primak PhD, R Eagleson PhD, R V Patel PhD, C M Schlachta MD, CSTAR (Canadian Surgical Technologies & Advanced Robotics) and the Department of Electrical and Computer Engineering, University of Western Ontario, London, Canada

Objective: The purpose of this study was to determine if network jitter (variation in network delay) impairs subject performance on basic telesurgical tasks.

Methods: Eight novice subjects were trained to proficiency using the Zeus teleurgical system on two standard dry-lab exercises that emulate surgical maneuvers. NetDisturb software was employed to simulate real-world network (common internet) conditions with the addition of jitter using an exponential distribution. Subjects completed 32 trials each of two drill exercises (cone transfer and needle passing) with a network delay of 300ms and either no jitter or random jitter (average of one fifth round trip latency), randomized in blocks of four trials. Subject performance was evaluated objectively by task completion time and errors for each attempt. Subjects also completed a questionnaire designed to evaluate their subjective assessment of thirteen qualities of the system. Statistical analysis consisted of student t-test or rank sum test where appropriate, with a 0.05 level of significance.

Results: No significant difference was observed in average task completion times for the cone transfer exercise (208±59s vs. 204±117s, p=0.762) or needle pass drill (283±96s vs. 295±87s, p=0.466) comparing trials with no jitter to jitter. Similarly, no significant difference was observed in average number of task errors for the cone transfer exercise (median 4.0 vs. 5.0, p=0.402) or needle pass drill (median 5.0 vs. 5.0, p=0.914). Subjects did not consider the addition of jitter to cause an increase in difficulty of task completion in any of thirteen system factors ranging from Image Quality to Reliability.

Conclusions: Based on an exponential distribution of network jitter, variation in real-world network delays had no statistically significant effect on task completion time, error rate, or subjective assessment of task difficulty for trained novices performing standard dry-lab exercises with the Zeus telesurgery system. These findings suggest that typical variation in real-world internet delay is not a concern for performing long distance telerobotic surgery possibly reducing the importance of higher cost dedicated telecommunication lines.

Solid Organ Removal-P455

LAPAROSCOPIC APPROACH FOR SPLENIC DISORDERS. ROLE OF 12 YEARS EXPERIENCE WITH A PROSPECTIVE SERIE OF 300 PATIENTS., Carmen Balague PhD, Eduardo M Targarona PhD, Sandra Vela MD, Albert Pey MD, Silvia Rofin MD, Carmen Martinez MD, Jordi Garriga PhD, Manuel Trias PhD, Service of Surgery, Hospital de Sant Pau, UAB. Barcelona. Spain.

Laparoscopic surgery has been shown as an effective and safe treatment for haematological disorders, especially laparoscopic splenectomy (LS) of normal sized spleens. The anatomical and clinical variability of different haematological diseases may difficult LS. Experience is an important factor that could permit to obtain similar results even in very difficult cases like splenomegaly. Aim: To evaluate the role of experience in outcome of a prospective serie of 300 patients with haematological diseases submitted to laparoscopic surgery.

Material and method: From Febr/93 to Aug/05, 300 laparoscopic approaches were attempted and clinical information was prospectively recorded. In 12 cases the lap approach was performed without splenectomy (not necessary in 4 splenic cists and 4 splenic aneurism, or performed before in 4 residual splenic tissue). In 288 patients LS was performed: ITP (n=133), AIHA (n=15), spherocytosis (S) (n=19), Evans syndrome (n=8),



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HIV-ITP (n=8), malignancy (n=69), myelofibrosis (n=9), TTP (n=2) and others (n=25). We compared the results of the first 50 LS (Group I) with the other 238 (Group II). Patients with spleen weight > 700 gr were divided in three groups: Group A: 1.993-1.996, Group B: 1.997-2.000, Group C: 2.001-2.005 in order to evaluate the evolution of results obtained with the subgroup of splenomegaly. Results: the serie include 113 m and 187 f with a mean age of 46.7±20. Results are presented in Table I (first 50 patients vs the other 238) and Table II (Cases of Spleen size > 700 gr comparing groups A, B and C including and not the patients were Hand Port (H-P) was used) :

Table I: Gr I - Gr II (H-P y/n)
 N: 50-238/199 -Spl w (gr): 200-300/248 -Op time (m): 173-120/120
 Conv rate: 6%-6%/5% -Blood trans: 38%-19%/14% -H-P use: 0%-16%/0%
 Morbidity: 20%-11%/9% -Hosp stay: 4-3 / 3
 Table II:
 Group A Group B Group B Group C Group C
 (93-96) (97-00) (no H-P) (01-05) (no H-P)
 N: 8 45 28 20 6 -Spl w (gr):1433 1260 1394 1278 1040
 Op time (m):210 150 150 140 105 -Conv rate: 12.5% 15% 21% 10% 0%
 Blood trans: 87% 33% 29% 40% 17% -H-P use: 0% 38% 0% 70% 0%

Morbidity: 25% 22% 25% 20% 17% -Hosp stay: 5 4 5 4 4
Conclusion:After the first 50 cases,we observe not only the reduction of operative time but also the reduction in blood transfusion requirement, postoperative morbidity and hospital stay.These advantages are observed also in the group of splenomegaly, were the use of H-P has permitted ameliorate the results.

Solid Organ Removal-P456

LAPAROSCOPIC EXCISION OF ADRENAL CYST MISDIAGNOSED AS BILIARY CYSTADENOMA OF LIVER, In Seok Choi PhD, Yoo Mi Na MD, Won Jun Choi PhD, Dae Keung Go MD, Dae Sung Yoon, Department of Surgery, Konyang University Hospital, Daejeon, South Korea

(Introduction) Adrenal cysts are not a common disease, which prevalence is reported to be 0.06-0.18%. It must be differentiated between all retroperitoneal tumors, hydronephrosis, pancreatic and mesenteric cysts, hepatic cysts and hemangioma. Surgical treatment is indicated when cysts are large, symptomatic, rapidly expanding, or cysts difficult to differentiate between malignant tumors. Herein, we reported one case of successfully removed adrenal cyst which was misdiagnosed as biliary cystadenoma of liver prior operation, via laparoscopy
(Case) A 55-year-old woman became symptomatic with dull pain on her right flank and distension. The general state of the patient at the time of admission was good, and the right abdomen was distended with no tenderness. Laboratory tests showed no remarkable findings. Simple abdominal X-rays showed no remarkable findings, but the CT showed a 12*15cm sized large lobulated exophytic growing cystic liver mass with septation and calcification in Segment 6. Operation was performed under the impression of biliary cystadenoma of liver, through 4 trocars (12-11-10-5mm). Laparoscope was introduced through the umbilical trocar for initial examination (12mm), huge retroperitoneal cystic mass was found to be filling the right upper quadrant, displacing the right kidney. 3 additional trocars were introduced: the 11mm in the mid-line between the xiphoid process and umbilicus, one in the left hypochondrium(5mm), and one(10mm) in the right hypochondrium. After identifying the cyst, about 700cc of serous cystic material was aspirated, and the cyst was separated using a Harmonic scapel. The cyst originated from the right adrenal gland. The cyst was separated without damage to the adjacent organs, a drain to the operating site was retained after which the surgery ended. The total time of operation was 95 minutes and the patient had an uneventful recovery.

Solid Organ Removal-P457

PHARMACOLOGIC MANAGEMENT OF PATIENTS WITH PHEOCHROMOCYTOMA PRIOR TO LAPAROSCOPIC ADRENALECTOMY: A SYSTEMATIC REVIEW OF THE LITERATURE, J Cyriac MD, J Hagen MD, L Klein MD, T Penner MD, P Sullivan MD, L Smith MD, D Weizman MD, D Urbach MD, Minimally Invasive Surgery Program, University of Toronto, Ontario, Canada

BACKGROUND: The aim of this systematic review was to evaluate recent data on the preoperative pharmacologic management of patients undergoing laparoscopic adrenalectomy for pheochromocytoma.

METHODS: We conducted a Medline search from January 2000 to August 2005 of English publications containing information on laparoscopic adrenalectomy for pheochromocytoma. Articles that described the preoperative medical regimen were selected. We extracted information from each article on the types of medical regimens and relative effectiveness.

RESULTS: Of the 152 articles that were selected with these search criteria, 37 (12%) described the preoperative medical management. The different types of medical regimens included (and their frequency of use): nonselective alpha-blockers +/- beta-blockers (64%); selective alpha-blockers (16%); calcium-channel blockers (12%); beta-blockers alone (4%); and a catecholamine synthesis blocker with a nonselective alpha-blocker +/- a beta-blocker (4%). No deaths or major morbidity were reported, but the articles had variable reporting of intraoperative hypertension, hypotension and tachycardia.

CONCLUSION: Most articles on laparoscopic adrenalectomy for pheochromocytoma do not describe the preoperative pharmacologic management used. The combination of a nonselective alpha-blocker with or without beta-blockers is most commonly used preoperatively for laparoscopic adrenalectomy for pheochromocytoma. However, other medical regimens, such as those based on calcium channel blockers, may be equally effective.

Solid Organ Removal-P458

SPLenic ARtery EMBOLIZATION LEADS TO ENDOVASCULAR STAPLER FAILURE: BURST PRESSURES IN AN ANIMAL MODEL, Edward P Dominguez MD, Yong U Choi MD, John F Sweeney MD, Charles F Bellows III MD, Michael E. DeBakey Department of Surgery, Baylor College of Medicine, and Veterans Affairs Hospital, Houston, Texas.

Introduction: The use of linear endovascular staplers for controlled ligation and division of the splenic hilar vessels during laparoscopic splenectomy (LS) has become standard practice. Device malfunction can lead to serious consequences of hemorrhage which require emergency conversion to an open procedure. Embolization of the splenic artery has been advocated prior to LS in selected cases of splenomegaly. The aim of this study is to examine the general reliability of linear cutting staplers to secure and divide large blood vessels, if fired at the site of embolization coil deployment.

Methods: Porcine abdominal aortas (6-7 mm) were harvested. In Group I the vessels were sealed using a laparoscopic endovascular stapler (2.5 mm, US Surgical). In Group II, two fibred platinum embolization coils (0.35, Boston Scientific) were deployed in the lumen of the vessel and a laparoscopic endovascular stapler (2.5 mm, US Surgical) was deployed across these coils. The vessel-sealing capabilities in each group were assessed via measured burst-pressures.

Results: There were no failures of the endovascular staplers in Group I. Moreover, these staplers adequately sealed the vessels with burst pressures nearing 310 mm Hg. However, when the endovascular stapler was deployed across the vessel in the area of the embolic coils (Group II) the device failed. Among the stapler problems noted were the abnormal closure of the jaws and improper staple formation after firing. Moreover, the stapler was not able to cut through the embolic coils leading to the improper and incomplete transection of the vessel. These problems in turn lead to the vessel not being adequately sealed with instantaneous failure of the staple line noted (burst pressures unrecordable).

Conclusion: Endovascular staplers fail when applied across embolic coils. The authors expect that these device malfunc-



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tions can lead to significant blood loss or delayed hemorrhage during a LS. Careful recognition of the anatomic location of these embolic coils within the vessels is essential.

Solid Organ Removal-P459

HAND-ASSISTED LAPAROSCOPIC SPLENECTOMY IS SAFE AFTER ORTHOTOPIC LIVER TRANSPLANT, Winston R Hewitt MD, Hani P Grewal MD, Christopher B Hughes MD, Jeffery L Steers MD, Mayo Clinic, Jacksonville, FL, USA

Laparoscopic procedures after orthotopic liver transplant (OLT) have been performed infrequently. Immune-mediated thrombocytopenia (IMT) requiring splenectomy is occasionally seen after liver transplant. It is our opinion that previous OLT is not a contraindication to laparoscopic splenectomy (LS).

Methods: Two patients who underwent previous orthotopic liver transplant developed IMT. A liver-spleen scan was performed prior to splenectomy in both patients to ensure the absence of accessory splenic tissue. Bone marrow biopsies were performed in both to support the diagnosis. Both patients were initially responsive, then, refractory to steroid and immune globulin therapy. Patient #1 was a 48-year-old male who developed IMT just over 3 years after OLT performed for end-stage liver disease secondary to hepatitis C and alcohol. Patient #2 was a 25-year-old male who developed IMT 5 years after his third OLT performed initially for end-stage liver disease secondary to biliary atresia. Hand-assisted laparoscopic splenectomy was offered to both patients.

Results: Both patients underwent hand-assisted laparoscopic splenectomy with the spleen removed intact. Neither patient required a blood transfusion intra-operatively. The operative time was 112 min and 58 min for patients #1 and #2, respectively. No significant decline in allograft function or other post-operative complications were noted.

Conclusion: There are advantages to performing laparoscopic procedures over open procedures for many patients. Laparoscopic splenectomy has been an effective and safe procedure for these patients after OLT.

Solid Organ Removal-P460

MINI INCISION OPEN AND LAPAROSCOPIC DONOR NEPHRECTOMY IN THE OBESE, Niels F Kok MD, Ian P Alwayn PhD, May Y Lind PhD, Willem Weimar PhD, Khe T Tran MD, Geert Kazemier PhD, Jaap H Bonjer PhD, Jan N IJzermans PhD, Erasmus MC

Background: Expansion of living kidney donation with obese donors could substantially increase the living donor organ pool. However, surgeons are often reluctant to operations of overweight patients. The aim of this study was to determine how obesity affected the minimally invasive, muscle-splitting open and laparoscopic approaches and which approach is desired for donor nephrectomy in the obese.

Methods: Data were collected prospectively. Per procedure, preoperative and postoperative data of obese donors (BMI >30) were compared to normal weight donors (BMI <25). In the obese, open donor nephrectomy (ODN) and laparoscopic donor nephrectomy (LDN) were compared.

Results: ODN in 20 obese donors necessitated a longer incision (median 12 vs. 10 cm, $P=0.04$) and caused more blood loss (median 310 vs. 100 ml, $P=0.01$) as compared to ODN in 37 normal weight donors. LDN in 30 obese donors necessitated 3 (10%) conversions as compared to 4 (4%) of LDNs in 91 normal weight donors. Complication rate and operation times were similar. Comparison of ODN and LDN in obese donors revealed a significantly shorter warm ischemia time (median 2.5 vs. 6.5 minutes, $P < 0.001$) and operative time (157 versus 231 minutes, $P < 0.001$) in ODN. Blood loss, complications and anesthesiologic parameters were similar. There was a tendency towards a shorter hospital stay in the LDN group (median 4 vs. 3 days, $P=0.07$).

Conclusion: ODN and LDN result in good results in obese donors. Expansion of the living donor pool with either technique is justified.

Solid Organ Removal-P461

OVERWEIGHT SHOULD NOT EXCLUDE WOMEN FROM LAPAROSCOPIC DONOR NEPHRECTOMY, Niels F Kok MD, Ian P Alwayn PhD, Geert Kazemier PhD, Willem Weimar PhD, Khe T Tran MD, Jaap H Bonjer PhD, Jan N IJzermans PhD, Erasmus MC

Kidney transplantation from living donors is the best treatment for end stage renal disease. The increasing number of overweight and obese people willing to donate has brought into question how to remove their kidneys. Surgeons and anesthesiologists are often reluctant towards donor nephrectomy in donors having a body mass index over 25 and especially towards laparoscopic donor nephrectomy in this category. From daily practice originated the idea that laparoscopic donor nephrectomy was easier performed in overweight females than in males. In order to investigate possible differences between the sexes, prospectively collected data of fifty-nine female and sixty-one male donors with body mass index over 25 and who underwent laparoscopic donor nephrectomy were compared. Studied parameters included conversion rates, operative time, blood loss and complications. Three (5%) procedures were converted to open in females and 7 (12%) in males. Operative time (median 221 vs. 253 minutes, $P=0.005$) was significantly shorter and blood loss (median 110 vs. 200 ml, $P=0.01$) was less in female donors. The number of complications did not differ.

Conclusion: The build and fat distribution of overweight female donors makes them suitable candidates for laparoscopic donor nephrectomy. Standard exclusion of overweight and obese women from laparoscopic donor nephrectomy should be reconsidered.

Solid Organ Removal-P462

LAPAROSCOPIC DONOR NEPHRECTOMY VERSUS MINI INCISION OPEN DONOR NEPHRECTOMY IN THE ELDERLY, Niels F Kok MD, Ian P Alwayn PhD, Khe T Tran MD, Willem Weimar PhD, Geert Kazemier PhD, Jaap H Bonjer PhD, Jan N IJzermans PhD, Erasmus MC

Kidney transplants derived from older living donors have proved good results in the recipient. Aging in Western countries establishes donation by older donors as an important source to further expand the donor pool. Older age is usually associated with an increased complication rate, decreased importance of cosmetic outcome and decreased importance of productivity losses. The aim of the present study was to determine whether either complete Laparoscopic Donor Nephrectomy (LDN) or Open Donor Nephrectomy should be the preferable operation in the elderly.

From 1997 data of all donor nephrectomies at our institute were prospectively registered. Of 73 donors aged 60 years and older, 43 underwent LDN and 31 underwent ODN. Surgical outcome was compared. In all Dutch speaking donors (28 LDN donors and 27 ODN donors) quality of life scores were calculated preoperatively, and one and three months postoperatively using the Short Form 36 (SF-36). Every two weeks postoperatively, these donors were also asked to indicate how many percent of their usual daily activities they had resumed until they resumed 100 percent of their preoperative activities. Baseline characteristics did not differ. Two (5%) laparoscopic procedures were converted to open. Incision length ranged from 8 to 15 cm (ODN). Warm ischemia time (6 vs. 3 minutes, $p<0.001$) and operation time (242 vs. 167 minutes) were significantly longer for LDN. Blood loss and postoperative complication rate did not differ. Hospital stay was shorter following LDN (3 vs. 4 days, $P=0.04$). Following LDN, significant higher scores on SF-36 dimensions vitality, social functioning and role emotional were assessed following LDN. Resumption of daily activities was significantly faster following LDN.

In conclusion, despite longer warm ischemia time and longer operation time, LDN provides superior postoperative recovery. These data support that LDN is preferably used for live kidney donation in older donors too.



Solid Organ Removal-P463

QUALITY OF LIFE FOLLOWING MINI INCISION OPEN VERSUS LAPAROSCOPIC DONOR NEPHRECTOMY, Niels F Kok MD, Ian P Alwyn PhD, Geert Kazemier PhD, Willem Weimar PhD, Khe T Tran MD, Jaap H Bonjer PhD, Jan IJzermans PhD, Erasmus MC

BACKGROUND. The main objective of minimally invasive donor nephrectomy is fast restoration of Health Related-Quality of Life (HR-QOL). This prospective, non-randomized study was set up to determine differences in HR-QOL following respectively mini incision open donor nephrectomy (ODN) and complete laparoscopic donor nephrectomy (LDN).

METHODS. From May 2001 to December 2004 93 donors were enrolled. Forty-four donors underwent ODN and 49 donors underwent LDN. Participants completed the Euroqol-5 dimensional survey (EQ-5D), Short Form-36 (SF-36) and Multidimensional Fatigue Inventory-20 (MFI-20) preoperatively and 1,3 and 6 months postoperatively. In addition, the EQ-5D was also completed at 3,7 and 14 days postoperatively.

RESULTS. Baseline characteristics of donors and recipients were comparable except for donors' sex (more females ODN, $P=0.01$). None of the open incisions was enlarged. In three patients LDN was converted to open. Complications occurred in a comparable number of patients, whereas hospital stay was significantly longer following ODN ($P=0.01$). Of all eight dimensions of the SF-36, physical functioning and bodily pain differed significantly in favor of LDN at 1 month (respectively $P=0.02$ and $P=0.03$). At 6 months significantly higher scores were found for mental health in favor of ODN. At all points across time scores on the MFI-20 and the EQ-5D did not differ between ODN and LDN.

CONCLUSIONS. Mini incision ODN and LDN both lead to satisfactory and fast restoration of HR-QOL. The physical component of quality of life is faster restored following LDN. Keeping in mind several other well known advantages of LDN such as less pain and shorter hospital stay, this makes LDN the favorable technique to expand live kidney donation programs.

Solid Organ Removal-P464

FAVORABLE OUTCOMES OF SIMULTANEOUS BILATERAL LAPAROSCOPIC HAND-ASSISTED NEPHRECTOMIES, Yuri W Novitsky MD, Andrew G Harrell MD, Lauren B Paton MD, Pierce B Irby MD, B. Todd Heniford MD, Chris M Teigland MD, Kent W Kercher MD, Carolinas Medical Center

Introduction: Laparoscopy has become the approach of choice for the majority of nephrectomies. However, the outcomes of simultaneous bilateral laparoscopic nephrectomies are less established. We hypothesized that hand-assisted laparoscopic (HALS) nephrectomies are safe and well-tolerated for both benign and malignant renal pathologies.

Patients and Methods: Retrospective review of prospectively collected database of consecutive patients undergoing HALS nephrectomies at a tertiary care hospital. All operations were performed trans-abdominally, supine, with a hand-assist device in a low midline position and additional trocars on the side of the respective nephrectomy. Main outcomes measured included patient demographics, operative time and blood loss, perioperative morbidity, and postoperative course. Results: Between December 2001 and August 2005, 14 patients underwent simultaneous bilateral HALS nephrectomies. There were 8 men and 6 women with the mean age of 51 years (range, 37-64), and the mean American Society of Anesthesiology score of 2.6 (range, 2-4). Preoperative indications included polycystic disease (5), renovascular hypertension (5), and carcinoma (4). Seven patients underwent bilateral radical and 6 patients had bilateral simple nephrectomies. One patient underwent partial nephrectomy on one side followed by radical nephrectomy on the contralateral side for bilateral renal cell cancers. The mean operative time was 227 ± 73 min (range, 130-395). The mean estimated blood loss was 104 ± 75 cc (range, 50-400). One patient required an intraoperative blood transfusion for bleeding from the renal vein staple line that was controlled with clips. There were no other intraoperative complications or conversions to open procedures. Postoperatively, 2 (14.3%) patients required brief intensive care unit admissions. The mean time to regular diet was 3.2 days

(range, 2-5). The median length of stay was 5 days (range, 3-15). One patient developed pneumonia. There were no other morbidities or mortalities.

Conclusion: Bilateral nephrectomies can be performed laparoscopically as single-stage procedure. The use of the hand-assisted approach avoids patient repositioning and facilitates safe kidney mobilization and resection. The use of HALS techniques resulted in a minimal perioperative morbidity and fast postoperative recovery. This approach may thus be preferred for simultaneous bilateral nephrectomies.

Solid Organ Removal-P465

ENDOSCOPIC SUBFASCIAL LIGATION OF INCOMPETENT LEG PERFORATORS IN VENOUS ULCERS, Ibrahim a salama MD, hesham e essam eldin MSc, mahamed s abdelrahman MD, mahamed s alakad MD, steven D Schwaizberg MD, department of surgery, national liver institute, menouphya university, met-ghamr general hospital, ministry of health, zigazig university, Egypt. cambridge health allianc, cambridg, MA. usa.

BACKGROUND: Chronic venous insufficiency results from venous obstruction, or venous reflux, in which venous ulceration is most devastating feature. Subfascial endoscopic perforator surgery (SEPS) has recently become popular to treat chronic venous insufficiency of the lower extremities. Complete SEPS was studied on chronic venous insufficiency with resistant venous ulcer.

METHODS: One hundred and ten patients were studied prospectively who had class IV, V, and VI insufficiency. First incision 4 fingers breadth distal to the tibial tuberosity. Insufflation to 30 mm Hg was used. The 2nd incision was made posterior and distal to the first one for 5mm clip applicator. Dissection proceeded using the curved shaft of 3mm arthroscopy scissor inserted directly without trocar to dissect the subfascial space and identify the laparoscopic anatomy. The endoscopic view appears as two tunnels (superficial and deep to intermuscular septum). Dissection is continued medially to the paratibial fascia, posteriorly to the posterior midline and distally to the medial malleolus to search for the retro-malleolar vein (Cockett I). Cockett III is often found in the free border of intermuscular septum, and Cockett II beneath the duplication of the intermuscular fascia. Controlling the perforators was done by 5 ml clip applicator or coagulation diathermy.

RESULTS: Total numbers of perforators was 412. The mean number of each limb 3.9 perforator per leg (range 1-9). Mean operative time 30 minutes (range 20-40 minutes). In the same procedure 30 stripping of long saphenous just below the knee, 22 multiple evulsions, 10 ligation of saphenopopl junction and 4 stripping of short saphenous. Ten limbs (9%) developed superficial wound infection, one had saphenous nerve dysesthesia and 6 limbs develop subfascial hematoma (5.5%). Postoperative duplex revealed missed incompetent perforators in 6 limbs. After a mean follow up of 12 months (6-30 months). Forty ulcers (91%) healed after surgery, ulcer recurrence was found in four legs (9%).

CONCLUSION: SEPS is safe and feasible procedure to do and to redo, with excellent result and promising outcome in patients with severe chronic venous insufficiency and recommended to be the standard operation for perforator vein intervention

Solid Organ Removal-P466

LAPAROSCOPIC NEPHRECTOMY, Ashok Sundraraman MS, Ramya Ramakrishnan MS, Naveen Alexander MS, J Rajesh MS, Sri Ramachandra Medical College & Research Institute Laparoscopic Nephrectomy is performed either for benign disease or for malignant disease. The indication for benign pathology includes renal hypertension, recurrent pyelonephritis calculus disease. Chronic obstructed symptomatic non-functioning kidney. Multi cystic dysplastic Kidney. In case of malignancies, like Renal cell Carcinoma, Transitional cell carcinoma of Kidney or ureter.

Under general patient is positioned in lateral decubitus. Once all ports are placed, the colon is retracted downward by cutting the paracolic peritoneum and the hepatic flexure. This maneuver will expose the Gerota fascia, Expose the gonadal vessels. Once the window is made, the ureter will be identified first. This will help retraction during dissection. After dissection of



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renal hilum, the renal artery and vein will be identified and ligated between clips, or by Endo GIA. The kidney will be lifted up and blunt dissection continues dividing remaining attachments to the retro peritoneum. Finally, the ureter is divided and the organ is collected in a plastic bag and removed to protect intra abdominal spillage and to protect the skin.

Advantages: no blood loss, No post operative discomfort, no post operative pain, early ambulation, more pleasing cosmetic result, no abdominal wall laxity from a flank incision. No diet restriction. Early discharge from hospital.

Solid Organ Removal-P467

EXPERIENCE WITH LAPAROSCOPIC MANAGEMENT OF SOLITARY SYMPTOMATIC SPLENIC CYSTS, Nobumi Tagaya MD, Makoto Furihata MD, Keiichi Kubota MD, Second Department of Surgery, Dokkyo University School of Medicine

Aggressive laparoscopic procedures can be used to treat pathological lesions of solid organs. We attempted laparoscopic management of solitary symptomatic splenic cyst in four patients - two males and two females - ranging in age from 19 to 63 years (mean 35 years). The cysts involved the whole of spleen in one case, the upper pole in one and the lower pole in two. We carried out laparoscopic splenectomy in one case and laparoscopic unroofing of the cyst wall in three. In two procedures we successfully used needlescopic instruments. The duration of surgery and the volume of intraoperative bleeding were 300 min and 200 ml for the splenectomy, and 170 min (range: 120-240) and minimum for the unroofing, respectively. There were no intra- or postoperative complications related to the laparoscopic procedures. The postoperative hospital stay was 9 days for the splenectomy patient and 5.6 days (range: 5-7) for the unroofing patients, respectively. One of the latter had a recurrence of cyst six years after unroofing, which was successfully treated by splenectomy. Laparoscopic management of splenic cysts is technically feasible and safe and has the advantages of reducing postoperative pain, shortening convalescence and improving cosmetic result. However, careful follow-up and adequate treatment for recurrence of cyst is necessary for splenic cyst to achieve good long-term outcomes.

Solid Organ Removal-P468

EXPERIENCE WITH TRANSPERITONEAL LAPAROSCOPIC ADRENALECTOMY FOR PHEOCHROMOCYTOMA, Nobumi Tagaya MD, Keiichi Kubota MD, Second Department of Surgery, Dokkyo University School of Medicine

Laparoscopic adrenalectomy for benign adrenal tumors has become the preferred surgical treatment, however, for pheochromocytoma it is still limited due to hypertensive events. We report our experience with transperitoneal laparoscopic adrenalectomy for pheochromocytoma. During eight years, five transabdominal laparoscopic adrenalectomies which corresponded to 20% of all laparoscopic adrenalectomies were performed for symptomatic pheochromocytomas in three males and two females. Their ages ranged from 17 to 50 years with a mean of 35 years. The location of tumor was right side in two cases, left side in one, bilateral side in one and Zucherkandle in one, respectively. There were no conversions to open surgery. The operation time and estimated blood loss ranged from 120 to 450 min (mean: 283 min) and 3 to 1200 ml (mean: 368 ml). None of the patients required transfusion. Only bilateral case had four tumors (right side in two and left side in two). The mean diameter of the excised tumors was 51 mm (range: 8 to 90 mm). There were no post-operative complications. All patients showed normal blood pressure and catecholamine levels without treatment. The mean postoperative hospital stay was 12 days (range: 7-15 days). The mean duration of follow up was 73 months (range: 51-90 months). There was no recurrence during the follow-up period. The laparoscopic treatment of pheochromocytoma is safe and effective procedure with avoiding hypertensive events and the consideration of careful maneuver due to the vessel rich tumor.

Solid Organ Removal-P469

TRANSABDOMINAL LATERAL APPROACH OF LAPAROSCOPIC LEFT ADRENALECTOMY USING THREE PORTS, Nobumi Tagaya MD, Keiichi Kubota MD, Second Department of Surgery, Dokkyo University School of Medicine

There are several endoscopic approaches for the resection of adrenal tumors. However, the choice of approach is still controversial depending on the surgeon or institution. We introduced the transabdominal lateral approach of laparoscopic left adrenalectomy using three ports with the reduced operation time and cosmetic benefit. Under general anesthesia, patients took the right lateral position. The operation was performed by two man method. Three ports (12-10-5mm or 12-5-5-mm) were inserted into the peritoneal cavity at left upper quadrant. Initially the peritoneum of the lateral side of spleen was divided by laparoscopic coagulating shears (LCS). The upper pole of the left kidney was identified. The tail of the pancreas was spontaneously divided with spleen medially. Left adrenal gland was easily identified after this maneuver. If the left adrenal tumor was small, we confirmed the exact location of tumor by laparoscopic ultrasonography. Left adrenal gland including tumor was resected by LCS without metal clips. Partial adrenalectomy was also performed by LCS at the lower side of tumor with the preservation of adrenal vessels. The operation time of recent three cases ranged from 60-100 min (mean: 77min) compared with 140-178 min (mean: 159 min) in the previous cases. There was a significant difference in the operation time. Our method for laparoscopic left adrenalectomy achieved the reduced operation time and the minimally invasive surgery. The development of operative instruments is necessary, however, surgical skills and keeping the good operative field with minimal bleedings are more important factors to accomplish better outcomes.

Thoracoscopy-P470

ENDOSONOGRAPHY DURING VATS FOR RESECTION OF SMALL NONPERIPHERAL LUNG NODULES: GOOD TOOL EVEN FOR THE BEGINNER, Yi-Chen Chang MD, Chung-Wei Chen MD, Department of Surgery, Far Eastern Memorial Hospital, Taipei, Taiwan

Objective: VATS in the management of lung nodules has been accepted for its lesser morbidity either in diagnostic or therapeutic procedures. However, for the small nonsubpleural nodules, it difficult to localize the lesion without some adjunct. Endosonography had been proven to be a good tool for intraoperative localization of small nodules. In this report, we showed that the endosonography is feasible even for the beginner in a community hospital in Taiwan.

Material and method: From Jan 2005 to Sep 2005, four patients with small nonsubpleural lung nodules (<2cm) received resection of tumor by VATS. The lesions was revealed by CT. The size and distance from pleura were measured on CT. All of the nodules were nonvisible by thoracoscopy, and nonpalpable by indirect palpation. Intraoperative endosonography (Philips Lap L9-5) was utilized to localize the lesions.

Results: The nodules had a average diameter of 8 mm and a range of 4 mm to 12 mm measured on CT. The minimal distance to pleura was 11 mm in average and range of 5 mm to 20 mm. Three nodules were localized by endosonography and resected. One was hamatoma, another was pulmonary TB, and the other was metastatic hepatoma. The endosonography inspection had 75% sensitivity and 100% specificity in localizing the nodules for the beginner in our hospital.

Conclusion: Intraoperative endosonography is a safe, real-time, cheap, and effective tool of localizing small nonperipheral pulmonary nodules as comparing with CT guided coil labeling. Besides, the learning curve is short and feasible for the beginner.

Thoracoscopy-P471

T2 VERSUS T2,3 ABLATION IN THORACOSCOPIC SYMPLECTECTOMY FOR HYPERHYDROSIS., Davide Lomanto MD, Avinash Katara MS, Wei-Keat Cheah, Jimmy So, Minimally Invasive Surgical Centre, Department of General Surgery, National University Hospital.



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Aim: Thoracoscopic sympathectomy is popularly performed for patients with palmar hyperhidrosis. Surgeons vary worldwide in the level of the sympathetic nerves ablated. Our aim is to compare the blockade of the 2nd thoracic sympathetic ganglion (T2) with ablation of levels T2 and T3.

Methods: Our usual practice for patients undergoing bilateral thoracoscopic sympathectomy for palmar hyperhidrosis is to ablate T2,3 levels bilaterally. 25 consecutive patients in our series had unilateral T2 and T3 ablation followed by contralateral ablation of T2 level only. Patients were followed up for mean period of 23 months (range 2 to 65 months). The patients were analyzed for comparison of symptoms bilaterally, compensatory hyperhidrosis and levels of satisfaction post-operatively.

Results: Our study group consisted of 25 patients with a male:female ratio of 3:2 and a mean age of 32 years (range = 19 to 50 years). All 25 patients confirmed that their palmar sweating resolved postoperatively, both palms being equally dry. 20 out of 25 (80%) patients complained of compensatory hyperhidrosis in other parts of the body, which was also bilaterally symmetrical. The areas involved were trunk (80%), lower limbs (32%) and armpits (12%). Overall, 80% were very satisfied with the procedure, 20% were satisfied with mild to moderate compensatory hyperhidrosis not affecting their lifestyle. None were dissatisfied with procedure.

Summary: T2 ablation in thoracoscopic sympathectomy for palmar hyperhidrosis is equally effective as ablation of T2,3 levels in terms of symptomatic relief, recurrence, compensatory hyperhidrosis and patient satisfaction.

Thoracoscopy-P472

VATS AND LAPAROSCOPY FOR THORACOABDOMINAL TRAUMA, Yi-Chen Chang MD, Chung-Wei Chen MD, Hen-Fu Lin MD, Department of Surgery, Far Eastern Memorial Hospital, Taipei, Taiwan

Objective: As the advancement of minimal invasive surgery, VATS play some roles in the management of patients of chest trauma. In our hospital, we use VATS as a tool for diagnosis and treatment for chest trauma, including penetrating and blunt injuries, in acute and subacute stage. We want to make some change in the management of trauma patients in the era of minimal invasive surgery.

Material and method: From January 2002 to December 2004, twenty five patients of chest trauma received VATS as the first step procedures. For the patients who had combined abdominal injuries, laparoscopy was used to inspect before on going surgery. All patients were hemodynamics stable before operation. We used 10 mm, 30 degree thoracoscope. The operations were converted to open thoracotomy if the injuries could not be controlled.

Results: There are 23 males and 2 females. The mechanisms of trauma: 2 cases were gunshot, 5 cases were knife penetrating, and the others were blunt injury. Eighteen patients received emergent or urgent operations because of indications of exploratory thoracotomy and 7 patients received operations at subacute stage because of clotted hemothorax. Five patients of blunt chest trauma were converted to thoracotomy because of multiple active bleeding. The other patients were successfully treated by VATS. Three patients had combined abdominal injuries, and laparoscopy were applied. Two of these patients did not receive laparotomy. There was no surgical mortality.

Conclusion: VATS is a safe and effective tool for diagnosis and therapy for the patients of chest trauma, especially for penetrating injuries, if the preoperative hemodynamics are stable. For the patients of combined abdominal injuries, we can use laparoscopy to diagnose and treat the patients.

Thoracoscopy-P473

THORACOSCOPIC APPROACH OF TRANSDIAPHRAGMATIC RESECTION OF RETROPERITONEAL AND THORACOABDOMINAL TUMORS, Ryan V Messiner DO, Robert Cywes MD, University of Florida Shands Jacksonville

Introduction: We describe a novel thoracoscopic transdiaphragmatic approach to thoraco-abdominal and high retroperitoneal tumors that significantly reduces surgical trauma

of open thoraco-abdominal access. Technique description utilizes our thoracoscopic experience with congenital Bochdalek diaphragmatic hernias and transthoracic retroperitoneal tumor resections.

Methods: A left-sided thoraco-abdominal tumor extending from T7 to the renal hilum was found in a 15 year old male during evaluation of a pectus excavatum. At surgery, in the supine position with arms laterally, 3 thoracoscopic ports were placed in the 5th interspace. Using an 8 mmHg pneumothorax, the left paravertebral mass was mobilized in cephalad to caudad by harmonic scalpel. The posterior diaphragmatic edge was split anterior to the tumor and tacked up with stay sutures allowing access to the retroperitoneum behind the spleen, adrenal gland and pancreas to the renal hilum. Visualization was excellent. A 13x6 cm ganglioneuroma was completely mobilized and removed via a small thoracotomy incision. The diaphragm was repaired with 0 Ticron sutures. A thoracoscopic Nuss pectus repair was performed. No chest tubes were required.

Discussion: The complexity, morbidity and difficult access to the transdiaphragmatic retroperitoneum laparoscopically and open is well-known. Thoracoscopic resection of posterior mediastinal tumors and repair of Bochdalek hernias have been reported. In this report we describe ease of access with excellent visualization and low morbidity to the retroperitoneum transthoracically. This approach may be extended to access the dome of the right liver and upper pole of the spleen.

Conclusion: Thoracoscopic transdiaphragmatic access to high retroperitoneal and thoraco-abdominal tumors is a practical minimally invasive, high visibility, low morbidity approach that surgeons need to consider in planning resection of such tumors.

Thoracoscopy-P474

ROLE OF THORACOSCOPY IN MISSED INJURIES OF DIAPHRAGM, N Ahmed MD, A Ibikunle MD, S Nijhawan MD, Department of Surgery, Huron Road Hospital, Cleveland clinic health system

Introduction: To define the role of thoracoscopy, in patients with delayed Pleural effusion after abdominal exploration for penetrating thoracoabdominal injuries. We hypothesized that that early thoracoscopy aids in early detection of diaphragmatic injuries missed by isolated placement of chest tube.

Method: The study, approved by IRB, was done in a level II trauma center with a high caseload of penetrating injuries. All patients included in the study had abdominal penetrating injuries, a delayed pleural effusion, a low initial suspicion of thoracic injury and a negative chest X-ray. No diaphragmatic injuries were found at initial abdominal exploration. A chest tube was placed initially and followed by an elective thoracoscopy.

Results: N=4 (Stab-1/GSW-3) Diaphragmatic Injury -4, (3 on left side). All repaired at thoracoscopy and where present in posterior recess.

Conclusions: Delayed effusion after penetrating abdominal injuries is due to missed diaphragmatic injury (usually posterior recess), simple chest tube drainage will not address the underlying injury, thoracoscopy is very helpful in diagnosis and treatment, repeat abdominal approach is discouraged.

Thoracoscopy-P475

ENDOSCOPIC THORACIC SYMPATHECTOMY FOR HYPERHIDROSIS USING A SELECTIVE APPROACH, Gustavo Salinas MD, Fernando Bautista MD, Lil Saavedra MD, Edwin Ramirez MD, Victoria Sanchez MD, Paola Dongo MS, Natanael Landa MS, Avendaño Medical Center for Ambulatory Surgery, Lima, Peru, Maison de Sante Medical Centers, Lima, Peru

INTRODUCTION: This study is aimed to determine the safety and efficacy of the procedure for palmar and axillary hyperhidrosis. Patients may be distressed by the occurrence of troublesome compensatory sweating over the trunk or back after ETS, even to the extent of preferring the original sweaty condition. The ideal technique for avoiding this undesirable outcome is still pending.

METHODS AND PROCEDURES: During the period Jan 2003 to Apr 2004, 71 patients underwent T2-T3-T4 sympathectomy



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through two or three entry ports. Since Apr 2004, 113 patients had a selective sympathectomy using a 5 mm transaxillary single port: T2 (r2b, r3a) for facial sweating or blushing, T3-T4 (r3a, r5a) for palmar hyperhidrosis and T4-T5 (r4a, r6a) for axillary sweating. A thoracic drain was not used. The patients were discharged the same day, unless a complication develop. Other nine patients were not included due to incomplete clinical records or insufficient follow-up.

RESULTS: Two failures, both in the selective group are reported. Recurrence rates were 1.4 % and 9,7 % for the first and second period, respectively. Compensatory hidrosis occurred in 73 % of the first group, and 8.8 % in the second one. A 4.8 % overall morbidity rate includes neuralgia, gustatory sweating and hemothorax, requiring an overnight hospital stay. The mortality was zero.

CONCLUSIONS: Endoscopic thoracic sympathectomy is a safe and effective procedure for palmar and axillar hyperhidrosis. The more selective the procedure, the higher recurrence rate would be expected. Since the evolution of the technique resulted in a better clinical outcome regarding compensatory sweating, a selective approach is strongly encouraged for lessen this complication.

Thoracoscopy-P476

THORACOSCOPIC APPROACH FOR ESOPHAGEAL RESECTION IN SEVERE CHRONIC CORROSIVE ESOPHAGEAL STRICTURE:

A CASE REPORT, chadin tharavej MD, patpong navicharoen MD, suppa-at pengpaong MD, Department of Surgery, Chulalongkorn University

BACKGROUND: The unrelenting corrosive strictures of esophagus merit esophageal substitution. Because of the risk of complications in the retained esophagus, such as malignancy, mucocele, gastroesophageal reflux, and bleeding, esophageal resection is deemed necessary. Transthoracic approach for esophageal resection is considered safe but requiring thoracotomy. Transhiatal resection of a scared esophagus could be associated with serious complications. The safety and feasibility of thoracoscopic resection of the esophagus is not established in corrosive injury of the esophagus. We reported here in the feasibility and safety of thoracoscopic approach for resection of the esophagus in a patient with diffuse corrosive esophageal stricture involving hypopharynx.

PATIENTS AND METHODS: Thoracoscopic approach was used for resection of the scarred esophagus in a 31 year-old female patient. Right side colon was mobilized as an esophageal substitute via laparotomy. Pharyngocolonic anastomosis was made via left neck incision. Any intra-operative and post-operative complications were noted. Swallowing ability was assessed in the early postoperative period.

RESULTS: Thoracoscopic esophageal mobilization was successfully performed without complications. Any adhesions around the esophagus could be clearly seen and divided using harmonic scapel. Operative duration of the thoracoscopic part was 104 minutes. Total blood loss was 320 ml. Postoperative period was uneventful. Patient could have regular diet on day 7 after surgery.

CONCLUSION: Thoracoscopic approach for esophageal resection could be safely used for the extirpation of diffuse esophageal stricture. To our knowledge, this is the first report of esophageal resection using thoracoscopic approach in a patient with severe corrosive esophageal stricture.

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NOVEL TECHNIQUE OF LAPAROSCOPIC INTRACORPOREAL KNOT TYING ? A SIMPLIFIED APPROACH FOR JUNIOR RESIDENTS,

Raja R Gopaldas MD, Chand Rohatgi MD, Drexel University College of Medicine/Easton Hospital

Introduction : The evolution of laparoscopic surgery has been rapid especially in the last decade with significant advances not only in the instrumentation used but also in the complexity of procedures performed. Laparoscopic surgery has however been limited by various factors including two dimensional vision and limited spatial mobility of instruments. Although these problems have been addressed by the use of robotic instrumentation, only a few centers are willing to implement these expensive equipment for procedures which have been

performed with equal dexterity by conventional laparoscopic methods. One of the biggest limitations of conventional laparoscopic surgery is the placement of an intracorporeal knot.

Technique/Methods: We describe a novel and easier technique of intracorporeal knot tying using a right angled 10 mm grasper/mixer. The knot can be placed with equal dexterity in either hands. The right angled grasper is used to initially create a V-shaped configuration of the armed end of the suture while it is being stabilized distally by the needle driver in the opposite hand. The jaws of the right angled grasper is then twisted axially using the thumb-dial, thereby converting the V-shaped configuration to that of an alpha loop, with the jaws through the loop. After stabilizing the loop, the jaws of the grasper are opened and the free end of the suture is pulled through. By rotating the thumb-dial in the opposite direction, the configuration can be varied to create slip or square knots. We also describe a variant of this technique where the armed end of the suture is held by the grasper instead of creating a loop and twisted axially twice, thereby creating a Surgeon's knot.

Conclusion: Conventional intracorporeal laparoscopic knot tying is a cumbersome procedure . Our technique involves the use of an extra degree of freedom thereby eliminating the cumbersome three dimensional spatial movements used in conventional knot tying.

P478

AXIAL SPIN TECHNIQUE OF ENDOSCOPIC INTRACORPOREAL KNOT TYING: COMPARISON WITH THE CONVENTIONAL TECHNIQUE AND OBJECTIVE ASSESSMENT OF KNOT SECURITY, LEARNING CURVES AND PERFORMANCE EFFICIENCY ACROSS TRAINING LEVELS,

Raja R Gopaldas MD, Chand Rohatgi MD, Easton Hospital/Drexel University School of Medicine

INTRODUCTION: A major limitation of conventional laparoscopic surgery is the placement of an intracorporeal (IC) knot, which requires a significant amount of training and practice. An easier technique using a 10mm right angled grasper is compared with the conventional IC knotting technique (CLT). The new axial spin technique (AST) uses the spin of the instrument shaft to configure and tie IC knots.

METHODS: 14 participants stratified into 3 training levels were instructed to tie 50 reef IC knots using each technique on trainees in three sessions. The final 5 knots tied using each technique were deemed to be representative of maximal performance efficiency (PE) and randomly subject to tensile strength measurements using a tensiometer at 50mm/s distraction. Mean knot execution time (mKET), Normalized KE time (nET = group mean/mKET), Knot holding capacity (KHC), Relative knot security (RKS), and Performance Efficiency (PE = RKS/nET) of the knots tied were computed and analyzed using paired t? and Tukey tests.

RESULTS: Variables included knot tying session, technique and the training level. On completion of the study, junior residents (JR) averaged 51.72 s longer , senior residents (SR) averaged 26.22 s longer and attendings (ATT) averaged 19.17 s less to tie using CLT compared to the AST (F = 40.52, P= 0.0001). Across all levels, CLT technique was taking 83.26 s on an average to execute an IC knot compared to 59.08s with AST method (t= 2.784, P = 0.015). Learning curves revealed that junior residents significantly improved KE times with the AST technique (473.8 to 55.9s) compared to CLT (672.5 to 107.6s) across the sessions compared to those in advanced levels of training. The RKS of knots executed by AST was significantly stronger (AST: 13.1 vs 5.44 Newtons, paired-t: 4.9 P<0.0001) CLT: t=4.9, df=17, P=0.0001). The PE of knots executed using the CLT increased geometrically across training levels (JR: 1.35% SR: 5.58% ATT: 11.22%) while those of AST showed a linear trend (17.09%; 17.11 & 13.95%) .

CONCLUSION: The axial spin technique has a linear pattern of learning variation compared to exponential patterns of the conventional technique. Inexperienced Junior residents were surprisingly 1.5 times more efficient with AST and 8 times less efficient with CLT compared to attendings using the conventional technique. The axial spin technique is more efficient and results in better knot quality whilst being easier to learn & teach within a short training session.



EMERGING TECHNOLOGY ORAL ABSTRACTS

ET001

CREATING INTESTINAL ANASTOMOSES WITHOUT SUTURES OR STAPLES USING A RADIO-FREQUENCY-ENERGY-DRIVEN BIPOLAR FUSION DEVICE JF Smulders MD, IHJT de Hingh PhD, J Stavast MD, JJ Jakimowicz PhD, Catharina Hospital Eindhoven, the Netherlands

OBJECTIVE: Intestinal anastomotic healing requires the apposition of the collagen containing submucosal layers of the opposing intestinal walls, which is traditionally achieved by staples or sutures. Recently, a feedback-controlled bipolar sealing system (LigaSure) has been successfully introduced to seal and transect vessels with a diameter of up to 7 mm. This technology depends on fusion of collagen and elastin fibres in the vessel wall. Since collagen and elastin is also abundantly present in the intestinal wall it was hypothesized that it should be possible to create intestinal anastomoses using this technology.

DESCRIPTION OF THE TECHNOLOGY: For this purpose a new-generation RF generator and a prototype of the Ligasure Anastomotic Device (LAD) have been developed. The generator incorporates a closed loop control system which monitors tissue fusion, compares it with a mathematical model of ideal fusion based on the density and compliance of intestinal tissue and adjusts energy output accordingly. With the LAD both RF-energy and mechanical pressure can be applied by pulling the intestine between the jaws of the device (figure).



PRELIMINARY RESULTS: In total 8 anastomoses were created using this method in a porcine model (4 pigs, 2 anastomoses each). Inspection of the seals both immediate after creation and at the 7th day when the pigs were re-operated showed a normal macroscopic appearance. Between operations pigs appeared healthy and had normal intestinal passage. Histological examination of the anastomotic sites showed successful fusion with granulation tissue, viable collagen in the submucosa and re-epithelialization at the borders of the seals. **CONCLUSION:** These results show that RF-energy may be successfully used to create intestinal anastomoses in an animal model. Further studies to characterize the anastomotic healing process in the long term are required before its use in clinical practice may be considered and will be undertaken in the near future.

ET002

A NOVEL ENDOSCOPE-MOUNTED FOCAL ABLATION DEVICE FOR BARRETT'S ESOPHAGUS Kenneth J Chang MD, Ninh T Nguyen MD, W. Scott Melvin MD, University of California, Irvine, CA; Ohio State University, Columbus, OH

Introduction: Several devices have been evaluated for ablating Barrett's esophagus (BE). There remains a need for a focal ablative device for both primary and secondary ("touch-up") BE ablation. The ideal device should: 1) ablate to a controlled depth without stricture, 2) deliver a pre-set energy per unit surface area, 3) treat focal uniform areas quickly, yet preserve adjacent normal epithelium.

Aims: Assess an endoscope-mounted device for focal mucosal ablation that can be used for primary and secondary treatment of BE.



Methods: This endoscope-mounted focal ablation device (BARRX Medical, Sunnyvale, CA) fits on the end of a standard gastroscop, without impairing visualization or maneuverability. The upper surface is a 20x15 mm articulated platform (adjusts for scope angulation, optimizes mucosal apposition) with an electrode array identical to the HALO360 System (BARRX Medical). An energy generator delivers a rapid pulse of RF energy (300 W) dosed per unit surface area (energy density, J/cm²) to control ablation depth. The electrode is apposed to the epithelium under direct visualization.

Results: In the pig model, 115 ablations were created. Treatment variables: electrode surface area (1-4 cm²), power density (20-50 W/cm²), energy density (8-20 J/cm²). Ablation <1 sec. Settings of 20-30 W/cm² and 10-15 J/cm² resulted in uniform ablation, immediate epithelium slough, no submucosa injury. Confluent vertical and horizontal ablations were performed. Secondary ablation has been performed in human clinical trials for treatment of BE-HGD in conjunction with the HALO360 circumferential device.

Conclusions: This focal ablation device incorporates the HALO360 electrode technology, with its known ablation depth effect. The device ablates 3 cm² in <1 sec, and can be overlapped to treat larger areas. Clinical trials are underway for the device as primary and secondary therapy for BE +/- dysplasia. Other indications include vascular lesions, bleeding and neoplasia.

ET003

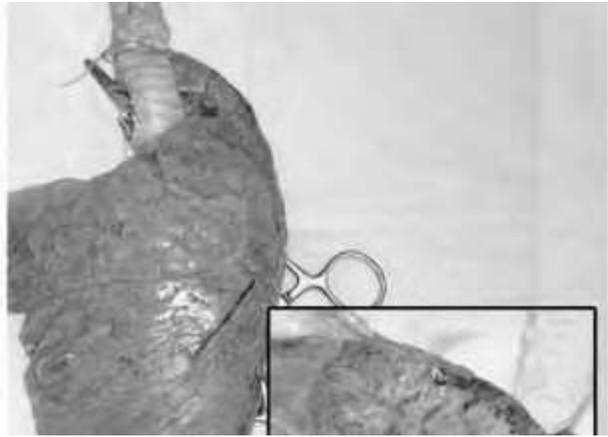
A NOVEL TECHNIQUE FOR IDENTIFYING PULMONARY AIR-LEAKS Thiru V Lakshman MD, Joshua Collins BA, Tracy Sims BA, Shamus Carr MD, Joshua Cantor MD, Atul S Rao MD, Joseph S Friedberg MD, Thomas Jefferson University, University of Pennsylvania

Objective: Spontaneous and iatrogenic pulmonary air leaks are challenging problems that continue to result in increased morbidity and mortality for hospitalized patients. Intraoperative identification of air leaks requires a thoracotomy and the crude technique of inflating a lung under saline in order to identify where bubbles originate (sites of injury). This method fails to reveal many leak sites and can not be performed thoracoscopically. Our objective was to develop a new technique for accurate identification of air leaks that could also be performed minimally invasively.

Methods: Ex vivo swine lungs (morphologically similar to human lungs) were ventilated with a circuit that allowed regulation of inspiratory pressures and instillation of aerosolized methylene blue (MB). Punctures and lacerations (typical of pulmonary injuries) were created and the lungs were then ventilated with air containing aerosolized MB. The lungs were subsequently photographed and dissected.

Results: Within seconds of ventilation, all sites of injury were immediately identified by MB extrusion. Dissection of the lungs revealed faint staining along the bronchial tree leading to the air leak and intense staining of the lung parenchyma at the site of the leak (image). There was no staining of any other lung parenchyma, even within 1-2 mm of the leak site. This finding was 100% reproducible (10/10 lungs).

Conclusions: These initial studies document a phenomenon of selective delivery of MB exclusively to areas of alveolar injury. This is likely due to forward airflow in the setting of particles with appropriate size, density, and charge. This technique could be utilized for thoracoscopic (or open) identification and treatment of air leaks. Future directions include in vivo studies and the development of an inhaled sealant application for non-surgical treatment of air leaks utilizing these same principles and techniques.



ET004

ENDOLUMINAL CLOSURE OF LARGE PERFORATIONS OF COLON IN A PORCINE MODEL USING NOVEL CLIP & SUTURING DEVICES, Gottumukkala S Raju MD, Ijaz Ahmed MD, Goro Shibukawa, MD, Douglas Brinning, Allison Poussard, Jonathan Coe BS, Mike Cropper, Dave Martin, Joanne Hull, University of Texas Medical Branch, Galveston, TX, USA & InScope, a division of Ethicon Endo-Surgery, Inc, Cincinnati, OH, USA

BACKGROUND: Very little is known about the outcome of endoluminal closure of colon perforations. Our preliminary work on endoluminal clip closure of a 2 cm colon perforation is encouraging (GIE 2005;62:791-95). Subsequently, we have shown in a controlled trial that InScope Multi-Clip Applier (IMCA) is effective in the closure of a 2 cm colon perforation. Endoluminal closure with clips at 1 cm intervals limits peritonitis and adhesions (accepted by DDW 2006). It is unclear whether larger perforations can be closed successfully by the endoluminal route. **AIMS:** To study endoluminal closure of a 4 cm colon perforation using partial thickness apposition with clips & full-thickness approximation with suturing.

DEVICES: InScope Multi-Clip Applier (IMCA) can fire 4 clips in one session, allows repositioning of the device, & has a rotation function. Tissue Approximation Device (TAD) allows full-thickness suturing & approximation of perforation. TAD was used to close gaping perforations that may be difficult to close with clips.

METHODS: Closure of a 4 cm full-thickness colon perforation created by an IT knife was studied in 10 animals. Experiment 1: Clip closure was attempted in the first 6 animals. Experiment 2: TAD closure was attempted in the next 4 animals. Measurements: a) Technical feasibility of closure; b) Clinical monitoring for sepsis and peritonitis for 2 wks; c) Necropsy on day 14 to check for peritonitis, adhesions; d) Quality of healing by a dye leak test. All the animals were allowed regular diet 24 hrs after closure. Antibiotics were given for 2 wks. **RESULTS:** Closure of a 4 cm colon perforation was successful in 9 of 10 animals. Clip closure was successful in 5 of 6 animals and TAD closure was successful in all 4 animals. IMCA failed to close a gaping perforation. IMCA closure of perforation prevented clinical sepsis & peritonitis; resulted in excellent healing (leak proof sealing) of the perforation, without evidence of fecal peritonitis on necropsy. Fibrinous material & adhesions were noted in 2 animals. TAD closure of colon perforation resulted in a leak proof seal at 2 wks in all 4 animals; fibrinous peritonitis was noted in the first 2 animals with adhesions & a normal peritoneal cavity, except for an adhesion at the perforation site in the 3rd and 4th animal. Learning curve is quick.

Conclusions: Both IMCA and TAD can successfully close 4 cm colon perforations. TAD is useful in the closure of gaping perforations.

ET005

MAGNETICALLY ANCHORED INSTRUMENTS FOR TRANSGASTRIC ENDOSCOPIC SURGERY, Daniel J Scott MD, Shou J Tang MD, Richard Bergs BS, Raul Fernandez PhD, Southwestern Center for Minimally Invasive Surgery, University of Texas Southwestern Medical Center, Dallas, TX, Automation and Robotics Research Institute, University of Texas, Arlington, TX

Background: Natural orifice transluminal endoscopic surgery (NOTES) is an evolving field. The purpose of this study was to develop magnetically anchored instruments that would be suitable for NOTES.

Methods: Non-survival procedures were conducted in pigs (n=5) and involved deployment of prototype instruments (camera, tissue retractor, and cautery dissector) which were held in place on the peritoneal surface using magnetic coupling and controlled using robotics (pneumatically-powered, joystick-controlled cautery), dual-magnet angulation, or direct manipulation of a single external magnet with mechanical deformation of the abdominal wall for angulation. Initial development was by a laparoscopic (LAP) approach with attempted cholecystectomy (n=2); subsequent transgastric (TG) deployment using a needle knife/sphincterotome-created gastrotomy and an esophageal overtube was used for liver biopsy (n=1) and cholecystectomy (n=3), with laparoscopic assistance as needed.

Results: Magnetic coupling was successful for all instruments. The camera was deployed in 3/3 LAP and 3/3 TG (pull-wire (1), push technique (2)) attempts and used for portions of all procedures; limitations included tethering, obscured view, and lack of light source. The tissue retractor was deployed in 4/4 LAP (fixation to gallbladder via suture (2) and magneto-rheological fluid injection (1) and to bowel by injection (1)) and 3/3 TG (fixation to bowel (1) and to gallbladder (2) via EGD clipping) attempts; limitations included dislodgment and retraction force. The cautery dissector facilitated partial cholecystectomy in 3/3 LAP (robotic (2), direct control (1)) and partial (1) and complete (2) cholecystectomy in 3/3 TG (direct control) attempts; limitations included spatial constraints, tethering, and torque. On the final 2 animals, all instruments were successfully deployed via a TG approach, and 100% of the cholecystectomy dissection was performed using the magnetic cautery instrument with sufficient torque to allow blunt and sharp dissection.

Conclusions: Endoscopic surgery using transluminal deployment of magnetically anchored instruments is feasible and may help overcome hurdles associated with NOTES; compared to using intraperitoneal flexible endoscopy, a deployable rigid instrumentation platform restores visual orientation, facilitates tissue retraction, and allows suitable dissection. This technology holds great promise and warrants further investigation.

ET006

A UNIQUE BALLOON-BASED HAPTIC FEEDBACK SYSTEM FOR ROBOTIC SURGICAL INSTRUMENTS, Erik Dutson MD, Soo Hwa Han MD, Martin Culjat PhD, Adrienne Higa BS, Aaron King BS, Warren Grundfest MD, David Geffen School of Medicine at the University of California, Los Angeles

The objective of this research is to develop a modular haptic feedback system. This system will consist of a sensor array, a system controller, and an array of pneumatically controlled balloon actuators. The sensor array will be mounted onto the tips of robotic tools to detect compressive and tangential forces exerted by the tools onto the tissues. The system controller will translate the voltage signals from the sensor array into signals that will vary the inflation pressure of the balloon actuator array. The balloon actuator array will exert forces onto the surgeons' fingertips in real time, with the inflation forces and patterns corresponding to the tissue-tool forces detected by the sensor array.

We have developed a proof-of-concept prototype. A FlexiForce® (Tekscan Inc.) A201 piezoresistive sensor has been selected as the force sensor. Upon application of a force to the sensor surface, a proportional voltage change is detectable. A peripheral interface controller (PIC) has been programmed to translate the voltage input from the sensor to a



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proportional pressure output control signal, which will actuate the pneumatic balloon. A prototype balloon actuator has been manufactured from a Dragon Skin[®] silicone rubber film (Smooth-on Inc) and a macromolded polydimethylsiloxane (PDMS) base.

A preliminary testing of the prototype actuator has demonstrated a maximum actuation force of 0.05 Newton (N) over 75 actuation cycles for a 200µm thick membrane. Three investigators from our research group were able to consistently distinguish between three actuation levels over the 0-0.05N range. The second design reiteration will produce a more complex prototype consisting of 3x2 sensor and actuator arrays. This added complexity will improve the resolution of the system and will also allow the force sensor to act as a slip sensor, measuring shear as well as compressive forces; that is, the detection of objects or tissues slipping from the grasper. The third design iteration will consist of miniaturization of the prototype using micro-electro-mechanical systems (MEMS) fabrication technology. Psychomotor testing will be performed to optimize the balloon array characteristics, including the balloon diameter, spacing, inflation pressure and maximum deflection.

The final optimized haptic feedback system will be retrofitted onto the robotic surgical instruments for in-vitro and in-vivo clinical testing.

ET007

TRANSVESICAL ENDOSCOPIC PERITONEOSCOPY, Estevao Lima MD, Carla Rolanda MD, Jose Pego MD, Tiago Coelho MD, David Silva MS, Jose L Carvalho MD, Jorge Correia-Pinto, Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho, Braga. Department of Urology, Santo António General Hospital, Porto. Department of Pediatric Surgery, S. João Hospital, Porto, Portugal

Introduction: Recently various authors reported successful attempts to perform intra-abdominal surgery through a transgastric pathway. We assessed the feasibility and safety of a novel transvesical endoscopic approach to the peritoneal cavity through a 5 mm port in a porcine model.

Materials and Methods: Transvesical endoscopic peritoneoscopy was performed in eight (3 non-survival and 5 survival) anesthetized female pigs. Under cystoscopic control, a vesical hole was created on the ventral bladder wall with an open-end ureteral catheter. An overtube (lumen diameter 5.5 mm) was placed in peritoneal cavity guided by a 0.035 inch guide-wire. In all animals, we performed peritoneoscopy of entire abdomen as well as liver biopsy and falciform ligament section. A vesical catheter was placed for 4 days in all survival animals, which were sacrificed by 15th day post-operatively.

Results: After a learning curve with the first three non-survival animals, the creation of a vesical hole and placement of the overtube were performed without complication in all survival animals. In these animals, we easily introduced an EndoEye[®] into the peritoneal cavity that provided a superb view of all intra-abdominal viscera as well as a 9.8 Fr ureteroscope that allowed simple surgical procedures without complication. In the survival experiments all pigs recovered, whereas post-mortem examination revealed complete healing of vesical hole and no signs of infection or adhesions into the peritoneal cavity.

Conclusions: Transvesical endoscopic peritoneoscopy was technically feasible and could be safely performed in a porcine model. This work gives encouragement for additional preclinical work in what seems to be the third generation surgery.

ET008

VAGAL BLOCKING FOR OBESITY CONTROL (VBLOC) THERAPY: PRE-CLINICAL FINDINGS AND RATIONALE GUIDING THE DEVELOPMENT OF THE FIRST ACTIVE IMPLANTABLE SYSTEM DESIGNED TO NEUROREGULATE MULTIPLE OBESITY MANAGEMENT MECHANISMS Mark B Knudson PhD, Richard R Wilson MD, Adrianus Donders MS, EnteroMedics

1. Objective of the technology: In addition to the present options available to the bariatric surgeon, the goals of any new obesity management procedure should be to:

•Minimize morbidity and mortality

- Maintain normal anatomy
- Foster early satiation
- Prolong satiety
- Reduce calorie absorption while maintaining micro-nutrient absorption
- Enable non-invasive, precise, post-operative adjustments

2. Description of the technology and method of its use Neural messages carried by the vagus nerve play a significant role in the regulation of ingestion, digestion and satiety. The technology in development utilizes a subcutaneous neuroregulator connected to two leads implanted on the anterior and posterior vagal trunks. The neuroregulator delivers very high frequency, low energy electrical pulses that completely block afferent and efferent neural transmission to provide Vagal BLocking for Obesity Control (VBLOC) Therapy.

3. Preliminary results:Pre-clinical studies have demonstrated the safety and efficacy of vagal blocking. Nerve function and histopathology remained normal following chronic blocking at 5000 Hz for 8 weeks. Vagal blocking demonstrated the ability to decrease the volume of pancreatic exocrine secretions by nearly 90% and to inhibit gastric contractions. Human VBLOC clinical trials are expected to demonstrate weight loss as a result of:

- reduced calorie ingestion and absorption
 - early satiation and prolonged satiety
- Anticipated VBLOC Therapy mechanisms of action:
- reduced gastric accommodation
 - reduced gastric contractions
 - delayed gastric emptying
 - reduced digestive enzyme secretion

4. Conclusions/Future directions Given the growing prevalence, medical consequences and costs of obesity, new alternatives to traditional obesity management procedures capable of further reducing mortality and morbidity are highly desirable. Future systems that can offer significant weight reduction while avoiding the untoward consequences of current surgical methods should be welcome additions to the surgeon's armamentarium. The early results of ongoing human studies assessing the efficacy of VBLOC Therapy are anticipated. VBLOC Therapy is not available or approved for use in the United States.

ET009

DEEP ENDOSCOPIC STAPLING DEVICE, Naomi L Nakao MD, Beth Israel Medical Center in NYC

There is no reliable surgical stapler that may be passed through the working channel of a flexible endoscope. Endoscopic clips (Olympus, Wilson Cook, & Microvasive) achieve only superficial mucosal closure. We have created a flexible endoscopic stapler that may be passed through a 3.2mm endoscope channel, and delivers a transmural staple. The Nitinol (NiTi) staple with open bias is closed with a stainless steel backbone. Prior to inserting the stapler into the working channel, the NiTi staple and adjoining backbone are preloaded into the stapler jaws. This is accomplished by opening the stapler jaws and inserting the staple and backbone using a staple cartridge.

Upon visualization, the stapler jaws with indwelling staple are closed upon an incision, thereby closing the indwelling staple. With the stapler jaws closed, the backbone is advanced. Guided onto the staple by the rails in each staple leg, the backbone locks into position engaging the staple firmly in the tissue. The stapler jaws are then opened, releasing the staple. The EndoStapler was used in 16 in vitro pig stomachs, closing 2.0 to 3.5cm incisions. Pressure testing proved secure closure. Used in an acute pig experiment, similar results were obtained. 6 week survival pig experiments are planned to prove long term efficacy. Post mortem histologic studies will be performed at 1-6 week intervals to prove tissue compatibility of the NiTi staple in the stomach environment. A DVD showing the live pig experiment is available.



ET010

A NEW MULTI-CHANNEL, SHAPE-LOCKING, THERAPEUTIC ACCESS DEVICE FOR ENDO AND TRANS-LUMINAL SURGERY, William O Richards MD, Lee L Swanstrom MD, Vanderbilt University, Nashville, TN and Legacy Health System, Portland, OR

Objective: The USGI Medical® TransPort? is a surgical access system designed to enable flexible endoscopic surgery.

Description: The body of the TransPort utilizes Shapelock® technology, which allows it to be locked into various configurations. It is introduced in a flexible state, and becomes rigid when the locking handle is squeezed. The distal section of the TransPort can be steered freely, allowing the user to visualize a site and deliver therapy with efficiency and precision. The device has 3 instrument channels which enable two-handed manipulation and approximation of tissue and one channel for a 5.3 mm flexible videoendoscope.

Results: Experiments in pigs demonstrated easy endoscopic visualization of the esophagus and stomach. Activation of the ShapeLock locks the shaft and allows the surgeon to utilize 4-way tip steering. This instrument was able to reach all areas of the stomach with a snare and a biopsy forceps down the two 4mm ancillary channels. Mucosal resection while retroflexed was facilitated because the TransPort could be locked into position enabling the surgeon to manipulate with greater force transmission, and the 4-way tip steering allowed fine-tuning? for precise manipulation of the instruments. Transgastric (NOTES) experiments done on pigs and cadavers included: running the small bowel and gastrojejunostomy, elevation of the cecum, wedge liver biopsy, and cholecystectomy. For the lower abdominal procedures, the TransPort allowed aggressive traction on the bowel when in its locked configuration. The upper abdominal procedures were done in a retroflexed position. The independent imaging system allowed the camera to be torqued permitting the image to stay true?. The ability to lock the device in the retroflexed position allowed the surgeon to use both hands to manipulate the tip and multiple instruments without fighting to maintain scope position. Finally, the locking curve of the device was used to elevate and hold the liver anteriorly which allowed the dependent gallbladder to be dissected.

Conclusion: The ability to steer and lock sections of the main body of the TransPort enables the user to access specific target locations within the patient, while also providing a stabilized platform for performing therapeutic procedures. The TransPort facilitates and enhances surgery using flexible endoscopic technology.

ET011

A NEW DESIGN DEVICE TO ENSURE CLOSURE OF TROCARS, Barry Salky MD, Asi Dekel MD, Gadi Lotan MD, Yossi Muncher PhD, Mount Sinai Hospital, New York

Objective: This device is designed to ease, simplify, and ensure the safe fascial closure of trocars and vascular access puncture sites.

Description of the technology and method of application: The device is inserted through the 10mm or larger trocar, the trocar is retracted, handle of the device is squeezed to open the needle passers (no sharp needle or metal is directed toward the internal organs at any time), retract the device for positioning until the tissue tension is felt, device activation by using a lever, pull out the device with the sutures in place equidistant of both sides of the fascia, and the sutures are tied extracorporeally.

Preliminary results: A geometrical closure with even tissue bites from both sides was observed. The time for each placement was 8-37 seconds averaging 21 seconds. The deployment of the suture is automatic assuming the device is placed against the fascia (video control). Its activation is not operator dependent. In the pig model, the NeatStitch® device was significantly quicker than the other three commercially available closure devices tested.

No adhesions were present at 6 days in the sacrificed pigs, and all ports were successfully closed.

Conclusions/Future directions: This device was shown to be effective, safe, reliable, quick and user friendly for the closure of trocars in the pig model. Future directions include closure of 5mm incisions in the pediatric age group and vessel closure in cardiac catheterizations.

ET012

A NEW LAPAROSCOPIC INTRACORPOREAL SUTURING MACHINE (ENDOSEW? SYSTEM), Ali Alzahrani MD, Charles Bailey MD, Didier Mutter PhD, Leroy Joel MD, Jacques Marescaux MD, IRCAD/ European Institute of Telesurgery, Louis Pasteur University, Strasbourg, France.

Laparoscopic suturing is a major challenge when performing advanced laparoscopic surgical procedures and can markedly prolong the learning curve. Many laparoscopic suturing devices have been developed, but all are operated manually by the surgeon and require knot-tying. We present here a new sewing machine for laparoscopic suturing which is operated by the surgeon via a foot-pedal using electrical power.

Objective of the device: To facilitate intracorporeal suturing, particularly in difficult and narrow intra-abdominal spaces, and also to shorten the time required for laparoscopic suturing.

The quality of anastomoses is an integral part of this objective.

Methods:-Description of the EndoSew? system: The system is composed of two parts, the first is the driving unit, (Unidrive II with EC Motor) connected to the EndoSew machine and to a foot pedal that controls the system. The second part is the sewing machine itself which consists of a handle and a shaft: the handle, which stays outside the abdomen, has the gear box and working mechanism, the shaft has at its tip the needle and stitch (suturing plate), which is inside the abdomen.

-Application for laparoscopic surgery: The trocar positioning is standardized. A 15mm port for the machine is placed about 5 cm in front of the 10mm camera port, and two working ports 5mm each. The sewing machine port is metallic and fixed to the operating table with an external fixator. Both layers of tissues for suturing are held together either side of the suturing plate using two specially designed, atraumatic graspers, and passed over the suturing plate from one side to the other, while the machine is controlled by pressing the foot-pedal.

Preliminary results: The machine was used to suture linear small bowel enterotomies and to perform an end-to-end anastomosis in a pig model. For linear closure of small bowel enterotomies in the pig, the suturing time was faster than conventional laparoscopic suturing. The integrity of the closure was water-tight. An end-to-end small bowel anastomosis also performed with encouraging results.

Conclusion: Although the EndoSew? is still under development, it has proved feasible to perform laparoscopic intracorporeal suturing and it has the potential to facilitate and expedite this advanced technique for most general surgeons. This development also opens new directions for research in this field of minimal access surgery.



EMERGING TECHNOLOGY POSTER ABSTRACTS

ETP001

APPLICATION OF BARBED SUTURE IN SMALL INTESTINE ANASTOMOSIS IN THE PORCINE MODEL, Fatemeh Abtahi MD, Gregory Ruff MD, Jeffrey Leung PhD, Stan Bachelor MS, Dan Hatem MD, Spencer Brown PhD, UT Southwestern at Dallas

Objective: To determine the superiority of barbed sutures over standard sutures for small intestine anastomosis.

Introduction: Surgical sutures and staples are the materials used for closing small intestine anastomosis. Due to a higher complication rate (leaking, etc.) with staples, sutures are the preferred biomaterial for small intestine anastomosis. Suturing relies on the ability of the surgeon to tie secure knots that is time consuming and improper tying and handling may result in knot breakage or slippage. This potentially may result in anastomosis breakage. A knotless, self-anchoring suture has been developed by Quill Medical Inc. in which bidirectional barbs are introduced into an absorbable monofilament suture that eliminates the need for tying a knot to obtain final suture closure.

Goals: The aim of our study is to compare barbed suture repairs to traditional suture and staple repairs on intestinal specimens following anastomosis. The primary endpoints are: intraoperative performance including handling and time; anastomotic bursting strengths, inflammatory response; and potential for anastomosis stricture.

Study design: This is a prospective, comparative study of small intestine anastomosis in the porcine model which is being evaluated for suturing time, intra-operative hemorrhage, luminal stenosis, anastomotic bursting strengths, and histopathology related to wound healing after surgery. To perform the anastomosis, a two-layer technique was used. The anastomosis study will compare barbed suture with standard suture. Upon sacrifice, all operated specimens will be isolated to determine burst strength levels (day 0 versus day 7). Histopathological examination and gross inspection of the surgical sites will be recorded.

Preliminary Results: Initial in vitro anastomosis closures were performed with barbed sutures on freshly isolated porcine intestines. Anastomosis closures resulted in complete closures with no or minimal leaking. Burst strength testing levels were performed. Compared to standard suturing time, approximately 30-40% reduced suturing time was associated with the barbed suture closure. Results of ongoing animal studies will be presented.

Conclusion: This novel barbed suture, based on the same material as standard sutures, is safe and will provide surgeons a superior small intestine anastomosis closure alternative that is currently present.

ETP002

ENDOLUMINAL FUNDOPPLICATION (ELF) FOR THE TREATMENT OF GERD ? FEASIBILITY STUDY OF A NEW TECHNIQUE, Guy-Bernard Cadière MD, Amin Rajan MD, Centre Hospitalier Universitaire St-Pierre (CHU Saint-Pierre); Clinique du Parc Leopold, CHIREC

Background: A feasibility study was undertaken with a new treatment for gastroesophageal reflux disease (GERD) that emulates surgical funduplications and recreates the anti-reflux barrier by forming a one-way gastroesophageal valve. This new endoluminal fundoplication technique involves inserting the EsophyX device transorally with the goal of creating a 3-5cm, 180-270° circumference valve by delivering multiple fasteners under direct visualization by an endoscope. The technique was evaluated in patients with GERD, dissatisfied with long term proton pump inhibitor (PPI) therapy, and referred for a Nissen fundoplication.

Methods: 19 patients referred for laparoscopic Nissen fundoplication were enrolled from June to October 2005. Inclusion criteria included chronic GERD, demonstrated PPI dependence, and the absence of significant esophageal motility disorder or other esophageal pathology. One patient was not treated due to preexisting esophageal stricture precluding device introduction. Within the remaining 18 treated patients (10F, 8M), 1 patient was treated but excluded from the analysis due to a

cm hiatal hernia. Mean age was 38 yrs (23-58). The mean duration of GERD symptoms was 8.6 yrs with average duration of PPI use of 6.1 yrs.

Results: GERD-HRQL scores at 3 months improved on average 53% (21.6 baseline to 10.1 p<0.001). PPI use was eliminated in 15 of 17 patients with a mean follow-up of 5.5 months. 3 Month pH was normal in 10 of 11 patients in whom 24 hour pH was available. Procedure related adverse events included mild to moderate throat irritation and epigastric pain, resolving in the first post-op week except in 1 patient readmitted for assessment of persistent pain. No clinical sequelae or anatomical correlate was identified. Pain resolved spontaneously. **Conclusions:** This study demonstrated feasibility and safety of this technique. Early symptom scores, pH and PPI dependency were improved. Further follow-up on this cohort and a larger study are planned to demonstrate long-term efficacy.

ETP003

MULTIMEDIA ENVIRONMENT FOR CUSTOMIZED TEACHING OF SURGICAL PROCEDURES Juan C Cendan MD, Sergei Kurenov BS, Sukitti Punak BS, Minh Kim BS, Jorg Peters PhD, University of Florida, Colleges of Medicine and Computer Science Engineering, Gainesville, Florida, USA

Background. We have developed a multimedia authoring environment to enable surgeons to convey key points of specialized procedures to colleagues and residents. After customizing the surgical scenario, the surgeon records a 3D motion path and adds multimedia annotation in the scene which guides learners through the procedure. A key issue for conveying important haptic cues and making the exercises effective is to have good visual and haptic fidelity.

Methods. The authoring kit tracks six degrees of motion of each hand with a low-cost 3D device (Omni, Sensable). The author can select organs and structures from a visual menu and arrange them. A procedure can then be performed, recorded and annotated with video clips of a real procedure, additional text or voice input, and diagrams. The annotation interface is simple to use and encourages the flow of information from the specialist to the learner.

Results. Purely visual feedback is unsatisfactory to give users a feeling of responsive materials. Purely haptic feedback, without visual confirmation, turns out to be equally unsatisfactory: Users tend to immediately exert maximal force on the elastic tissue. The perception of elasticity of the tissue, however, improves dramatically by combining haptic and visual channels: Once the visual clues indicate contact, the user's sensory focus switches from the initial visual focus to a haptic focus and force is exerted more delicately. Therefore synchronization of visual and haptic cues is crucial and any lack of resolution, time lag or inconsistency between the two senses must be avoided.

Conclusions. Synchronization is crucial to support a surgical exercise such that the student can follow the points emphasized by the author without being distracted by the haptic or visual artifacts. Novelty: This approach to procedural education allows an expert to create immediately deployable multimedia exercises with good haptic-visual fidelity.





ETP004

ULTRABROADBAND INTERNET FOR CRITICAL CLINICAL APPLICATIONS ? THE VICCU PROJECT., Patrick C Cregan MD, Stuart Stapleton MD, Laurie Wilson PhD, Nepean Hospital Penrith, CSIRO ICT Centre

The need for access for health care in rural & remote areas is a challenge for many countries. Governments are expected to provide equity of access & outcome despite the lack of critical mass of patients or staff or both. To date telemedicine has largely failed to deliver its promise in resolving this problem. This is due to the technical constraints of image transmission where images are compressed and decompressed with consequent loss of quality and the introduction of latency so that the systems have lacked transparency. Clinicians lose trust in such systems and cannot form effective teams as are needed in the OR or ED.

To address this we designed the Virtual Critical Care (ViCCU) Project. By using Ultrabroadband Internet with a 1 Gbps Ethernet connection and purpose built remote and base stations these problems have been overcome to a level where supervision and clinical responsibility for a complex medical environment such as a cardiac arrest at a remote hospital is enabled.

Review of the first year of operation in an ED situation has demonstrated:

?Statistically significant reduction in length of stay, improved resuscitation as measured by RAPS score, increased number clinical interventions, reduced unnecessary admissions and transfers and reduced critical incident reports for patients presenting to the ED at the remote hospital

?Not statistically significant trends include reductions in time to contact medical retrieval team, ventilated hours and ICU length of stay in the supporting hospital

?Not statistically significant evidence of no change in treatment time in the remote ED and length of stay at the supporting hospital

Conclusions: The use of ultrabroadband internet has enabled the use of multichannel, high quality, low latency telepresence with consequent improvement in patient care in an ED situation. The system is now ready to support other areas such as the OR

ETP005

COMBINED SPECT-CT SOLID GASTRIC EMPTYING STUDY: A NOVEL IMAGING TECHNIQUE FOR LOCALIZING UPPER GI OBSTRUCTION S M Cross MD, S Raja MD, D Nepomnayshy MD, Lahey Clinic Medical Center

1. Objective of the technology: We present a case of a patient with a remote history of a vertical gastric banding in which conventional imaging techniques were unable to definitively localize the site of an upper GI obstruction. By combining a solid gastric emptying study with concurrent SPECT and CT imaging of the abdomen on a combined SPECT-CT scanner the obstruction was correctly localized to the proximal gastric pouch outlet.

2. Description of the technology and method of its use: This is a case of a 41 year old female s/p a remote vertical banded gastroplasty who presented with a history of chronic abdominal pain, nausea and vomiting. A scintigraphic solid gastric emptying study revealed no gastric emptying after 2 hours. Based on this study, however, it was unclear whether the entire stomach was atonic or simply the pouch proximal to the band. The study was subsequently repeated on a combined SPECT-CT scanner. The initial planar serial imaging was followed by acquisition of a concurrent CT and SPECT of the abdomen, resulting in a surprisingly precise and accurate localization of the obstruction to the proximal gastric pouch.

3. Preliminary results: Based on this study, the patient was taken to the OR for drainage of her pouch by a side to side gastro-gastrostomy. Ultimately, the patient has done well. She is currently tolerating a regular diet without nausea or pain.

4. Conclusions: By combining the data from a standard gastric emptying study with findings on combined SPECT-CT imaging, the proximal gastric pouch was accurately identified as the source of this patient's obstruction. We present this case study to highlight a novel option for practitioners faced with similarly difficult diagnostic scenarios.

ETP006

ERGONOMICS AND FORCE TRANSFER IN LAPAROSCOPIC HANDLE DESIGN. Earl C Downey MD, Robson L Splane Jr PhD, Stephen B Carter, Kenneth A Gross, Darin A Schmuckle, Penllbrook Engineering Inc

Most laparoscopic operating instruments are currently based on a paradigm designed for open-tube endoscopic procedures. This widely used technology lacks ergonomics and precision for current hand-held, camera-assisted laparoscopic interventions. This older paradigm requires the operator to hold the wrist awkwardly, in a non-functional position that encourages fatigue, joint stress, and impairment of precision. To overcome these disadvantages two technologies were joined, a pistol grip handle and an in line activation mechanism which utilizes rack and pinion technology for force transfer. Utilization of a prototype device in a laparoscopic trainer in a subjective manner suggests marked improvement in the qualities outlined. Further analysis of this system is ongoing.

ETP007

DETERMINING THE INNER DIAMETER OF THE ESOPHAGEAL BODY USING AN ENDOSCOPIC BALLOON CATHETER, PRESSURE/VOLUME MONITORING AND AUTOMATED INFLATION SYSTEM. Brian J Dunkin MD, David S Utley MD, University of Miami, Miami, FL

Background: Until recently, there has been no means to objectively measure the inner diameter (ID) of the GI tract, such as esophageal body, gastric bypass pouch, post-fundoplication gastroesophageal junction (GEJ), or anastomotic stricture. We describe, herein, a new method which uses a non-compliant balloon with a pressure/volume monitoring and inflation system for this purpose.

Methods: This device was developed as a component of the HALO360 System (BARRX Medical, Sunnyvale, CA), an endoscopic system for ablation of Barrett's esophagus (BE). Prior to ablation, an ID measurement of the lumen is required to: 1) select an ablation balloon of appropriate size, 2) set the ablation energy density (J/cm²) based on the ID and surface area to be treated.

The catheter has a non-compliant balloon (outer diameter 33.7 mm, length 4 cm), which is passed over a guidewire, positioned in the targeted lumen with endoscopic visualization, auto-inflated to 4 psi (0.28 atm), then auto-deflated (total time ~3 sec). The system displays ID (mm), based on measured pressure/volume at steady state.

Prior to human use, a bench model using 24 rigid cylinders of varying ID (22.0-33.5 mm) were measured with the system and results of measured vs. actual ID were compared. Thereafter, the system was evaluated in patients undergoing ablation of BE, comparing measured ID, selected ablation balloon ID, and ablation effect.

Results: In rigid cylinder testing, 72 measurements were obtained. The median difference between measured and actual ID was -0.3 mm (IQR -0.5 to 0.0) or -1.2% (IQR -1.7 to 0.0). Thereafter, 238 measurements were made in 34 patients who were undergoing BE ablation. In the first 20 pts, balloon migration occurred near the GEJ, confounding measurements. In the final 14 pts, starting more proximally resulted in highly reproducible ID estimates (median ID 25.9 mm, range 21.7-32.6). In 14/14 (100%) cases, an accurate estimate of targeted lumen ID was achieved, based on selected electrode size and ablation effect.

Conclusion: This is the first report of a method for measuring the ID of a segment of the GI tract. The results are accurate (within 0.3 mm) and highly reproducible. While the device is currently used in conjunction with BE ablation (HALO360 System), future applications include compliance measurement, quantifying success of stricture dilation, and assessing the dimensions of the gastric bypass pouch, post-fundoplication GEJ, gastric outlet, and surgical anastomoses.



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ETP008

OPTICAL ACCESS TROCAR - EVALUATION IN ABDOMINAL LAPAROSCOPIC SURGERY, Oliver Florica MD, Richard J Curran MD, Hills Private Hospital - Sydney Australia

Purpose: most techniques used to establish the pneumoperitoneum for laparoscopic surgery carry significant risk of visceral or vascular injury. We are presenting a Visiport technique that offers the advantage of dissection under direct vision.

Limited data is available regarding the safety of this technique.

Methods: We reviewed the procedures in which a Visiport was used for abdominal access in a retrospective study of a series of 249 consecutive laparoscopic procedures performed by a single surgeon over a two year period. The procedures include appendectomy, cholecystectomy, ventral and inguinal hernia repair, diagnostic procedures, division of adhesions, gastric banding, fundoplication, laparoscopic colectomy, splenic artery aneurysm ligation, etc. While the most common site of insertion was the umbilical region, the Visiport was also placed in all other abdominal quadrants for special site access or to avoid adhesions after previous surgery. The patient age range was 5-94yrs old.

Results: no visceral or vascular injuries related to trocar insertion were encountered.

Conclusion: the Visiport technique is a safe and quick approach to laparoscopic surgery. It offers flexibility and versatility to adapt for different operations and patients, not being limited to periumbilical region; although the series is small it provides the basis for further evaluation to assess the suitability in replacing or complementing older techniques.

ETP009

REAL TIME USE OF COMPUTERIZED VOLUMETRIC ANALYSIS SYSTEM (CVAS) DURING A LIVE MIS PROCEDURE AT THE UNIVERSITY OF KENTUCKY Raymond J Gagliardi MD, James D Hoskins BS, Jihui Li MD, Joseph A locono MD, Donald Witzke PhD, University of Kentucky

Our objective was to determine if it would be possible to construct 3D computerized models using preoperative imaging for the purposes of improving real-time intraoperative surgical decision making. A patient with a gastric stromal tumor was selected and using Amira software (Mercury Computer Systems, Inc.®) and CVAS, a detailed and accurate 3-D computerized image was constructed of the patient's stomach, tumor, and tumor ulceration.

Abdominal Computerized Tomography data of the patient in DICOM format were transferred to CVAS, and 3D models were created using specific, surgically oriented selection criteria. CVAS imaging accurately identified the tumor location and the characterization of the tumor. The final 3-D CVAS models were transmitted from the remote laboratory site in real-time to the operating room via the Stryker telesurgery system. The images were displayed and manipulated on-the-fly by the imaging technician in the remote laboratory per instructions of the operating surgeon using the direct 2-way audio and video connection. The problem of registration was addressed by allowing the imaging technician to adjust the magnification and orientation of the CVAS 3-D model to mirror that of the laparoscopic view.



CVAS imaging allowed for more accurate surgical resection of the gastric stromal tumor compared to that which is possible by traditional preoperative imaging such as endoscopy and CT scanning. CVAS accurately determined the location and characterization of the gastric stromal tumor.

Future directions include applying CVAS technology to additional organ systems as well as investigating the feasibility of direct voice control by the operating surgeon.

ETP010

EVALUATION OF GEMINI SURGICAL CONTROL AND DISPLAY SYSTEM, Mary T Hawn MD, C M Harmon MD, John D Alred BS, David A Alexander BS, University of Alabama at Birmingham and Applied Surgical

Objective: Laparoscopic surgery often requires the use of multiple foot controlled electro-surgical devices. The potential for activating the wrong device and the inconvenience of multiple foot pedals has been addressed by the Gemini Surgical Control and Display (GSCD) system.

Description: The GSCD System employs advanced embedded microprocessor control technology along with unique and patented interfacing technology. This unique design allows interfacing to any existing or future electro-surgical device. Automatic and active smoke evacuation is also provided as an integral component of the system. The GSCD received FDA approval in September of 2005 and is in the initial clinical evaluation phase. A post-evaluation survey was given to surgeons and operating room support staff after use of the GSCD. A five point Likert scale from strongly disagree (=1) to strongly agree (=5) was used to evaluate the effectiveness of the GSCD in meeting the objectives.

Preliminary Results: Four area hospitals have evaluated the system. Thirteen surgeons and 10 operating room support staff have complete post-demonstration evaluations.

Question	Surgeons (N=13)	OR Staff (N=10)
Foot pedal reduction beneficial for set up/surgery.	.5	5
Foot pedal/cable reduction creates safer environment	.4.98	.5
Toggle device beneficial	.4.94	N/A
First Alert useful	4.6	N/A
SurgiClear smoke evacuator useful	4.58	N/A
Would like it in my OR	5	5

Conclusions: The GSCD was highly effective at meeting the objectives of decreasing number of foot pedals while maintaining surgeon preference for electro-surgical devices. The addition of the First Alert and SurgiClear smoke evacuator provided additional benefits to the system. Furthermore, both surgeons and OR staff strongly desire to have the system in their operating rooms.

ETP011

A NEW LAPAROSCOPIC SIMULATOR, Jaime M Justo MD, Alejandro Pedroza PhD, Luis G Vázquez de Lara PhD, Eduardo Prado MD, Benemérita Universidad Autónoma de Puebla & Universidad Popular Autónoma del Estado de Puebla

BACKGROUND: Simulators are effective devices for the development of certain skills needed in laparoscopic surgery. Bench models with laparoscopy equipment, virtual reality and mirror boxes have been used; however, they have limitations such as the need for laparoscopy equipment, high cost or a considerable mismatch with reality.

OBJECTIVE: To test a simulator as a training device that allows the acquisition of eye-hand coordination and two-dimensional spatial orientation without the need of laparoscopic equipment.

METHOD: The simulator consists of a box with an internal light and a color video CCD connected to a television set.



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Quality of vision, illumination and adequacy as training equipment was assessed by experienced laparoscopic surgeons. Thereafter, 12 general surgeons without experience in laparoscopic surgery and 18 surgery trainees performed 7 different drills after a short course on basic skills and knot tying laparoscopic techniques. The time to completion of each task was recorded at the beginning and after 10 practices of 30 minutes each.

RESULTS: Ten experienced surgeons qualified the simulator with a mean of 42 points (40-44 from a 44 total). There were significant reductions in the final times of all participants. Paired t-test was significant in all the measurements. The mean time diminished 31.8% (from 1108 to 755 seconds) with a 95% confidence interval of 15.1-48.5%.

DISCUSSION: The simulator tested in this study helps to develop laparoscopic surgical skills at low cost and without the need of laparoscopic equipment. This laparoscopy training equipment is novel and original in its design.

FUTURE DIRECTIONS: We are now conducting works in order to compare our simulator with another kind of them.

ETP012

ESOPHYX? ENDOLUMINAL FUNDOPLICATION FOR THE TREATMENT OF SEVERE CHRONIC GERD: NOVEL APPROACH FOR VALVULOPLASTY DEMONSTRATED IN AN ANIMAL MODEL, Stefan J Kraemer MD, Brett J Carter, John M Adams, EndoGastric Solutions, Inc.

Background: Previous work suggests that the anatomy of the gastroesophageal junction helps define propensity to reflux. This study was designed to demonstrate efficacy and safety of a novel flexible endoluminal fundoplication device (ELF).

Method: Healthy dogs naturally have a loose gastroesophageal junction (GEJ), a weak LES and an inconspicuous gastroesophageal valve (GEV) is usually absent. In retroflexed endoscopic view, the canine valve closely resembles a poorly defined or absent valve noted in patients with severe chronic GERD. In a Good Laboratory Practice (GLP) setting 19 mongrel dogs were treated with an ELF procedure to create a robust GEV at the GEJ. Endoscopies were performed at 4 and 12 weeks.

Observations: ELF was performed safely in all dogs. Intraoperatively solid full-thickness fundoplication was achieved in all animals, which resulted in robust valves. At baseline valve grading according to Hill, et al. (grades I-IV), a normal grade I valve was found in retroflexed endoscopic view in 2 dogs, 3 valves were graded as grade II (GEV and its aboral lip is slightly less well defined than in grade I, opens occasionally with respiration but closes promptly) while an abnormal valve appearance (grade III and IV) was found in 14 canines. Immediately after the ELF procedure, all newly-created valves were graded as a grade I. At 4 weeks, GEV grade I was maintained in all but 1 dog, which had disintegrated into a grade II. At 12 weeks all but 2 valves remained grade I, whereas 2 valves had slightly deteriorated into a grade II.

Conclusions: The EsophyX? ELF procedure appears to be safe and efficacious in creating robust gastroesophageal valves in canines. Endoscopic assessment at 4 and 12 weeks demonstrated persistence of a grade I valve in 95% and 89.5%, respectively. Further studies correlating grades of valve anatomy with degrees of reflux are underway.

ETP013

ESOPHYX? ENDOLUMINAL FUNDOPLICATION FOR THE TREATMENT OF SEVERE CHRONIC GERD: VALVULOPLASTY WITH NOVEL TISSUE FASTENERS; ?DOSAGE? IN AN ANIMAL MODEL, Stefan J Kraemer MD, Brett J Carter, John M Adams, EndoGastric Solutions, Inc.

Background: Previous work has suggested that the anatomy of the gastroesophageal junction can help define propensity to reflux. Experimental work was performed to demonstrate that more than one application of multiple fasteners can safely be performed with a novel flexible endoluminal fundoplication device and system, using a proprietary novel fastener. **Method:** Dogs naturally have a very loose gastroesophageal junction including a weak LES. A gastroesophageal valve

(GEV) is mostly absent in healthy adult dogs and, in a retroflexed endoscopic view, the canine valve appearance closely resembles the poor or absent valve in patients with severe chronic GERD. Dogs in whom an incomplete valve was created, according to the criteria by Jobe et al., underwent additional endoluminal treatments with the application of further tissue fasteners, in order to create a robust GEV at the gastroesophageal junction. The GEV was assessed during endoscopic follow-up postoperatively.

Observations: Dogs with a partial or an incomplete endoluminal fundoplication were reassessed at variable intervals. Following reassessment, the existing gastroesophageal valve was improved to create an omega-shaped nipple valve. Placement of additional tissue fasteners was performed safely and the pre-existing valve could be improved in all cases. The existing valve or previously placed tissue fasteners and the resulting tissue reaction did not cause technical difficulty and did not result in a change of the planned procedure.

Conclusions: EsophyX? polypropylene fasteners could be safely and efficaciously placed in a canine model in animals with an initial suboptimal valvuloplasty. This may have implications in the treatment of patients with incomplete endoluminal or surgical antireflux procedures.

ETP014

A CT-BASED NOVEL NAVIGATION SYSTEM - PHANTOM STUDIES AND FIRST CLINICAL RESULTS, Ulrich H Krause MD, Markus Nagel, Rainer M Seibel MD, MRI-Mülheim Radiology Institute; IMP-Institute of Medical Physics, Friedrich-Alexander-University Erlangen

Purpose We aimed to prove that this innovative navigation system for the first time is able to allow the accurate puncture of different targets in two phantom studies reproducibly. In two sets of measurements we tried to demonstrate the technical accuracy as well as the accuracy of positioning.

Method and Materials The navigation system (CAPPa IRAD, CAS Innovations AG, Erlangen, Germany) is a setup consisting of a standard pc with a touchscreen serving as an input interface and the navigating software (IRAD) with a passive optical tracking system (Polaris, NDI, Canada). It is completed by a needle holder, a patient-fix-kit and a patient frame with optical and CT markers.

In both sets of measurements the phantoms were fixed securely on the CT. The patient frame was positioned above and the setup was scanned (Sensation 64, Siemens; Erlangen, Deutschland). Therefore the field of measurement was selected in a way that all CT-markers were within the field. All data were gathered in dicom format; an exchange to the navigation system was easily possible.

For technical accuracy we used an acrylic glass phantom. After the scanning process the tips of the acrylic pins were planned as targets.

For accuracy of positioning a prepared spine phantom was used. The setup was scanned and with help of the planning device of the navigation software the typical target approach was defined.

Results For technical accuracy we measured an average distance of 0.7 mm needle to target and an average distance of 0.5 mm for the perpendicular. For accuracy of positioning we found an average distance of 0.80 mm needle to target and an average of 0.7 mm for the perpendicular.

Conclusions The proven accuracy of the novel system allows to even puncture smallest targets / lesions reproducibly that in conventional techniques are difficult to aim at. High precision interventions are possible even with an angulated 3-dimensional approach. Clinical testing has been performed with good results.

ETP015

ENDOLUMINAL ROBOTIC SURGERY: ZENKER DIVERTICULA APPROACH, Adrian LOBONTIU MD, Daniel RABREAU MD, Henri Mondor Hospital, Paris (France) and European Hospital Georges Pompidou, Paris (France)

This video is performed with the da Vinci Surgical Robot. The Endo Luminal Robotic approach of the Zenker Diverticula is feasible. The articulated wristed instruments with 7 degrees of



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freedom as well as multiple scale movements allow high precision in manipulating the crico-pharyngeal muscle in a very narrow room. The approach of the cervical esophagus and its superior orifice is very easy. By activating the camera pedal, the console surgeon navigates endoluminal with a 3 D camera: the trachea and the vocal cords anteriorly, the thyroid cartilage reclined as well as the arytenoid cartilage can be extremely well visualised because of the 10-15 times image magnification. The 30° scope used has 2 optical channels of 5 mm diam. each, in order to obtain a real 3 D image at the console obtaining the depth sensation of the surgical field. This is remote surgery: the surgeon sits comfortably at distance of the patient, without being scrubbed in. The wristed scissors are in a strictly median position which avoids any possible bleeding and also facilitates dividing the esophageal and pharyngeal mucosa at the junction level. The approach of the crico-pharyngeal muscle and its section is facilitated by the articulated instruments. For patient's safety reasons, the computer is analysing 1300 times/second any movement between the surgeon's fingers and the tip of the instruments. Unvoluntary trembling is eliminated by the computer. The robotic arms have memory so when replacing an instrument, it will go down and stop at the exactly same level where the previous instrument was. Again, for safety reasons, there is no risk of tissue perforation. By acting the camera pedal, the scope can be zoomed in and out in order to have a better positioning toward the crico-pharyngeal muscle. Its transversal muscular fibres are well visualised and freed after the division of the esophageal mucosa of the posterior wall. Besides the very rare cases of arteria Lusoria the median section must be strictly median. Robotic Endo Luminal Surgery helps the endoscopist to better understand the anatomy because of the excellent magnified 3D stereo view. The dissection is much more precise having all 7 degrees of freedom. The future is that one of the Robotic Surgery but above all, the future is that one of ENDOLUMINAL SURGERY.

ETP016

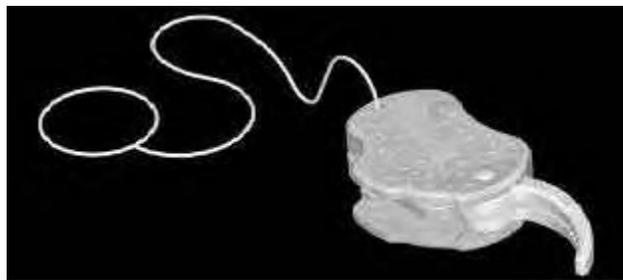
3D TELESTRATION AS A MENTORING TOOL IN ROBOTIC SURGERY, Jamie P Loggins MD, William Fuller MD, Jonathan Pierce MD, Tamas Vidovszky MD, Brian Miller PhD, Chris Hasser PhD, Peter Yellowlees MD, Mohamed R Ali MD, University of California, Davis & Intuitive Surgical

- Objective of Technology:** Telestration is an important teaching tool in minimally invasive surgery. While robotic surgery offers the added benefit of 3-D visualization, telestration technology does not currently exist for this modality. This project aims to develop a video algorithm to accurately translate a mentor's 2-D telestration into 3-D telestration in the Da Vinci visual field.
- Description of the Technology & Method of Use:** The video algorithm analyzes the location of telestrated marks on a 2-D image and mathematically identifies the appropriate spatial location that the image should occupy in each of the 2 separate Da Vinci video channels. Once the two video channels are merged to produce 3-D visualization, the telestration is accurately placed within the 3-D robotic visual field. These precise visual cues will enhance the operating surgeon's understanding of the mentoring surgeon's directions and should, thereby, facilitate the educational experience and ensure patient safety.
- Preliminary Results if Available:** Laboratory testing of a prototype device proved the concept to be feasible. Initial dry and wet labs comparing 2-D to 3-D graphic projection demonstrated the surgeon's ability to recognize the 3-dimensional cues and to properly identify and manipulate the intended targets in complex multiplanar fields.
- Conclusions/Future Directions:** Robotic 3-D telestration is an exciting innovation that will allow remote proctoring of robotic surgery from a regular 2-D mentor station into the 3-D Da Vinci optical system. This technology will be objectively tested in a formal trial against 2-D telestration to further delineate its advantages. Future applications of this technology will include such possibilities as long-distance proctoring over broadband communication networks. Future development of this technology platform will include dynamic anatomy tracking, whereby the mentor's telestrations will remain superimposed onto underlying anatomic structures even when the visual field changes.

ETP017

MICRO PICK-UP FOR HAND-ASSISTED LAPAROSCOPIC SURGERY, Andrea Pietrabissa BA, Bernardo Magnani PhD, Cesare Stefanini BA, Paolo Dario, MicroTech S.r.l.

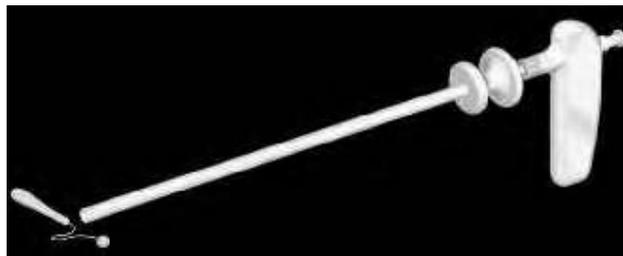
- Objective of the device** The operative potential of Hand-Assisted Laparoscopic Surgery (HALS) could be enhanced by the introduction of a new generation of assisting instruments. These tools will have to meet specific requirements of shape, function, and safety of use.
- Description of the device and its use** Problems related to the working environment of HALS and deriving projectual restrictions of HALS instruments were analysed in order to develop and manufacture a working prototype with grasping and dissecting properties to assist during HALS procedures. The resulting instrument was clinically tested in several HALS procedures.
- Preliminary results** The additional benefit of the new device was particularly appreciated during dissection and isolation of vascular pedicles (nephrectomies and splenectomies). It showed to be safe and effective in providing the additional assistance it was designed for.
- Conclusions/Future directions.** The grasping and dissecting instrument for HALS is of great value in assisting the surgeon during fine dissection, as required in selected procedures. New generation of HALS instruments should comply with the functional, ergonomic and safety issues described in this presentation. Our device will be commercialized in Europe within this year.



ETP018

SPONGE SUBSTITUTE FOR LAPAROSCOPIC SURGERY: A NEW DEVICE, Andrea Pietrabissa MD, Bernardo Magnani PhD, Cesare Stefanini PhD, Paolo Dario, MicroTech S.r.l.

- Objective of the device.** Sponges are routinely used in open surgery to wipe the surgical field and to obtain temporary hemostasis. Similar devices are not available for laparoscopic surgery, given obvious problems of insertion, potential loss and final recovery. Our objective was to realise an integrated device capable to insert a special sponge in the surgical field and able perform a safe recovery of the sponge inside the device at the end of the procedure.
- Description of the technology and method of its use or application** The idea is basically very simple: a cannula contains a specially shaped surgical sponge. The sponge can be delivered out of the cannula simply pushing an internal piston. The sponge is linked to a sort of small buoy (by a short thread) in order to facilitate identification of the device inside the surgical field.



- Preliminary results.** The effectiveness of the new device was tested in several laparoscopic procedures. It proved easy to be

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operated and efficient in providing compression hemostasis. It also represents an useful tool when used in combination with the aspirator. 4. Conclusions. The new laparoscopic sponge will represent a useful device for the laparoscopic surgeon, to the same extent of conventional laparotomy sponges used in open surgery. Our device will be commercialized in Europe within this year.

ETP019

TRANSORAL SURGASSIST® CIRCULAR STAPLER FOR INTRATHORACIC ANASTOMOSIS IN MINIMALLY INVASIVE ESOPHAGOGASTRECTOMY, Daniel L Miller MD, C. Daniel Smith MD, Emory University School of Medicine

OBJECTIVE: Esophagectomy typically requires extended and/or multiple incisions for mobilization, resection and restoring gastrointestinal continuity, especially within the chest cavity. Even when laparoscopy is used for the hiatal dissection, gastric mobilization, and creation of the neoesophagus, a thoracotomy is frequently needed to complete the intrathoracic anastomosis, even when a stapling technique is employed. The ability to use a transoral approach whereby an EEA-type stapler is passed orally may allow the performance of an intrathoracic anastomosis thoroscopically and thereby eliminate many of the constraints and subsequent complications associated with a thoracotomy. The SurgASSIST stapling platform, with corresponding CS21 and PCS21 circular stapling devices, represents an emerging technology which may facilitate this less invasive, transoral technique

DESCRIPTION: The SurgASSIST system (Power Medical Interventions; Langhorne, PA) consists of a flexible shaft that connects to a circular digital loading unit (DLU). Control of the DLU is mediated through a remote control unit (RCU). The anvil of the circular DLU is inserted into the neoesophagus via a thoracoscopic access incision. The FlexShaft is passed orally, removed from the thoracic cavity, and connected to the DLU extracorporally. The DLU is then slipped through the access incision and into the proximal esophageal segment for mating with the anvil. The device is closed, fired, and then removed. Intraluminal and extraluminal visualization as well as a leak test are performed to evaluate anastomotic integrity.

RESULTS: Early results, based on use of the SurgASSIST CS21 technology in 10 patients, showed decreased operative time and postoperative pain and improved performance than with more conventional approaches.

CONCLUSIONS: Use of the SurgASSIST CS21 circular device, with flexible shaft inserted transorally, appears to be a safe and efficient way to perform an intrathoracic esophageal anastomosis. The flexible shaft facilitates improved trans thoracic access which has the potential to decrease operative time and reduce morbidity. The transoral delivery of this device may also facilitate less invasive surgical procedures. Further study will be needed to assess the clinical impact that this next generation of stapling technology will have on esophagogastrectomies and other GI procedures requiring an anastomosis.

ETP020

ZASSI BOWEL MANAGEMENT SYSTEM, John S Minasi MD, Jae H Kim MD, Zassi Medical Evolutions, Inc., Fernandina Beach, Florida USA

The name of the product is the Zassi Bowel Management System (ZBMS), a unique system designed to protect patients, caregivers, and facilities from fecal contact and contamination. It is the necessary tool that allows clinicians to actively control the fecal stream so that individuals who are unable to defecate in an appropriate setting are not relegated to stool on themselves and their environment or develop constipation which could lead to impaction or incontinence.

The ZBMS is a unique catheter and collection bag system that is inserted into the rectum and attached to a large capacity drainage bag via a wide flexible connector tubing. The intraluminal balloon is inflated with air to assist with the insertion or medication administration and then deflated to allow for stool drainage. The retention cuff is inflated with water to provide retention of catheter in the rectum. The irrigation lumen is used for the delivery of routine irrigations and medication administration. A flush/sampling port is located on the drain

tube and provides access for catheter flushing and stool sampling. It is specifically designed for the anorectal anatomy with distinct sections that respect the physiology of the rectum and the anal canal, respectively.

For the first time, clinicians can perform a proactive practice of fecal stream control that assists routine evacuations with stool modification and irrigations. The fecal stream is then contained hygienically with minimal contact of the feces with the patient, caregiver, or facility. The continuous access also allows for facilitated delivery of medications via rectal or colonic mucosal absorption. As a surgeons tool, it allows for the immediate non-surgical fecal diversion for perineal pathology.

Since first introduced to the US market in March 2003, thousands of systems have been used and the ZBMS is becoming a standard of care at many institutions as a proactive means to control the fecal stream or to allow the effective administration of certain drugs via the colon such as lactulose, neomycin, vancomycin.

Passive management of the fecal stream is becoming an obsolete practice. The safety and reliability of indwelling access to the body via the anorectum will foster proactive fecal management as well as a new category of access.

ETP021

ENDOSCOPIC ANCHORING DEVICE (THE ROSARY BULLET), Naomi L Nakao MD, Beth Israel Medical Center

There has been a great deal of recent interest in transgastric surgery. One of the obstacles to this approach has been the lack of reliable devices for delivering surgical fasteners through a flexible endoscope.

We have created a Nitinol (NiTi) anchor that may be passed through a 3.2mm working channel of the flexible endoscope. The four-legged anchor is made of temperature biased NiTi, which assumes an austenitic state at body temperature causing the anchor's hooked legs to splay out and become firmly anchored in tissue. The anchor, attached to a suture thread, is delivered through a catheter with a distal needle tip. Upon visualization of a lesion in the GI tract, the needle is ejected and a flexible pusher advances the anchor into tissue. A second anchor may be placed at an adjacent location. The suture threads are then synched together with a Titanium ring. We used the anchoring device in 13 in vitro pig stomachs, wherein we closed 2-4cm incisions. We also closed iatrogenic gastric perforations with the anchor in an acute pig experiment. Survival experiments in the domestic pig are planned in order to prove the efficacy of the device, as well as to test for long term histologic tissue reaction to the NiTi anchor.



The endoscopic anchoring device may be used to approximate tissue in several applications: during gastric restrictive surgery performed through the flexible endoscope, repair of surgical leaks post gastric bypass, or for closure of gastric incisions after endoscopic transgastric surgery. This device offers an advantage in flexible endoscopic fastening, because implanting an anchor requires a push-pull operation, easily performed through a flexible endoscope.

ETP022

INTERACTIVE ENDOSCOPIC SURGERY (IES), Naomi L Nakao MD, Andrew Lo, Beth Israel Medical Center

Endoscopic transgastric surgery in the peritoneal cavity (PC) has presented a challenge to both surgeons and gastroenterologists. One problem has been the flexibility of the devices: endoscopic instruments, which handle as a long wet noodle would, are not suitable for intricate surgical maneuvers. We propose a new method, Interactive Endoscopic Surgery (IES), wherein the flexible endoscope may be used in conjunction with rigid laparoscopic instruments.



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First, an endoscope is inserted into the stomach, and air is insufflated. Next, a laparoscopic trocar is pierced through the abdominal wall into the stomach, just as one would insert a PEG, and a cannula is inserted. A second cannula is similarly inserted about 10 cm away from the first, via another trocar piercing. Next, two 1cm gastric incisions are created with an endoscopic needle knife, 1.5 cm from each cannula, through which laparoscopic graspers are introduced into the PC. Lastly, a 2 cm gastric incision is created between the two cannulae, through which the endoscope is introduced into the PC. Air insufflation via the endoscope rapidly distends the PC, enabling excellent visualization. The rigid instruments are manipulated by one or two surgeons, creating a triangle with the endoscope. To close, we use our deep EndoStapler (abstract 14024), and our endoscopic Anchoring Device (abstract 14026). We Performed this operation in the live domestic pig (DVD available), and plan a 6-week survival trial to prove that this rout is indeed safe and efficacious. IES may be preferable to laparoscopic surgery during certain procedures, particularly in the morbidly obese in whom entering the PC through the abdominal wall is arduous. IES may also be used to operate within the stomach during gastric restrictive surgery for morbid obesity.

ETP023

INITIAL PRE-CLINICAL REMOTE TELESURGERY TRIAL OF DA VINCI® TELESURGERY PROTOTYPE, Chris Y Nguan MD, Brian Miller PhD, Rajni V Patel PhD, Patrick P Luke MD, Christopher M Schlachta MD, CSTAR (Canadian Surgical Technologies & Advanced Robotics) and Intuitive Surgical

OBJECTIVE: The objective of this study was to perform the first pre-clinical remote telesurgery test of a da Vinci® Telesurgery prototype from Intuitive Surgical (Sunnyvale, CA) on a surgical grade Virtual Private Network (Bell Canada's VPNe network).

METHODS: A da Vinci® Telesurgery prototype was provided by Intuitive Surgical for the performance of surgery across a 12 MB VPNe network spanning 2848km round trip landline distance from the CSTAR telesurgery testbed in London, Ontario to Halifax, Nova Scotia and back. For this study, 3D visual and robotic data was transmitted over the network. Seven porcine pyeloplasties were performed by a single surgeon. The outcomes measured were surgical times and quality of anastomoses.

RESULTS: This network configuration resulted in latencies of 370 ms with 140 ms due to transport delay. The da Vinci® Telesurgery performed well with an average pyeloplasty anastomotic time of 20.7 ± 4.7 min. The quality of the anastomoses achieved was excellent with 7/7 watertight anastomoses. Both of these parameters compared favourably to prior experience with the Zeus® TS. The surgeon was able to easily compensate for the network delay and the da Vinci® Telesurgery performed well across the eight subjective domains surveyed (visualization, fluidity, efficacy, precision, dexterity, tremor, tactile feedback, coordination), scoring an average of 68/72 in validated likert scores.

CONCLUSION: This was the very first test of the da Vinci® Telesurgery prototype for remote telesurgery on a surgical grade network. This study clearly demonstrated the feasibility of remote telesurgery using the da Vinci® platform to perform a complex surgical task. Future development of the da Vinci® Telesurgery system will give the operator full control of the surgical field. Evaluation of the da Vinci® Telesurgery system for clinical application is still pending.

ETP024

USEFULNESS OF A MODIFIED LAPAROSCOPIC SYSTEM TERMED LOCAL GAS DORM FORMATION SYSTEM (LGDFS) IN INSERTING AN INTRAPERITONEAL CATHETER AND MAKING A LIMITED INTRAPERITONEAL OBSERVATION, Takeshi Ohdaira MD, Hidenori Yokota MD, Keishi Oguro MD, Eiju Watanabe MD, Hideo Nagai MD, Jichi Medical University

When conducting local drainage for intraperitoneal abscess, traumatic intraperitoneal hematoma, and duodenal ulcer perforation and when performing the intraperitoneal insertion of a ventricular drain for hydrocephalus, it is essential to ensure the effectiveness and safety in positioning the drain to the target site within the intraperitoneal cavity through a small abdominal wall incision. However, ordinary laparoscopic surgery through a small incision has involved 1) the risk caused by failure to obtain a sufficient visual field, 2) the possibility of damaging organs underneath or in the periphery of the incision, and 3) the jeopardy of positioning the drain to an erroneous site, including abdominal wall. This time, we developed a new device which allows the completion of surgical treatment while securely observing the drain tip and the direction of progression by forming a minimally required gas dorm through the reservation of local space for gas insufflation only at the required site within the intraperitoneal cavity. This device consists of the following parts: 1) a flexible, stick-shaped insufflator 25 cm in length and 8 mm in diameter; 2) an image transmitter; and 3) a controller with the CCD and gas insufflation control switches. The easy control of insufflation efficiency by the handy controller according to body mass index (BMI) of the patient allowed the securement of the visual field also in obese individuals. We termed this device "local gas dorm formation system (LGDFS)" in the sense that it forms a gas dorm locally, i.e., the target site within the intraperitoneal cavity. We used a pig to repeatedly evaluate the effectiveness of this device by conducting minor intraperitoneal surgery during which we made a small, 1-cm long incision only. During insertion, LGDFS allowed its sure insertion while permitting the operator to observe respective layers which form the abdominal wall. Immediately after insertion, furthermore, the tip CCD enabled the safe reach of the device to the target site while permitting the operator to avoid the damage of organs in the periphery of the incision. Although a panoramic view of the intraperitoneal cavity was difficult to obtain, LGDFS allowed the full observation of the target site within the intraperitoneal cavity, e.g., Douglas pouch. Therefore, LGDFS suggested its potential of providing an environment for safe and less invasive surgical treatment at the target site within the intraperitoneal cavity.

ETP025

USEFULNESS OF CARTRIDGE GAUZE CARRIER (CGC) FOR LAPAROSCOPIC SURGERY AS A DEVICE FOR URGENT HEMOSTASIS DURING LAPAROSCOPIC SURGERY, Takeshi Ohdaira MD, Hideo Nagai MD, Jichi Medical University

During laparoscopic surgery, it is impossible to stop bleeding by the direct manual application of gauzes at the time of accidental hemorrhage. Furthermore, as soon carriage of gauzes into the operative field and soon astriction as possible are required in a setting where massive hemorrhage occurs in a short period of time. We developed a gauze carrier, which is insertable into a trocar (?: 10 mm) for laparoscopic surgery, which is capable of instantaneously carrying numerous gauzes to the target site within the intraperitoneal cavity, and which also allows astriction with gauzes as needed; we termed this device Cartridge Gauge Carrier (CGC). Gauzes to be carried to the operative field are stored in the cartridge-shaped tube 10 mm in diameter. In the case that the urgent carriage of several gauzes to a site is required, the triggering of CGC at a stroke carries the gauzes instantaneously to the target site. In the case of bleeding from solid organs, e.g., liver and spleen, there are settings in which both the carriage of gauzes and astriction are required concurrently. In such settings, the slow triggering of CGC fixes a gauge to the cartridge tip, thus satisfying the two needs: carriage of gauzes and astriction. We conducted a

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preliminary study in a pig to evaluate the rate at which CGC carries gauzes for laparoscopic surgery in conventional use into the intraperitoneal cavity and to evaluate its astringent ability. The method of evaluation consisted in the measurement of operation time required to carry five gauzes to the target site within the intraperitoneal cavity. Furthermore, we assessed whether CGC actually stops bleeding from the spleen and conducted a questionnaire survey in three surgeons specialized in laparoscopic surgery who attended the study to obtain their comments on astringent efficiency. CGC allowed the consecutive carriage of gauzes at a constant rate (1 second/gauze), while operation time required to carriage gauzes for conventional laparoscopic surgery ranged between 3 to 10 seconds per gauze due to sorts of causes. Furthermore, we could verify that CGC is usable as a device capable of providing the same hemostatic effect as that of gauze balls which allow astringent. Therefore, CGC for laparoscopic surgery suggested its potential of becoming an effective hemostatic device during laparoscopic surgery.

ETP026

SUTURECINCH: A 5 MM MULTIPLE CRIMP SUTURING TOOL, Timothy N Judkins MS, Kathryn N Done' MS, Dmitry Oleynikov MD, Human Centered Designs; University of Nebraska Medical Center

OBJECTIVE OF THE DEVICE In laparoscopy, suturing is one of the most complex tasks a surgeon must perform. Current laparoscopic suturing tools are difficult to use, requiring multiple stages, or are larger than 5 mm. The SutureCinch is an all-in-one 5 mm suturing tool with the ability to stitch and crimp multiple times, using the same tool without reloading. The SutureCinch was designed primarily to provide the laparoscopic surgeon with a simple tool that eliminates knot-tying and provides a lasting secure fastener to single-stitch sutures. The SutureCinch will drastically reduce the time needed to stitch and tie suture.

DESCRIPTION OF THE TECHNOLOGY The SutureCinch, designed by Human Centered Designs, in Lincoln, NE, is an intuitive, comfortable and functional suturing tool specifically designed to eliminate knot-tying and decrease suturing time. A set of crimping tubes are extracted one-by-one by this tool to secure suture inside the surgical field and replace classic suture knots. The elimination of knot-tying will greatly reduce surgical time, as well as training time for laparoscopic surgeons.

The unique features of this tool include the following:

- The ability to stitch and crimp suture in a single 5 mm tool.
- A generous length of self-contained suture and numerous crimping tubes allowing for multiple stitches without reloading.
- The design includes replacement suture spools and cartridges of crimping tubes that can be replaced quickly if additional suturing is needed.
- The tool resets itself after each suture, without the need of multiple tools or confusing processes.

CONCLUSIONS/FUTURE DIRECTIONS Endoscopic surgery is one of the fastest growing surgical fields, and in need of continued improvement and innovation. There continues to be a paucity of effective suturing tools for the laparoscopic surgeon's toolbox. The SutureCinch is next in a line of laparoscopic surgical tools which continue to ease the stresses placed upon the surgeon and balance the playing field of surgical technique.

ETP027

ABDOMINAL WALL REPAIR WITH SHAPED COLLAGEN PATCH, Peter R White BA, Jack Pacey MD, Burnaby General Hospital, Burnaby, British Columbia, Canada

Introduction: A ten patient case study was completed to evaluate a shaped PeriPatch Sheet(TM) collagen surgical mesh for ease of use during hernia repair. The patients were followed one year to assess pain. The PeriPatch Sheet is Health Canada licensed for sale and FDA cleared for sale device indicated for cardiac and vascular reconstruction and repair and soft tissue deficiency repair.

Methods: All patients were male with an mean age of 60 years. All laparoscopic procedures used staples as fixation and

hernias were comparable in type. The one open stoppa repair used sutures as method of fixation. The 10cmx16cm PeriPatch Sheet (TM) collagen surgical mesh was used in all cases and shaped to ease manipulation in laparoscopic hernia repair. Patient follow up consisted of 1 week, 3month, 6 month and 12 month office visits.

In all laparoscopic hernia repair cases The PeriPatch Sheet was placed in the preperitoneal space with a Keith needle tacked to the medial side of the defect and centered with the Keith needle and then stapled in place with titanium staples. In all cases the surgical mesh was quickly deployed through a 12mm trocar and easily manipulated in the preperitoneal space. The PeriPatch Sheet was deemed easy to manipulate in the open stoppa repair. A ventral hernia in the midline extending from just below the xiphoid to the umbilicus was repaired by suturing the PeriPatch Sheet in the retro rectus space. A very solid repair was achieved.

Results: In all cases the PeriPatch Sheet was quick and easy to use. The shaped patch with the centered Keith needle was particularly effective for positioning the patch during laparoscopic repairs. Patient follow up office had no remarks of unusual pain.

Conclusions: The shaped PeriPatch Sheet is a viable collagen patch for hernia repair. The patch was easy to handle, quick to deploy and orient. Patient follow up indicated no complications.

ETP028

INITIAL DEVELOPMENT VIA ACADEMIC-INDUSTRIAL COLLABORATION OF A MIS PELVIC TRAINER FOR TEACHING COLECTOMY, Doug Beigle, Chris Toly, John Paige MD, LSU Health Sciences Center New Orleans, LA and Simulab Corporation Seattle, WA

Background: Minimally invasive surgery (MIS) presents a challenge to surgical educators because of the unique technical challenges that it presents. The rapid adaptation of many common open surgical procedures to the MIS approach has generated demand for instruction in these techniques that is safe, reliable, inexpensive, and reusable. Colectomy is currently one such procedure with a large need for MIS instruction. Through an academic-industrial partnership, we have begun to develop a pelvic trainer model focusing on teaching the critical steps in MIS colectomy.

Methods: The critical steps required to perform a left sided colectomy were determined. The creation of the low anterior anastomosis (LAA) via circular stapler under laparoscopic guidance was chosen as the first step to recreate. A Simulab pelvic trainer model was adapted to mimic the operation from placement of the anvil in the proximal divided colon to testing the integrity of the completed LAA. The model was tested within a realistic operating room setting as part of a skills session at an MIS colectomy course. Feedback was obtained.

Results: The majority of respondents felt that the pelvic trainer mimicked the LAA and that it was a useful exercise. Almost half felt that the trainer was real enough. Suggestions for improvement included adjusting the pliability of the simulated rectum and adding a mesentery.

Conclusion: Creation of a reusable, safe, reliable pelvic model for MIS colectomy training focusing on the critical steps of the procedure is feasible. Future development will focus on refining the LAA model as well as recreating other critical steps of the procedure.

ETP029

SURGISIS INCREASES STAPLE LINE BURST STRENGTH PRESURE. AN ANIMAL STUDY., Jose S Pinheiro MD, Ricardo Cohen MD, Jose L Correa MD, Carlos A Schiavon MD, Hospital São Camilo, São Paulo, Brazil

Objective of the technology or device: Surgical staplers are widely used in general surgery to replace conventional sutures becoming standard practice in many operations. Two of the most reported problems associated with surgical staplers are suture line failure and bleeding. Surgisis SLR TM (Cook Inc, Bloomington, IN, USA) is a porcine small intestinal submucosa (biodegradable) membrane that applied over the staple line suture might help prevent these problems.



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Description of the technology and method of its use or application:

Forty animals (canine model developed at the University of São Paulo, São Paulo, Brazil) were submitted to general anesthesia and laparotomy. Two surgeons with experience in stapler devices performed all procedures. A segment 20 cm distal to the ligament of Treitz was identified. A 45 mm linear stapler with a blue cartridge (3.0 mm staple depth) was fired dividing the small intestine. The burst pressure of this staple line was obtained. In the same animal, a segment 30 cm from the ligament of Treitz was identified. Surgisis membrane was placed over both sides of the surgical stapler as described by the manufacturer. The bowel segment was divided creating a staple line with the biodegradable membrane. Burst pressure was tested. Suture line bleeding and ease of use of the membrane were also observed. Dogs were sacrificed after the procedure. The Animal Care Committee approved all procedures. Burst strength pressures of the staple line suture with and without Surgisis were compared (Student's t-test).

Preliminary results: Mean burst pressure of the staple line without the biodegradable membrane was 209.26 mmHg (SD±76.41 mmHg). Mean burst pressure of the staple line with the biodegradable membrane was 441.33 mmHg (SD±128.64 mmHg). Statistical significance was achieved (p=0.002). There were no in vivo suture line bleeding. The biodegradable membrane was easy to use.

Conclusions/Future directions: The biodegradable membrane was able to increase burst strength pressures of the bowel segments? staple line sutures. It might help prevent staple line leaks.

ETP030

A NOVEL TECHNIQUE FOR PER-ORAL FULL THICKNESS GASTRIC RESECTION IN A PORCINE MODEL USING SURGASSIST,

Francis E Rosato MD, John A Evans MD, Jo Buyske MD, Gregory G Ginsberg MD, University of Pennsylvania Medical Center

Full-thickness gastric resection (FTGR) is an accepted treatment modality for early gastric cancer and gastrointestinal stromal tumors. SurgASSIST® is a computer mediated, electromechanically powered, cutting/stapling device delivered on a flexible and steerable shaft to which interchangeable loading units of varying configuration, length, and application are affixed. Steering of the flex-shaft and operation of loading units are remote controlled and allow for multidirectional movement. This feasibility study assessed SurgASSIST's ability to perform per-oral intraluminal FTGR in swine.

Methods: Four non-survival swine under general anesthesia were used. An oro-esophageal overtube was placed. Under endoscopic guidance, the stomach was affixed to the abdominal wall via percutaneous gastrotomy and placement of a 10mm balloon trochar. This port served as an alternate access for instruments and endoscope. Under direct visualization the SurgASSIST device with a 55 mm straight-linear-cutter-stapler was advanced via the overtube, into the esophagus and then to the stomach. We evaluated safety and efficacy of overtube placement, insertion, maneuverability in the stomach, parallel vs perpendicular optics, various tissue grasping devices to achieve tenting of the gastric wall within the arms of the stapler, and performance of FTGR.

Results: Overtube insertion was successful in all subjects and produced no mucosal tears in 1, limited in 2, and severe in 1. The SurgASSIST easily traversed the overtube, but required considerable manipulation under retrograde endoscopic visualization to traverse the esophagus and EG-junction.

Maneuverability in the stomach was limited. Endoscopic guidance for attempted FTGR via both per-oral (parallel) and per gastrotomy port (perpendicular) orientations was satisfactory. Laparoscopic grasping forceps compared favorably to endoscopic grasping forceps. The depth of resected tissue could not be reliably predicted until post-resection specimen inspection. A FTGR was successful in 2 of 4 subjects. The resected tissues measured 6.0 cm by 0.6 cm and 6.0cm by 0.7 cm. There was no pneumoperitoneum, intra- or extraluminal bleeding, or gastrotomy leak/failure. In the other 2, depth of resection was submucosa.

Conclusion: Per-oral intraluminal FTGR is feasible. A large diameter overtube permits per-oral access. A gastrotomy port facilitates device positioning and tissue manipulation. With further refinements, reliable results are predicted.

ETP031

WIRELESS POCKET PC: A PRACTICAL SOLUTION FOR TELEMENTORING. PRELIMINARY STUDY., Antonello Forgiione MD, Thomas Parent, Francesco Rubino MD, Michele Simone MD, Didier Mutter MD, Michel Vix MD, Jacques Marescaux MD, IRCAD, University Louis Pasteur, Strasbourg, France

Background: Telementoring provides an important educational opportunity, however, in spite of the promises, it remains largely underutilized. The need for dedicated videoconferencing systems and wired high-speed telecommunication connections, requiring the mentor's physical presence in a specific room at a scheduled time, can partially explain its limited diffusion. We aimed to test the feasibility of using a wireless connected Pocket PC for telementoring video assisted procedures. **Materials and methods:** a laparoscopic cholecystectomy was performed by a surgical fellow in a pig telementored by a remote expert through wireless Pocket PC. A Karl Storz Image 1® camera provided the endoscopic view and two external cameras showed the surgical field. A standard laptop was used for real-time encoding and streaming (VLC®) over the internet or alternatively one of the 3 video signals. A Pocket PC (Microsoft® Windows Mobile™ 2003), Wi-Fi 802.11b connected to the web and equipped with software for video player (VLC®), screen capture (SnapIt®), painting (PaintWinCE®) and remote desktop visualization (VNC®) was used by the mentor. Hands-free phone connections were used for verbal communication. Bandwidth utilization, live video streaming delay and quality of the image were analyzed.

Results: By drawing on the Pocket PC screen, the remote expert helped with trocars positioning, operative field exposure and vascular and biliary structures identification before their division. Quality of the images was appropriate for the task. Live streaming had an average time delay of 4 sec, however this did not have appreciable impact on the mentoring process. An internet speed of 300 Kbps was measured throughout the procedure.

Conclusion: This study shows that a Wireless Pocket PC can be used for telementoring video-assisted surgical procedures. Unlike wired videoconferencing systems, which have economic and spatial constraints, the wireless hand-held technology may offer a practical and low-cost alternative for telementoring, potentially improving safety and quality of surgical care. Further advances in wireless technologies are also likely to reduce time delay for live streaming in the near future.

ETP032

TELEMENTORING FOR MINIMALLY INVASIVE SURGICAL TRAINING BY WIRELESS ROBOT., Stefano Sereno MD, Didier Mutter MD, Francesco Rubino MD, Luis Mendoza Burgos MD, Charles Bailey MD, Joel Leroy MD, Bernard Dallemagne MD, Jacques Marescaux MD, IRCAD, University Louis Pasteur, Strasbourg, France

Introduction. Over the last decade, hands-on training courses with local expert mentoring have proved to be an excellent educational tool in minimally invasive surgery. However, the need for physical presence of specialized instructors represents a relative limitation due to costs, time and geographical constraints. We aimed to evaluate the possibility of using a new wireless, mobile and remotely controlled robot for surgical telementoring. **Materials and methods.** We used the Remote Presence Robot (RP-6?, Intouch Health, Santa Barbara, USA), consisting of a control station and a 574?? tall wheeled device equipped with a mobile screen, auto-focus camera, microphone and a 29 infrared sensors to assist driving. The control station consists of a computer console with a double screen display, camera, microphone, joystick, tele-stration, and sharing pictures capability. The RP-6 worked through a Wifi 802.11b hot spot (WEP secured) connection at a speed of 768 Kbit/sec internet stream. This system allows interactivity by videoconferencing between the operator at the control station and the trainees at the operating table.



Two instructors mentored trainees surgeons to perform laparoscopic intracorporeal suturing in pigs. Instructions on how to perform manual tasks were given to each trainee by operating the robot from a separate room. The trainees assessed the overall performance of the robot (quality of sound, image definition, and smoothness/appropriateness of movements) on a 0-to-10 scale. To test the feasibility of long-distance telementoring, on one occasion the trainees at our Institute in Strasbourg were instructed by a surgeon operating the RP-6 robot from the Emory University School of Medicine of Atlanta, (GE), USA (Dr D. Smith, MD). Results. Twenty-four surgeons were trained using robotic-assisted telementoring. All the trainees were able to complete the manual tasks as instructed. No interruption of video-signals and sound were experienced during the telementoring sessions allowing for continuous interactivity and feedback. Robot mentoring was well received and appreciated by the trainees as shown by an average score of 7.4 (range: 5-10) at the assessment of the robotic performance. Transatlantic telementoring was also feasible and did not result in deterioration of image and sound quality for the duration of the session (one hour). Conclusions. This study shows that the RP-6 robot can be used as a valuable tool in telementoring minimally invasive

ETP033

EFFICACY OF COLD NEBULIZATION IN THE PREVENTION OF CENTRAL TEMPERATURE DROP DURING PERITONEAL INSUFFLATION: AN EXPERIMENTAL STUDY IN PIGS., Pierre

Diemunsch MD, Herve Schlotterbeck MD, Roland Schaeffer MD, Antonello Forgione MD, Catherine Schmidt-Mutter MD, Francesco Rubino MD, Didier Mutter MD, Jacques Marescaux MD, IRCAD, University Louis Pasteur, Strasbourg, France

Aim: CO2 insufflation during laparoscopic surgery induces heat loss. Humidification and/or heating of the CO2 can prevent hypothermia. We aimed to compare 2 different methods of humidification of the insufflated CO2: cold nebulization vs. heating and evaporation of water. Materials and

Methods: With IACUC approval, 16 standardized endotracheal general anesthesia sessions (ketamine, azaperone, thiopental, pancuronium, isoflurane, O2/N2O, Dr ger SA2, room temperature: 20.5C +/- 1.0C), were performed in 4 pigs. The animals underwent a 4 hour peritoneal insufflation to 10 mmHg with a compensated 180 liter/hour CO2 leak. Each animal, acting as its own control, was studied at 8-day intervals in randomized sequence with the following conditions: 1) Control (C): no pneumoperitoneum 2) Standard (S): insufflation with non-heated, non-humidified CO2 (measured output gas temperature [GT] 24.2 C, measured output gas humidity [GH] 2.6%) 3) Aeroneb (A): insufflation with non-heated humidified CO2 with water delivered through the Aeroneb nebulizer (Aerogen, Ireland; GT: 21.4 C, GH: 79.4%) 4) Laparoshield (L): insufflation with heated and humidified CO2 with the Laparoshield dedicated device (Pall, USA; GT 35.9 C, GH 91.9%). Central temperature (CT) was recorded every 10 min (esophageal probe Odam Physiogard SM 785). The results were compared with ANOVA (repeated measurements), applied to time effect and insufflation type (C, S, A, L) and with analysis of contrast method (ACM).

Results: After 4 hours, the measured heat loss was 1.82 +/- 0.78 C in group C; 2.82 +/- 0.68 C in group S; 1.72 +/- 0.62 C in group A; and 1.87 +/- 0.39 C in group L. The ANOVA shows a significant difference with time and with the insufflation type (p=0.004). The ACM identifies the following: 1. after 80 minutes, the heat loss in group S > group C (p=0.035) 2. after 30 minutes, the heat loss in group A < group S (p=0.036) and this difference increased with time (p=0.0001) 3. after 100 minutes, the heat loss in group L < group S (p=0.024) and this difference also increased with time (p=0.0001). There is no statistical difference in heat loss between the A, L, and C groups, at any time.

Conclusion: Cold nebulization as well as heating and humidification of insufflated CO2 prevent heat loss associated with gas insufflation during laparoscopic surgery. This benefit appears earlier with the Aeroneb cold nebulizer. Cold humidification of CO2 presents the advantage that it can also be used for intraperitoneal drugs delivery.

ETP034

MSC STUDENT REMOTE SKILLS TUTORING, P. Sains MD, R. Aggarwal MD, S. Black MD, J Hance MD, S. Purkayastha MD, R. Jindal MD, A. Change MD, A. Darzi MD, Department of Biosurgery and Surgical Technology, Division of Surgery, Oncology, Reproductive Biology & Anaesthetics, Imperial College London

Background: Technical skills workshops are now commonplace to teach trainee surgeons to perform tasks on synthetic models. Such courses rely upon the presence of experienced tutors, who must often travel to remote sites. The aim of this study was to assess the use of a remote presence technology robot (RP6) to enable a tutor to be virtually present during a skills training session and deliver one to one and group tutoring.

Methods: Novice surgeons completed a vein patch graft on a synthetic bench-top arterial model. Each subject performed the task twice, in a random order, once with a human tutor present and once with a remote tutor relayed via the RP6 robot. Following the two sessions, all subjects completed a satisfaction questionnaire. All final products were marked on a 25-point procedure specific end-product rating scale by two independent blinded reviewers.

Results: Forty-three trainee surgeons took part. Overall ratings of the human tutor session were reported as good or excellent by 95% of subjects, versus 51% for the virtual tutor session (p<0.001). Seventy one percent of participants said the virtual tutor was approachable, and 61% felt that they received appropriate advice to complete the task. End product analysis revealed equivalent scores on performing the task with virtual or human tutors (medians = 13, p=0.069).

Conclusions: This study has established the feasibility of tutoring a technical skills session using remote presence technology with equivalent outcomes to conventional tutoring. Though the human tutor was perceived to be superior, subjects were satisfied with advice received from the virtual tutor, and performed the task to an equivalent level. This technology allows expert tutors to be present at remote teaching sessions, enabling junior surgeons to benefit from high quality tutoring during skills courses.

ETP035

DURABILITY OF THE STAPLED TRANS-ANAL RESECTION (STARR) FOR OBSTRUCTED DEFECTION SYNDROME (ODS),

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Purpose: The optimal surgical approach to patients with refractory symptoms of obstructed defecation syndrome (ODS) remains elusive. Data supporting the durability of STARR in this population is limited. This represents the first long-term experience with STARR in the USA.

Methods: Prospective cohort series of ODS patients at two US colorectal centers with 1-year follow-up. Inclusion: Symptom complex > 1-year duration including prolonged straining, need for manual perineal/vaginal pressure, and/or use of enemas for defecation, sensation of incomplete evacuation. Exclusion: Patients with enterocele at rest, prior sigmoid colectomy, anismus. Assessments included: defecography, symptom and quality of life scores, pain, patient satisfaction.

Results: 43 females, mean age 59 years (31 ? 83). 30 presenting with rectocele; 18 with intussusception. Six-month follow-ups complete; 1-yr follow-ups ongoing. Three significant complications: one bleeding re-intervention, one pain re-hospitalization, single case of tissue overload of stapler.

Visit	ODS	PAC QOL SF12 Physical	
Pre-op	N=43	16.6 (3.9)	2.17 (.99) 54.3 (12.4)
1 mo.	N=42	6.7 (4.4)	0.84 (0.70) 59.6 (13.6)
6 mo	N=37	7.0 (5.4)	0.83 (0.54) 61.1 (16.3)
1 yr	N=14	7.3 (5.7)	0.97 (1.13) 61.6 (12.2)
		mean (SD)	



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Conclusion: The STARR procedure appears to reduce rectal compliance, substantially reducing symptoms and improving quality of life of ODS patients within one month of surgery. Benefit is sustained at least 6 and potentially 12 months. A larger, longer-term multicenter trial is warranted to confirm these findings.

ETP036

AUGMENTED REALITY SIMULATOR FOR HAND-ASSISTED LAPAROSCOPIC COLECTOMY Derek Young, Derek Cassidy, Fiona Slevin, Donncha Ryan, Haptica Ltd, Dublin, Ireland. Training in Hand-Assisted Laparoscopic Colectomy (HALC) has largely been done using cadavers and porcine models. These have drawbacks in terms of realism, logistics and lack of performance measurement. A Simulator would provide consistent instruction and practice and provide feedback on performance. However, given the range of instruments used in the procedure, and especially the use of a hand, pure virtual reality could not be considered as a solution. The ProMIS Augmented Reality simulator platform – by combining physical and virtual reality – enables interaction and tracking of real instruments with a physical model. And because of its technological approach (vision-tracking) also enables the hand to be tracked. In the new ProMIS HALC simulator, 3D models or graphical objects are overlaid on the physical model to provide instruction and guidance. For example, a 3D animation may be used to demonstrate how to complete a step; a graphical guideline 'A – B' may be used to indicate a target area for dissection. ProMIS HALC measures surgical skill by gathering data on the movement of commercial laparoscopic instruments while completing a standardized task. The main performance metrics are time taken, total path length and economy of movement. Additionally metrics specific to a step are calculated to measure performance associated with a specific instruction in a specific region of the physical model. Following the simulated procedure, the user completes a self-assessment which contributes to the metrics for the full procedure. A full analysis of performance is presented to the user on completion of the procedure and self-assessment. Results: Initial trials of the ProMIS HALC simulator indicate that practice on the simulator improves performance as measured by the metrics gathered by the simulator. While detailed validation studies remain to be done, initial indicators are that the HALC simulator represents an "unparalleled opportunity to practice, step by step, a Hand-assisted laparoscopic sigmoid resection" and "a huge step forward in surgical training".



ETP037

CHANGES OF GI TISSUE COMPRESSIVE PROPERTIES DUE TO COMPROMISED BLOOD SUPPLY, Michael A Soltz PhD, Christina Rideout MS, Henry Holsten, Russell Heinrich PhD, US Surgical

INTRO: In GI surgery, a goal of using staples and sutures is to provide a hemostatic, leak free joint (anastomosis) by mechanically compressing and joining the tissues. Disease states, pre-surgical treatments, and/or surgical complications may reduce blood perfusion to the anastomotic wound site. Poor blood supply, or ischemia, has been cited in the literature as one of the primary causes of anastomotic leak formation. It has been suggested that surgeons avoid stapling or suturing in ischemic tissue since the success rate of such an anastomosis is reported to be low. However, in some surgical situations, these poorly perfused anastomoses may be unavoidable. Therefore, to understand the possible effect of ischemia on compressed tissue, this study will focus on the changes in the compressive mechanical properties of the tissue with an impaired blood

supply over time.

METHODS: In-vivo testing was performed on canine gastrointestinal tissue. A custom mechanical testing compression device was used to measure the mechanical properties of the GI tissue. The intestine was transected and the blood vessels were ligated in order to simulate poorly perfused tissue. The tissue was placed between the jaws of the device and compressed at a constant rate while the reaction force of the tissue was measured with a load cell. When the final gap of 1.5mm was reached (typical closure of a 3.5 mm staple), it was maintained for 10min to allow the tissue to relax and the forces to equilibrate. Compression tests were repeated every 20min for 1hr along a section of bowel that had the blood supply removed.

RESULTS: Three mechanical properties were examined for this study: peak force during compressing; equilibrium force after 10min relaxation; and initial thickness. Peak force was not observed to change over the time duration. However, equilibrium force decreased by nearly 50% after 1hr and initial thickness appeared to increase over time, by nearly 75%.

INITIAL CONCLUSION: The main findings for this study suggest that compromised blood flow has a significant impact on the mechanical properties of GI tissue. Within 20min, tissue with compromised blood supply begins to soften. Interestingly, the tissue thickness increases over time, perhaps as a result of a spasm response in effort to increase blood flow. Understanding the interaction between tissue and sutures/staples in disease situations that may compromise blood flow will ideally help improve patient outcomes. 1. Cooperman et al 1979. Surg Gyn & Obst (149) 15-16.

ETP038

EXPERIMENTAL MEASUREMENT OF THE STRAIN TO CONTROL BLEEDING IN GI TISSUE, Michael A Soltz PhD, Henry Holsten, Russell Heinrich PhD, US Surgical

INTRODUCTION: Stapling GI tissue involves initially compressing the tissue to a desired gap and then applying staples with the overall goal of controlling bleeding. However, variability of tissue thickness could influence the stapling process and resulting hemostasis. Regardless of the initial thickness of the tissue, the stapler will compress it to a specific height known as tissue gap. Thus, thicker tissue will experience more relative tissue thickness changes or strain than thinner tissue so that hemostasis can be preserved. The optimal amount of strain required to mechanically control bleeding has yet to be determined. Thus, the hypotheses for this study are (1) a range of strain exists that will collapse the blood vessels to create hemostasis, and (2) the strain to create hemostasis is statistically the same among different tissues types.

METHODS: Small intestine, colon, stomach, and lung tissue of a canine were examined. To determine the hemostasis strain of each tissue, the initial and final thickness at hemostasis were measured with a custom digital caliper. Initial thickness measurements were taken prior to compressing the tissue to nearly 90% of its original thickness. The tissue was then transected and the compression was slowly decreased until the presence of blood at the cut edge was visible. The strain was calculated by determining the percent change of the initial thickness to thickness at the presence of blood. A 2 Factor ANOVA was used to detect a difference among the means of each tissue type (small intestine, colon, stomach, and lung). A post hoc comparison, Fisher's LSD test, was run to determine the statistical difference between the means ($\alpha = .05$).

RESULTS: Small intestine and colon were not significantly different. Likewise, stomach and colon were not significantly different. In contrast, lung was significantly different from all tissues.

DISCUSSION: The hemostasis strain range was not found to be statistically the same for each tissue. However in GI tissue, the strains were found to be between 60% to 70%. Lung was found to be significantly different from all other tissues. Mechanically, lung is softer than other tissues therefore the percent compression required to create hemostasis is greater. **INITIAL CONCLUSION:** Defining the range of strain required for hemostasis may help in the selection of staples sizes thereby potentially improving surgical outcomes.



ETP039

VERSATILE TISSUE ANCHORS FOR ENDOLUMINAL AND NOTES PROCEDURES. Lee L Swanstrom MD, Aureo L de Paula MD, Guido Sclabas MD, Desmond H Birkett MD, Legacy Health System, Hospital de Especialidades Goiania, Lahey Clinic

Technology Objective: To achieve permanent tissue approximation endoluminally, generous full thickness ?bites? are needed. Tissue anchors and a delivery instrument (USGI Medical, San Clemente, CA) have been developed to achieve full thickness tissue approximation for endoluminal and NOTES procedures.

Description of Technology/Method of Application: Tissue anchors are constructed so that a pair of anchors is strung on a length of suture with a terminal suture knot and a proximal, novel one way cinch. The anchors fit within a 16 gauge needle for delivery through tissue using a flexible, combination grasper/needle driver instrument designed for endoluminal use. This instrument was used to approximate tissue using interrupted, running or figure of eight techniques. Anchors constructed of titanium, nitinol and polyester have been implanted and studied in porcine and canine models for periods of 28 ? 60 days. Anchors were cinched together to close gastrotomy incisions and to hold individual or pairs of folds of intragastric tissue in apposition.

Results: Anchors have been demonstrated to be safe and effective for holding tissue together while it heals. Cinched anchor pairs maintained deep sero-muscular apposition using several common suturing techniques. At late sacrifice the anchors embedded deeply within the mucosa but did not migrate through the submucosal layers. Histological examination revealed a standard healing response with no abnormal pathological effect on the mucosa. Folds of apposed intragastric tissue were characterized by resolved healing of the submucosa evidenced by compact, dense, fibrous connective tissue and subsequent re-growth of adjacent mucosal tissues. An interrupted pattern of 3 anchor pairs was used to close a 2 cm gastrotomy incision. Gastrotomy closures showed no evidence of leaks.

Conclusions/Future Directions: The described endoluminally applied tissue anchors have been documented to achieve light tight closure of gastric incisions and durable intragastric tissue folds as needed for endoluminal antireflux or bariatric procedures. It is expected that these tissue anchors will be useful for a multitude of endoluminal and NOTES procedures.

ETP040

LOW SECTION OF THE RECTUM DURING LAPAROSCOPIC TOTAL MESORECTAL EXCISION USING THE CONTOURTM DEVICE. TECHNICAL REPORT., EM Targarona, C Balague MD, R Beringoade MD, C Martinez MD, P Hernandez MD, J Garriga MD, M Trias MD, Service of Surgery, Hospital Sant Pau, Autonomous University of Barcelona

After the demonstration of the advantages of laparoscopic approach for colon cancer, evidence exist about its role for rectal cancer. Initial reports show technical feasibility, adequate oncologic clearance and optimal outcome. Conversion range between 0 - 20%, and anastomotic leakage is up 20%. Local anatomy (male pelvis, prostate and tumor size) may impair adequate dissection, and the most challenge is the transection of the lower rectum. Available devices reach the transection line in an oblique direction, requires more than one staple cartridge and distal stump acquires an assymmetric trapezoidal shape. Recently, an staple an cutting device for section of te distal rectum has been designed for open surgery (ContourTM, Ethicon). This concept may be adapted to endoscopic surgery, in spite of the shortcomings of a device specifically designed for open surgery. The aim of this report is to show the possible utility of this device in endoscopic surgery, and to suggest the need of improved staplers to ammeriolate the surgical task when operating in the low rectum.

SURGICAL TECHNIQUE AND RESULTS: The abdomen is approached trough five trocars.. Once the rectal dissection is finished, a 6 cm pfanestiel incision is performed. A Lap Disc device (Ethicon) is inserted, and the ContourTM (Ethicon) is inserted trough it. The Lapdisc is closed and the pneumoperi-

toneum is recovered. The stapler is smoothly inserted in the lower pelvis . Additional pushing movements permit to locate the stapler in the adequate placement. After the lavage of the lower rectum, the stapler is closed and fired, obtaining the simultaneous closure of the proximal and distal rectum ends. The sigmoid-rectal segment is exteriorized and excised trough the Pfanestiel incision. Neumoperitoneum is restored an a transanal double stapling colorectal anastomosis is performed under laparoscopic control. Between May- Nov 2005, 6 patients (low rectal cancer) were approached by laparoscopy, with succesful transection of the lower rectum with the ContourTM device. There were no conversions and the anastomosis was fashioned without problems. Immediate outcome was unremarkable in all cases.

COMMENT: The ContourTM device has been developed for open surgery, but its design accomplishes the needs for a regular transection of the rectum. Future directions in stapler designs for laparoscopic rectal transection should follow the main functional guidelines of this device.

ETP041

ENDOSCOPY ASSISTED SURGICAL MANAGEMENT OF ACUTE BLEEDING FROM GATRIC AND DUODENAL ULCERS, O. L Degterev PhD, V N Sitnikov PhD, A B Lageza PhD, A Yakubu MD, Faculty of Surgery No:4, Rostov State Medical University

Objective: To look into a possibility of using endoscopy assistend surgical management of acute bleeding from gastric and duodenal ulcers without opening the gastric or duodenal lumen.

Materials and method: 37 patients were evaluated; 6 with pyloric gastric ulcer, 15 with cardiac gastric ulcer and 16 with duodenal. The aetiology of the bleeding ulcers was mainly of drugs, alimentary and stress type.

In the 37 evaluated cases the bleeding vessels were over sewn with 1-3 layers of interrupted 2/0 polypropylene sutures passed through all coats visualizing the ulcer site and the sure through endoscope. This is done without opening the gastric or duodenal lumen. Adhesive collagen plates are used over the sutured line for further strengthening.

Results: During fellow up endoscopy at three, six, and twelve months in the 37 patients on definite medical treatment there was no single complication of re-bleeding, scarred deformation or sepsis at sutured site.

Conclusion: The method can be used confidently in management of acute bleeding from anterior gastric and proximal anterior duodenal ulcers.

ETP042

MRI-COMPATIBLE ENDOSCOPE TO USE DISTALLY-MOUNTED CCD, Takefumi Yasunaga MSc, Tsuneo Fukuyo BS, Kazuo Tanoue PhD, Kozo Konishi MD, Ken Okazaki PhD, Yoshiro Kawabe BS, Jae-Sung HONG PhD, Satoshi Ieiri PhD, Hideaki Nakashima PhD, Makoto Hashizume PhD, Graduate School of Medical Sciences, Kyushu University

A few MR-compatible endoscopes have already been developed. Although these are the optical system of the relay lens like common laparoscope, we have developed MR-compatible endoscope to use distally-mounted CCD. We evaluated the MR safety, MR compatibility, and the quality of the laparoscopic view in vivo.

1/10 inches CCD was placed on the distal end of the scope. The scope was wrapped with brass twice and electric circuit was made to perform differential transmission of the image signal. Other noise measures were given to the processor, the cable, and connectors. A large adverse effect was given to the magnetic field. On the other hand, our scope stores all important parts such as the signal processing part, microcomputers, and the processing part for differential transmission in the relay substrate, and image signal was transmit only. In addition, the clock signal of the CCD DSP was selected in consideration of the nuclear magnetic resonance frequency of MRI. The MR-safety and MR-compatibility of this endoscope was verified with open MRI. The verification was done according to the following procedures.

1. Presence of gravitation by magnetic field



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2. Presence of influence of RF pulse on CCD

3. Presence of influence in MR image by CCD

Image sequence used spin echo. We compared the pictures on this condition with the control pictures which were taken without the endoscope. Moreover, this endoscope was inserted in abdomen of the pig under general anesthesia and the image quality was evaluated by the clinician.

The endoscope achieved low EMI by the above-mentioned noise measures. Gravitation by the magnetic field was not able to be felt even if the endoscope was put in the gantry. It is easy to operate the endoscope. The noise in the endoscope image during irradiating the RF pulse is a little, but the view of

the endoscope was enough for clinical use. This was also same on the center of the gantry. There is not significant difference between SNR of images with the endoscope and that of control images without the endoscope.

It seemed that this MR-compatible endoscope itself was able to be used because there was neither pulling by the magnetic field, was no obstacle in the operation, and obtaining a clear endoscopic view when the RF pulse was irradiated by taking a picture, and not seeing a remarkable noise in the MR image. However, other operation peripheral machines also need a detailed examination about MR safe and MR compatibility.