Surgical treatment of GERD: systematic review and meta-analysis

Supplemental Figures and Appendix

Key Question 1: Surgical versus medical management

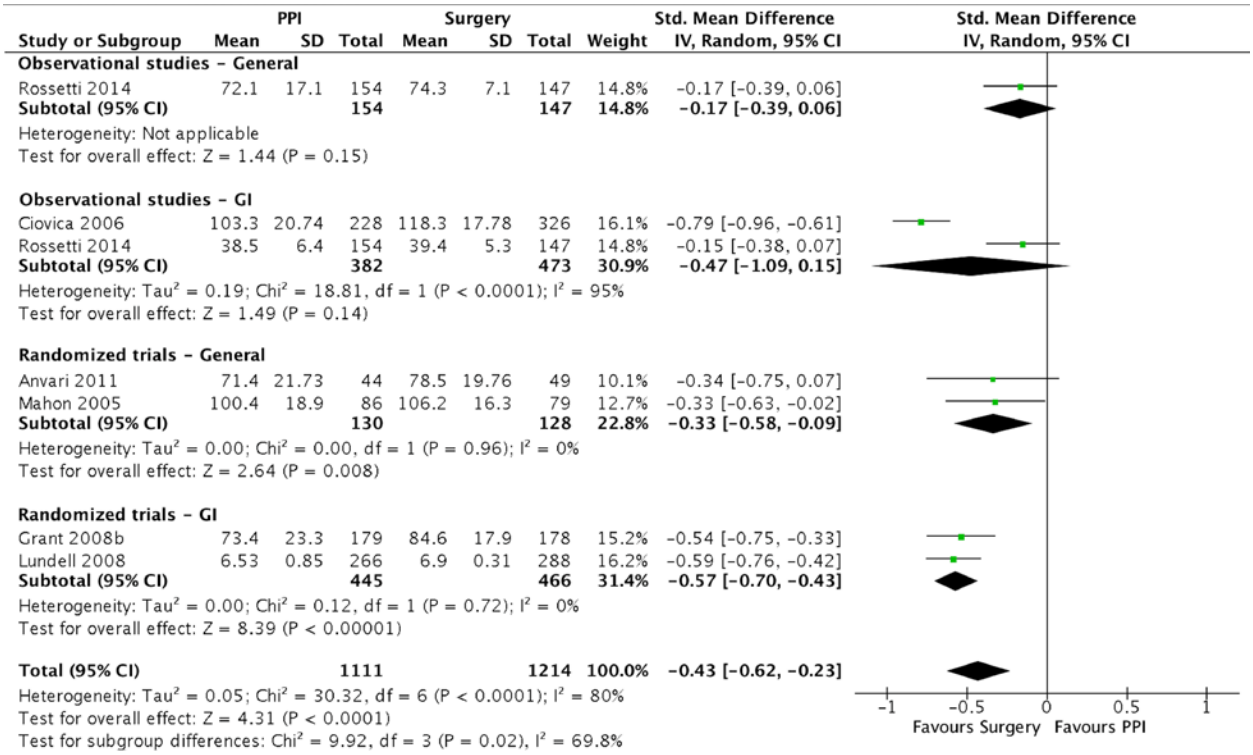
Figure S1. Risk of bias assessments for randomized studies addressing medical versus surgical treatment of GERD.

Study	Sequence Generation	Allocation Concealment	Blinding participants and Personnel	Blinding of Assessors	Incomplete Outcome Data	Selective Outcome reporting	Noncomparable groups	Performance bias	Detection Bias	Final Risk of Bias
Anvari 2006	Low	Low	High	Low	Unclear	Low	Low	Low	Low	**Low**
Anvari 2011	Low	Low	High	High	Unclear	Low	Low	Unclear	Low	**High**
Attwood 2008	Low	Unclear	Unclear	Low	Low	Low	Low	Low	Low	**Low**
Fiocca 2010	Unclear	Unclear	Unclear	Unclear	Unclear	Low	Low	Low	Low	**Low**
Galmiche 2011	Low	Unclear	High	High	High	Low	Low	Low	Low	**High**
Goeree 2011	Low	Low	High	High	Low	Low	Low	Low	Low	**High**
Grant 2008.1	Low	Low	High	High	Low	Low	Low	Low	Low	**Low**
Grant 2008.2	Low	High	High	Low	Unclear	Low	Low	Low	Low	**High**
Grant 2013.1	Low	Unclear	High	Low	High	Low	Low	Unclear	Low	**High**
Grant 2013.2	Low	Low	High	Low	High	Low	Low	Low	Low	**High**
Hatlebakk 2016	Unclear	Unclear	High	Low	High	Low	Unclear	Low	Low	**Unclear**
Lundell 2001	Low	Low	Unclear	Unclear	Low	Low	Unclear	Low	Low	**Unclear**
Lundell 2007	Low	Low	Unclear	Unclear	High	Low	Unclear	Low	Low	**Unclear**
Lundell 2008	Unclear	Unclear	High	High	Low	Low	Low	Low	Low	**High**
Lundell 2009	Low	Low	Unclear	Unclear	High	Low	Unclear	Low	Low	**Unclear**
Mahon 2005	Low	Unclear	High	Low	Low	Low	Low	Low	Low	**Low**
Mehta 2006	Low	Unclear	Unclear	High	Low	Low	Unclear	Low	Low	**High**
Parrilla 2003	Low	Low	High	Low	Low	Low	Low	Unclear	High	**Low**
Spechler 2001	Low	Low	High	Low	High	Low	Low	Low	Low	**High**
Spechler 2019	Low	Low	Low	Unclear	Low	Low	Low	Low	Low	**Low**

Figure S2. Risk of bias assessments for cohorts studies addressing medical versus surgical treatment of GERD.

Study	Selection	Comparability	Outcome	Final Risk of Bias
Attwood 1992	High	Unclear	Unclear	**High**
Babar 2010	Low	Low	Low	**Low**
Ciovica 2006	High	Unclear	Low	**High**
Esposito 2012	Low	Unclear	Unclear	**Unclear**
Gurski 2003	High	High	Low	**High**
Mauritz 2016	High	Low	Low	**Unclear**
Rantanen 2007	Low	Low	Low	**Low**
Rossetti 2014	High	Low	Unclear	**High**
Rossi 2006	High	Unclear	Low	**High**
Swoger 2006	High	High	Low	**High**
Tolone 2015	Low	Low	Low	**Low**
Van Meer 2013	High	High	High	**High**
Zaninotto 2012	High	Low	High	**High**

Figure S3. Quality of life by type of scale. Studies used either “general” quality of life scales or “GI” based quality of life scales.



By follow-up:

Figure S4. Quality of life by follow-up period.

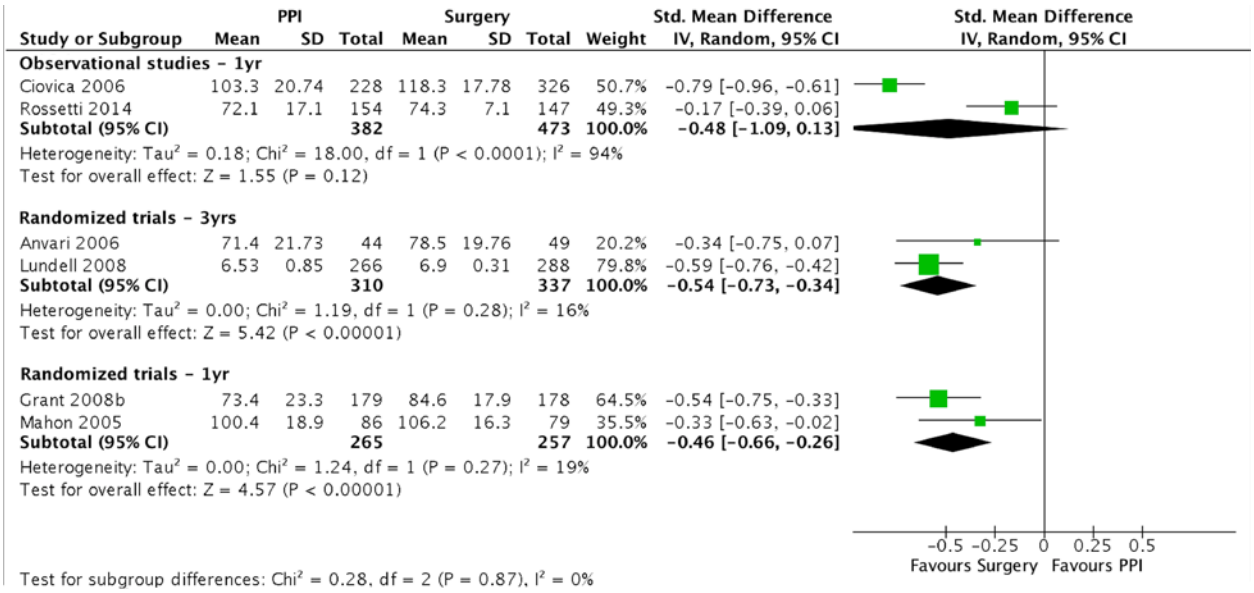


Table S1 Summary of outcomes with 1-2 studies reporting comparison between patients undergoing medical versus surgical treatment of GERD.

Study type	Studies	N, PPI treatment	N, Surgical treatment	Outcome	RR, [95% CI]	Notes
RCT	Galmiche 2011	266	288	Long term dumping	0.94 [0.64, 1.39]	Favors neither
RCT	Galmiche 2011	266	288	Long term gas bloat	0.70 [0.55, 0.89]	Favors PPI
RCT	Spechler 2001	46	33	Pneumonia	3.59 [0.44, 29.29]	Favors neither
Observa-tional	Rantanen 2007	180	24	Pneumonia	2.73 [0.71, 10.58]	Favors neither
RCT	Grant 2008a, Spechler 2001	269	216	Treatment failure	0.52 [0.22, 1.25]	Favors neither

Table S2 Summary of cost analyses between PPI and surgical intervention in treatment of GERD

Study type	**Study**	**$, PPI treatment**	**$, Surgical treatment**	**Notes**
Markov simulation	Arguedas 2004	8798	10475	10 year time horizon, based on Medicare reimbursement rates. Surgery judged to be cost ineffective.
Markov simulation	Bojke 2007	4890	5014	30 year time horizon, based on UK cost data. Surgery judged to be cost effective from perspective of increased QALYs.
Markov simulation	Epstein 2009	3411	5026	Lifetime cost, based on UK cost data. Surgery judged to be cost effective from perspective of increased QALYs.
RCT-based resource utilization study	Goeree 2011	12743	15948	3 year cost based on Canadian cost data. Surgery judged to be cost effective from perspective of increased QOL. 52 patients in each arm, PPI vs laparoscopic fundoplication.
RCT-based resource utilization study	Grant 2008a	4890	5014	1 year cost based on UK cost data. Surgery judged to be potentially cost effective from perspective of increased QALYs.

Key Question 2 - laparoscopic vs robotic fundoplication

Figure S5. Risk of bias assessments for randomized studies addressing laparoscopic versus robotic approach for fundoplication.

Study	Sequence Generation	Allocation Concealment	Blinding participants and Personnel	Blinding of Assessors	Incomplete Outcome Data	Non-comparable Groups	Performance bias	Detection Bias	Final Risk of Bias
Broeders 2011	Unclear	Unclear	Unclear	Unclear	Low	Low	Low	Low	Unclear
Draaisma 2006	Unclear	Unclear	Unclear	Unclear	Low	Low	Low	Low	Unclear
Morino 2006	Low	Low	Unclear	Unclear	Low	Low	Low	Low	Low
Muller-Stitch 2007	Unclear	Unclear	Low	Low	Low	Low	Low	Low	Low
Muller-Stitch 2009	Unclear	Unclear	Low	Low	Low	Low	Low	Low	Low
Nakadi 2006	Low	Unclear	High	Low	Low	Low	Low	Low	High

Figure S6. Risk of bias assessments for cohort studies addressing laparoscopic versus robotic approach for fundoplication.

Study	Selection	Comparability	Outcome	Final Risk of Bias
Albassam 2009	Low	Low	Low	Low
Anderberg 2007	High	High	High	High
Anderberg 2009	Low	High	Low	High
Ceccarelli 2009	Low	Low	Low	Low
Hartmann 2009	High	Unclear	Unclear	High
Lehnert 2006	High	High	Low	High
Owen 2014	Unclear	Low	Low	Unclear

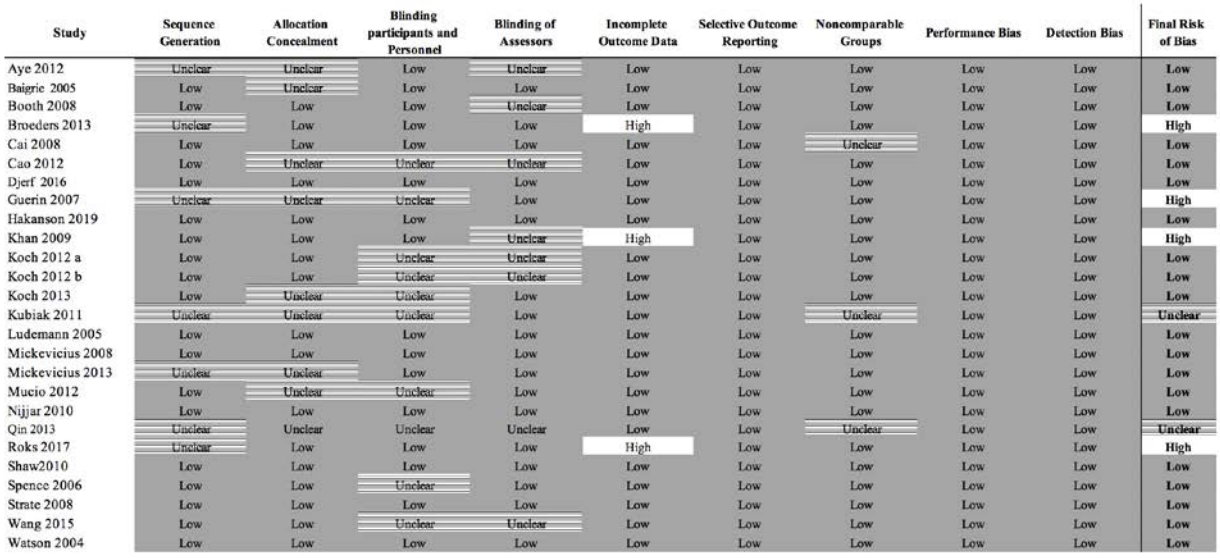
Table S3 Summary of outcomes with single studies reporting comparison between patients undergoing laparoscopic vs robotic fundoplication.

Study type	**Study**	**N, robotic fundoplication**	**N, laparoscopic fundoplication**	**Outcome**	**Result [95%CI]**	**Notes**
Adult patients						
RCT	Morino 2006	25	25	Post-operative Demeester score	Mean difference Demeester Score = 1.60, [0.25, 3.45	Favors neither
RCT	Draaisma 2006	25	25	24 hour pH monitoring	Mean difference % time= -1.05, [2.71, 0.61]	Favors neither

RCT	Muller-stitch 2009	20	20	Post-operative PPI use	RR=0.14, [0.01, 2.60]	Favors neither
Observa-tional	Hartmann 2009	15	44	Post-operative PPI use	RR = 0.80, [0.26, 2.60]	Favors neither
RCT	Muller-stitch 2009	20	20	Wrap failure	RR 3.00, [0.13, 69.52]	Favors neither
Observa-tional	Ceccarelli 2009	45	45	Wrap failure	Not estimable	Favors neither
Pediatric patients						
Observa-tional	Albassam 2009	25	25	Wrap failure	Not estimable	Favors neither
Observa-tional	Albassam 2009	25	25	Post-operative dysphagia	RR 0.33, [0.01, 7.81]	Favors neither
Observa-tional	Anderberg 2009	n/a	n/s	Cost	9,582 Euros (robotic) vs 8,982 Euros (laparoscopic)	

Key Question 3 - Complete vs partial fundoplication

Figure S7. Risk of bias assessments for randomized controlled trials addressing complete vs partial fundoplication for GERD.



Study	Sequence Generation	Allocation Concealment	Blinding participants and Personnel	Blinding of Assessors	Incomplete Outcome Data	Selective Outcome Reporting	Noncomparable Groups	Performance Bias	Detection Bias	Final Risk of Bias
Aye 2012	Unclear	Unclear	Low	Unclear	Low	Low	Low	Low	Low	Low
Baigrie 2005	Low	Unclear	Low	Low	Low	Low	Low	Low	Low	Low
Booth 2008	Low	Low	Low	Unclear	Low	Low	Low	Low	Low	Low
Broeders 2013	Unclear	Low	Low	Low	High	Low	Low	Low	Low	High
Cai 2008	Low	Low	Low	Low	Low	Low	Unclear	Low	Low	Low
Cao 2012	Low	Unclear	Unclear	Unclear	Low	Low	Low	Low	Low	Low
Djerf 2016	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Guerin 2007	Unclear	Unclear	Unclear	Low	Low	Low	Low	Low	Low	High
Hakanson 2019	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Khan 2009	Low	Low	Low	Unclear	High	Low	Low	Low	Low	High
Koch 2012 a	Low	Low	Unclear	Unclear	Low	Low	Low	Low	Low	Low
Koch 2012 b	Low	Low	Unclear	Unclear	Low	Low	Low	Low	Low	Low
Koch 2013	Low	Unclear	Unclear	Low	Low	Low	Low	Low	Low	Low
Kubiak 2011	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low	Low	Unclear
Ludemann 2005	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Mickevicius 2008	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Mickevicius 2013	Unclear	Unclear	Low	Low	Low	Low	Low	Low	Low	Low
Mucio 2012	Low	Unclear	Unclear	Low	Low	Low	Low	Low	Low	Low
Nijjar 2010	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Qin 2013	Unclear	Unclear	Unclear	Unclear	Low	Low	Unclear	Low	Low	Unclear
Roks 2017	Unclear	Low	Low	Low	High	Low	Low	Low	Low	High
Shaw2010	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Spence 2006	Low	Low	Unclear	Low	Low	Low	Low	Low	Low	Low
Strate 2008	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Wang 2015	Low	Low	Unclear	Unclear	Low	Low	Low	Low	Low	Low
Watson 2004	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

Figure S8. Risk of bias assessments for Observa-tional studies addressing complete vs partial fundoplication for GERD.

Study	Selection	Comparability	Outcome	Final Risk of Bias
Broeders 2011	High	High	Unclear	**High**
Broeders 2012	Low	Low	Low	**Low**
Esposito 2006	High	High	Low	**High**
Fernando 2002	Low	High	Low	**High**
Goessler 2007	Low	High	Low	**High**
Gunter 2017	High	High	Low	**High**
Hoshino 2017	Low	Low	Unclear	**Unclear**
Pessaux 2005	Low	High	Low	**High**
Radajewski 2009	Low	Low	Low	**Low**
Robertson 2017	Low	Unclear	Unclear	**High**
Ruiz-Tovar 2010	High	Low	Low	**High**
Stewart 2004	Low	High	Low	**High**
Toydemir 2011	Low	High	Unclear	**High**
Wagener 2007	Low	Low	Low	**Low**
Walle 2019	High	Unclear	Low	**High**
Wykypiel 2005	Low	High	Low	**High**
Zingg 2010	Low	Low	Low	**Low**

Figure S9. Studies reporting on complications (Funnel Plot)

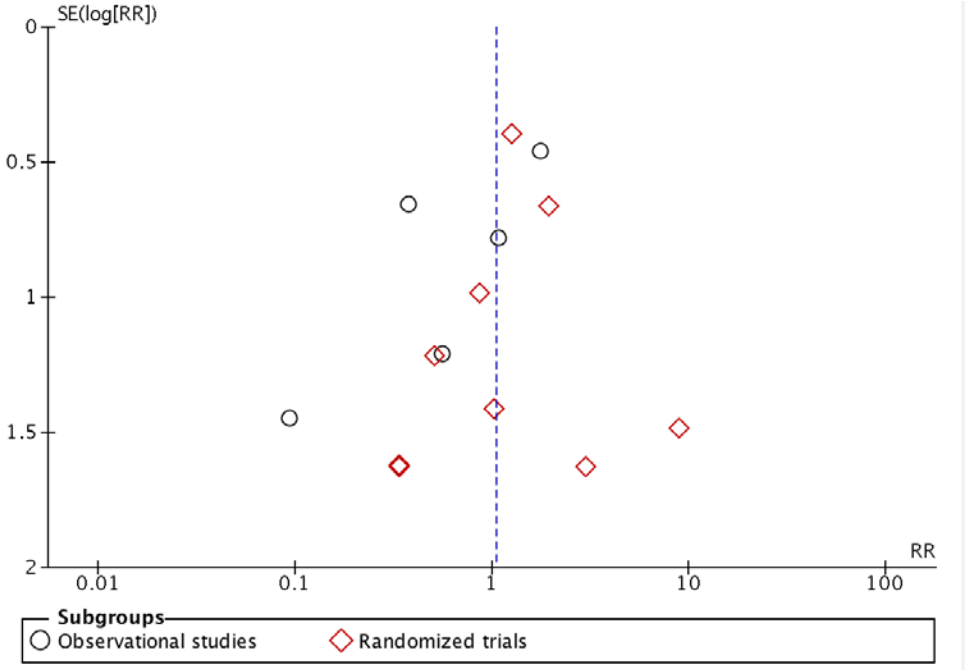


Figure S10. Studies comparing wrap failure and reoperation rates in patients undergoing partial versus complete fundoplication (Funnel Plot)

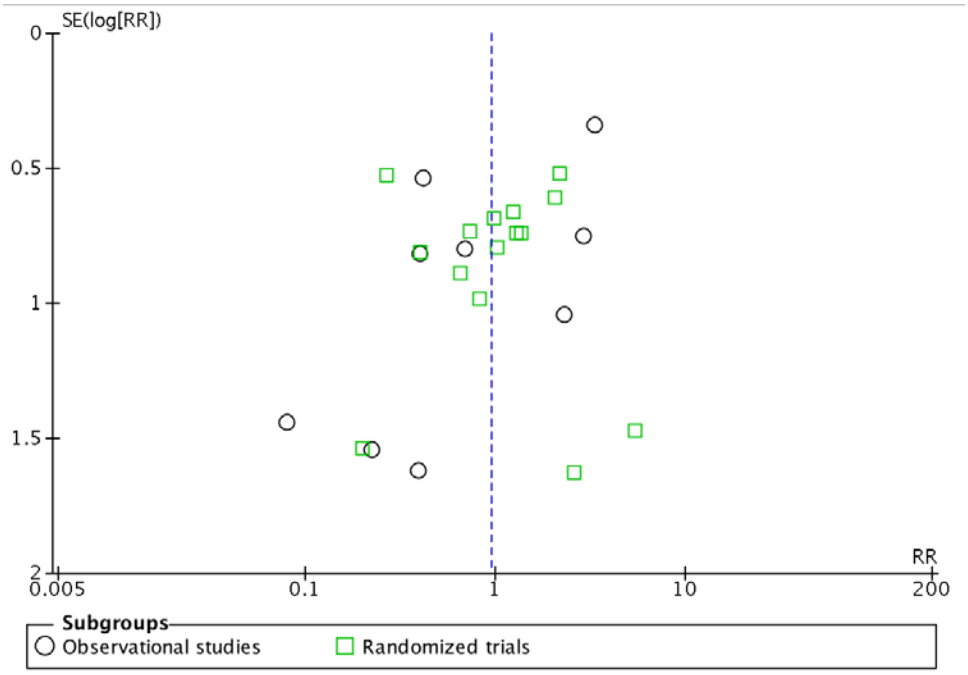


Figure S11. Studies reporting on symptom control (Funnel Plot)

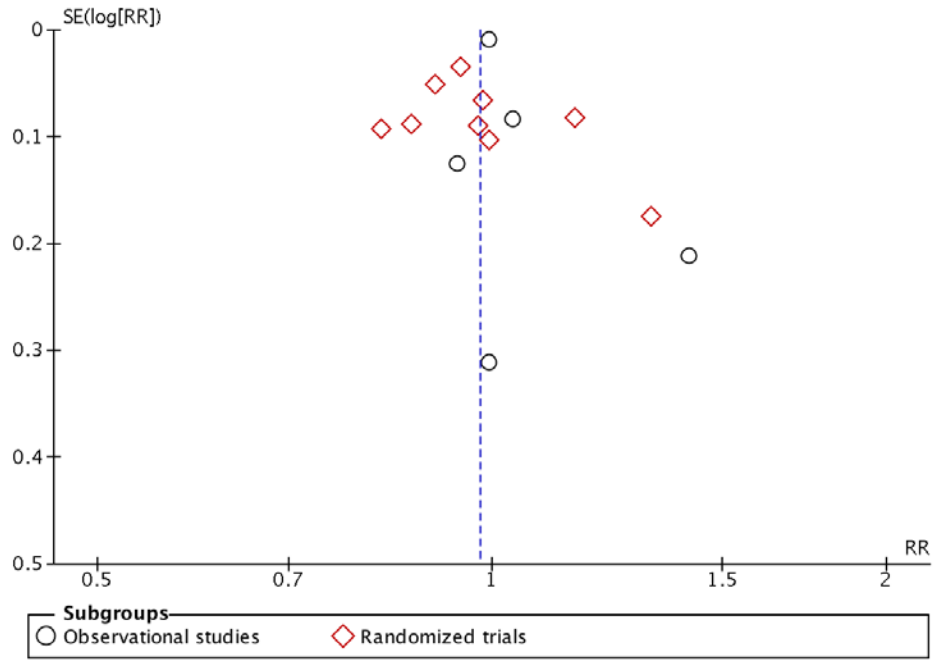


Table S4 Summary of additional outcomes comparing adult patients undergoing complete versus partial laparoscopic fundoplication.

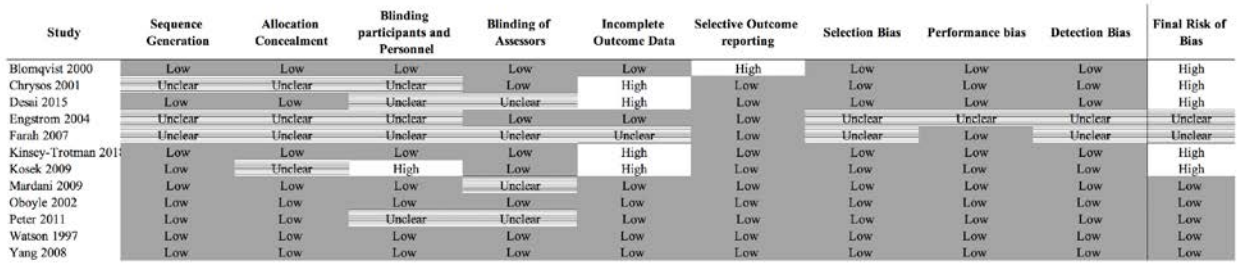
Study type	Study	N, partial fundoplication	N, complete fundoplication	Outcome	Result [95%CI]	Notes
RCTs	Wang 2015, Aye 2012, Cao 2012, Koch 2012b, Shaw 2010, Qin 2013	398	432	Post-operative Demeester score	Mean difference = 1.39, [0.97, 1.80]	Favors complete fundoplication, p=0.00001
RCTs	Broeders 2013, Djerf 2016, Khan 2009, Shaw 2010	99	99	pH normalization	Mean difference = -0.23 [-1.98, 1.53]	Favors neither, significant study heterogeneity (I^2=99%, p<0.00001)
Observa-tional	Broeders 2012, Goessler 2007	42	41	pH normalization	Mean difference = -4.95 [-12.30, 2.40]	Favors neither, significant study heterogeneity, (I^2=68%, p=0.031)
RCTs	Mickevicius 2013, Nijjar 2010, Broeders 2013, Roks 2017	189	197	Long-term gas bloat	RR=0.96 [0.77, 1.21]	Favors neither.
Observa-tional	Pessaux 2005, Wykpiel 2005	761	848	Long-term gas bloat	RR = 0.34 [0.14, 0.84]	Favors partial fundoplication, substantial study heterogeneity, (I^2=73%, p=0.06)

Table S5 - Summary of additional outcomes comparing pediatric patients undergoing complete vs partial laparoscopic fundoplication.

Study type	Study	N, partial fundoplication	N, complete fundoplication	Outcome	Risk Ratio, [95%CI]	Notes
Observa-tional	Esposito 2006, Wagener 2007	199	170	Complications, Clavien Dindo grade 3-5	RR=1.05, [0.56-1.96]	Favors neither
Observa-tional	Esposito 2006	144	94	Long term dysphagia	RR=0.49 [0.11, 2.14]	Favors neither
RCT	Kubiak 2011	82	85	Post-operative endoscopic dilation	RR =0.21, [0.05-0.92]	Favors partial fundoplication, p=0.04
Observa-tional	Wagener	55	76	Post-operative endoscopic dilation	RR=0.28, [0.01-5.62]	Favors neither
RCT	Kubiak 2011	82	85	Wrap failure	RR=2.70, [1.01,7.22]	Favors complete fundoplication , p=0.05
Observa-tional	Esposito 2006, Wagener 2007	199	170	Wrap failure	RR=1.98, [0.52,7.57]	Favors neither
RCT	Kubiak 2011	82	85	Prolonged PPI use	RR=0.75, [0.32-1.78]	Favors neither

Key Question 4 - Short gastric division and min vs max

Figure S12. Risk of bias for randomized studies comparing outcomes for patients undergoing no division versus division of the short gastric vessels in adult patients and and minimal versus maximal dissection in pediatric patients.



Study	Sequence Generation	Allocation Concealment	Blinding participants and Personnel	Blinding of Assessors	Incomplete Outcome Data	Selective Outcome reporting	Selection Bias	Performance bias	Detection Bias	Final Risk of Bias
Blomqvist 2000	Low	Low	Low	Low	Low	High	Low	Low	Low	High
Chrysos 2001	Unclear	Unclear	Unclear	Low	High	Low	Low	Low	Low	High
Desai 2015	Low	Low	Unclear	Unclear	High	Low	Low	Low	Low	High
Engstrom 2004	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Unclear	Unclear	Unclear
Farah 2007	Unclear	Unclear	Unclear	Unclear	Unclear	Low	Unclear	Low	Unclear	Unclear
Kinsey-Trotman 201	Low	Low	Low	Low	High	Low	Low	Low	Low	High
Kosek 2009	Low	Unclear	High	Low	High	Low	Low	Low	Low	High
Mardani 2009	Low	Low	Low	Unclear	Low	Low	Low	Low	Low	Low
Oboyle 2002	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Peter 2011	Low	Low	Unclear	Unclear	Low	Low	Low	Low	Low	Low
Watson 1997	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Yang 2008	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

Literature Search & Eligibility criteria

Appendix 1 - Examples of search terms

Table 4: Example Literature search for Embase for key question 1

‘gastroesophageal reflux'/mj AND ('antireflux operation'/mj OR 'antireflux operation' OR 'antireflux procedure' OR 'antireflux surgery') AND ('therapy'/mj OR 'combination therapy' OR 'disease therapy' OR 'disease treatment' OR 'diseases treatment' OR 'disorder treatment' OR 'disorders treatment' OR 'efficacy, therapeutic' OR 'illness treatment' OR 'medical therapy' OR 'medical treatment' OR 'multiple therapy' OR 'polytherapy' OR 'somatotherapy' OR 'therapeutic action' OR 'therapeutic efficacy' OR 'therapeutic trial' OR 'therapeutic trials' OR 'therapeutics' OR 'therapy' OR 'therapy, medical' OR 'treatment effectiveness' OR 'treatment efficacy' OR 'treatment, medical')
AND
(2004:py OR 2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py OR 2019:py) AND ([adult]/lim OR [aged]/lim OR [middle aged]/lim OR [very elderly]/lim OR [young adult]/lim)
plus
gastroesophageal reflux'/mj AND ('antireflux operation'/mj OR 'antireflux operation' OR 'antireflux procedure' OR 'antireflux surgery') AND ('therapy'/mj OR 'combination therapy' OR 'disease therapy' OR 'disease treatment' OR 'diseases treatment' OR 'disorder treatment' OR 'disorders treatment' OR 'efficacy, therapeutic' OR 'illness treatment' OR 'medical therapy' OR 'medical treatment' OR 'multiple therapy' OR 'polytherapy' OR 'somatotherapy' OR 'therapeutic action' OR 'therapeutic efficacy' OR 'therapeutic trial' OR 'therapeutic trials' OR 'therapeutics' OR 'therapy' OR 'therapy, medical' OR 'treatment effectiveness' OR 'treatment efficacy' OR 'treatment, medical')
AND
gastroesophageal reflux'/de AND (2004:py OR 2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py OR 2019:py) AND ([adolescent]/lim OR [child]/lim OR [infant]/lim OR [newborn]/lim OR [preschool]/lim OR [school]/lim)
plus
('barrett esophagus'/mj OR 'barrett esophagus' OR 'esophagus ulceration, barrett') AND ('antireflux operation'/mj OR 'antireflux operation' OR 'antireflux procedure' OR 'antireflux surgery') AND ('therapy'/mj OR 'combination therapy' OR 'disease therapy' OR 'disease treatment' OR 'diseases treatment' OR 'disorder treatment' OR 'disorders treatment' OR 'efficacy, therapeutic' OR 'illness treatment' OR 'medical therapy' OR 'medical treatment' OR 'multiple therapy' OR 'polytherapy' OR 'somatotherapy' OR 'therapeutic action' OR 'therapeutic efficacy' OR 'therapeutic trial' OR 'therapeutic trials' OR 'therapeutics' OR 'therapy' OR 'therapy, medical' OR 'treatment effectiveness' OR 'treatment efficacy' OR 'treatment, medical')
AND

barrett esophagus'/de AND (2004:py OR 2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py) AND ([adult]/lim OR [aged]/lim OR [middle aged]/lim OR [very elderly]/lim OR [young adult]/lim)
plus
('barrett esophagus'/mj OR 'barrett esophagus' OR 'esophagus ulceration, barrett') AND ('antireflux operation'/mj OR 'antireflux operation' OR 'antireflux procedure' OR 'antireflux surgery') AND ('therapy'/mj OR 'combination therapy' OR 'disease therapy' OR 'disease treatment' OR 'diseases treatment' OR 'disorder treatment' OR 'disorders treatment' OR 'efficacy, therapeutic' OR 'illness treatment' OR 'medical therapy' OR 'medical treatment' OR 'multiple therapy' OR 'polytherapy' OR 'somatotherapy' OR 'therapeutic action' OR 'therapeutic efficacy' OR 'therapeutic trial' OR 'therapeutic trials' OR 'therapeutics' OR 'therapy' OR 'therapy, medical' OR 'treatment effectiveness' OR 'treatment efficacy' OR 'treatment, medical' OR 'proton pump inhibitor'/mj OR 'gastric proton pump inhibitor' OR 'hydrogen potassium adenosine triphosphatase inhibitor' OR 'hydrogen potassium atpase inhibitor' OR 'proton pump inhibitor' OR 'proton pump inhibitors')
AND
barrett esophagus'/de AND (2004:py OR 2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py) AND ([adult]/lim OR [aged]/lim OR [middle aged]/lim OR [very elderly]/lim OR [young adult]/lim) AND 'proton pump inhibitor'/de

Table 5: Example PubMed search for KQ1

(((Gastrointestinal[All Fields] AND Reflux[All Fields] AND ("surgery"[Subheading] OR "surgery"[All Fields] OR "surgical procedures, operative"[MeSH Terms] OR ("surgical"[All Fields] AND "procedures"[All Fields] AND "operative"[All Fields]) OR "operative surgical procedures"[All Fields] OR "surgery"[All Fields] OR "general surgery"[MeSH Terms] OR ("general"[All Fields] AND "surgery"[All Fields]) OR "general surgery"[All Fields]) AND (("therapy"[Subheading] OR "therapy"[All Fields] OR "therapeutics"[MeSH Terms] OR "therapeutics"[All Fields]) OR ("pharmaceutical preparations"[MeSH Terms] OR ("pharmaceutical"[All Fields] AND "preparations"[All Fields]) OR "pharmaceutical preparations"[All Fields] OR "medication"[All Fields]))) AND ("2004/01/01"[PDAT] : "3000/12/31"[PDAT]))
OR
(((("Gastroesophageal Reflux/surgery"[Majr:NoExp] OR "Gastroesophageal Reflux/therapy"[Majr:NoExp]))) AND "antireflux surgery") AND (("2004/01/01"[PDat] : "2019/12/31"[PDat]) AND Humans[Mesh] AND ((infant[MeSH] OR child[MeSH] OR adolescent[MeSH]) OR infant[MeSH]))))
OR
((((("Barrett Esophagus/surgery"[Majr:NoExp] OR "Barrett Esophagus/therapy"[Majr:NoExp]))) AND "antireflux surgery") AND (("2004/01/01"[PDat] : "2019/12/31"[PDat]) AND Humans[Mesh] AND (adult[MeSH] OR adult[MeSH:noexp] OR aged[MeSH]))))

OR
(((("Barrett Esophagus/surgery"[Majr:NoExp] OR "Barrett Esophagus/therapy"[Majr:NoExp]))) AND "antireflux surgery")) OR (((("Barrett Esophagus/surgery"[Majr:NoExp] OR "Barrett Esophagus/therapy"[Majr:NoExp]))) AND "Proton Pump Inhibitors"[Majr:NoExp])) AND (("2004/01/01"[PDat] : "2019/12/31"[PDat]) AND Humans[Mesh] AND (adult[MeSH] OR adult[MeSH:noexp] OR aged[MeSH]))))

NOT ("address"[Publication Type] OR "autobiography"[Publication Type] OR "bibliography"[Publication Type] OR "biography"[Publication Type] OR "book illustrations"[Publication Type] OR "case reports"[Publication Type] OR "classical article"[Publication Type] OR "clinical conference"[Publication Type] OR "clinical trial, veterinary"[Publication Type] OR "collected work"[Publication Type] OR "comment"[Publication Type] OR "congress"[Publication Type] OR "consensus development conference"[Publication Type] OR "consensus development conference, nih"[Publication Type] OR "corrected and republished article"[Publication Type] OR "dataset"[Publication Type] OR "dictionary"[Publication Type] OR "directory"[Publication Type] OR "duplicate publication"[Publication Type] OR "editorial"[Publication Type] OR "ephemera"[Publication Type] OR "expression of concern"[Publication Type] OR "festschrift"[Publication Type] OR "government document"[Publication Type] OR "historical article"[Publication Type] OR "interactive tutorial"[Publication Type] OR "interview"[Publication Type] OR "lecture"[Publication Type] OR "legal case"[Publication Type] OR "legislation"[Publication Type] OR "letter"[Publication Type] OR "news"[Publication Type] OR "newspaper article"[Publication Type] OR "patient education handout"[Publication Type] OR "periodical index"[Publication Type] OR "personal narrative"[Publication Type] OR "pictorial work"[Publication Type] OR "portrait"[Publication Type] OR "retracted publication"[Publication Type] OR "retraction of publication"[Publication Type] OR "review"[Publication Type] OR "scientific integrity review"[Publication Type] OR "study characteristics"[Publication Type] OR "support of research"[Publication Type] OR "video audio media"[Publication Type] OR "webcasts"[Publication Type]))