Robotic approach to paraesophageal hernia repair reduces long-term recurrence rates

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Abstract category: stomach-malignant or benign OR new technologies

Background: Recurrence rates for hiatal hernia repairs remains unacceptably high; as much as 56% in multi-center prospective trials. Robotic-assisted paraesophageal hernia (RPEH) repair offers a promising alternative to the traditional laparoscopic approach with improved mediastinal dissection and visualization, increased surgical dexterity, and enhanced surgeon ergonomics. However, the clinical effect of these potential advantages remains unknown. Here we describe the largest long-term study of the outcomes of patients undergoing RPEH.

Methods: This prospective study analyzed adult patients who underwent RPEH repair from 2009 to 2016 at a tertiary academic medical center. Long-term post-operative outcomes included radiographic evidence of PEH recurrence at 1 and 3 years post-operatively (as defined by an independent radiologist as >2cm); GERD-HRQL score; and PPI use.

Results: A total of 223 patients underwent RPEH repair during the study period. There was a relatively equal distribution of repair type (primary repair: 44% (89/223), recurrent repair: 56% (134/223)). A predominance of type III PEH were encountered and repaired (Type II: 4/223 (2%), Type III: 177/223 (79%), Type IV: 42/223 (19%)). At 1-year post-operatively, 152/223 (68%) of patients were available for follow-up and a radiographic recurrence rate of 3% (5/152) was seen. At 3-years post-operatively, 105/223 (47%) were available for follow-up and a radiographic recurrence rate of 8% (8/105) was seen.

Conclusion: This study presents the long-term outcomes of one of the largest robotic foregut surgical databases. The robotic approach to PEH repair can yield lower recurrence rates, in both primary and redo repairs. This may be due to extensive mediastinal dissection that is facilitated

with the robotic instrumentation as well as the lower pneumoperitoneum that is needed to maintain adequate visualization. Additional follow-up studies will help to determine if this benefit is sustained long-term.

Does Ineffective Esophageal Motility Have an Impact on Long-Term Outcomes Following Collis Gastroplasty and Fundoplication?

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Introduction: The impact of ineffective esophageal motility(IEM) on postoperative outcomes in patients undergoing repair of giant paraesophageal hernia(PEH) with Collis gastroplasty(CG) for short esophagus is not well-known. This study compares outcomes between patients with IEM and normal motility(NM) following PEH repair, fundoplication and CG.

Methods: From 2003-2018, an institutional database was studied to evaluate early post-operative(<4 weeks) and longer-term outcomes of patients who had pre-operative high resolution manometry(HRM) and had CG with and without IEM(DCI $\leq$ 450 or $\geq$ 50% abnormal peristalsis). Demographics, pre/post-operative symptoms, length of stay(LOS), complications, and Quality of Life(QOL) data were studied utilizing the gastroesophageal reflux disease health-related QOL survey(GERD-QOL). Chi-square and fisher's exact tests were used to determine differences between groups.

Results: A total of 142 patients were identified; 36(25%) had IEM and 106(75%) had NM. Median long-term follow-up was 4.8 years. 25(70%) and 11(30%) patients with IEM underwent a partial and total fundoplication, respectively. A significant difference in preoperative regurgitation was found(IEM/normal; 29(80%)/51(48%), p=0.04). There was no difference in early postoperative symptomatology or complications between patients with IEM and NM. Patients with IEM demonstrated significant improvement in dysphagia, regurgitation, chest pain($p<0.0001$, $p<0.0001$, $p<0.03$, respectively). LOS was similar between groups(IEM/normal; 4.0/4.9 days, p=0.1). There was no difference in symptomatology, complications and LOS in patients with IEM undergoing partial vs. total fundoplication. At early and longer-term follow-up HRQL scores improved in all patients(IEM pre/post HRQL 19/1, p=0.0001 and NM 16/3, p=0.0004). There was no difference in mean HRQOL scores between the IEM and NM groups at long term follow-up(p=0.12)(Figure 1). There was no difference in HRQL scores at longer-term follow-up between patients with IEM who underwent partial versus total fundoplication(8.5 vs. 1.6, p=0.07). At longer-term follow-up, 37% of patients with IEM and 35% of patients with NM were using acid reduction therapy(ns).

Conclusion: CG and fundoplication can be performed safely in patients with IEM and giant PEH with excellent post-operative outcomes.

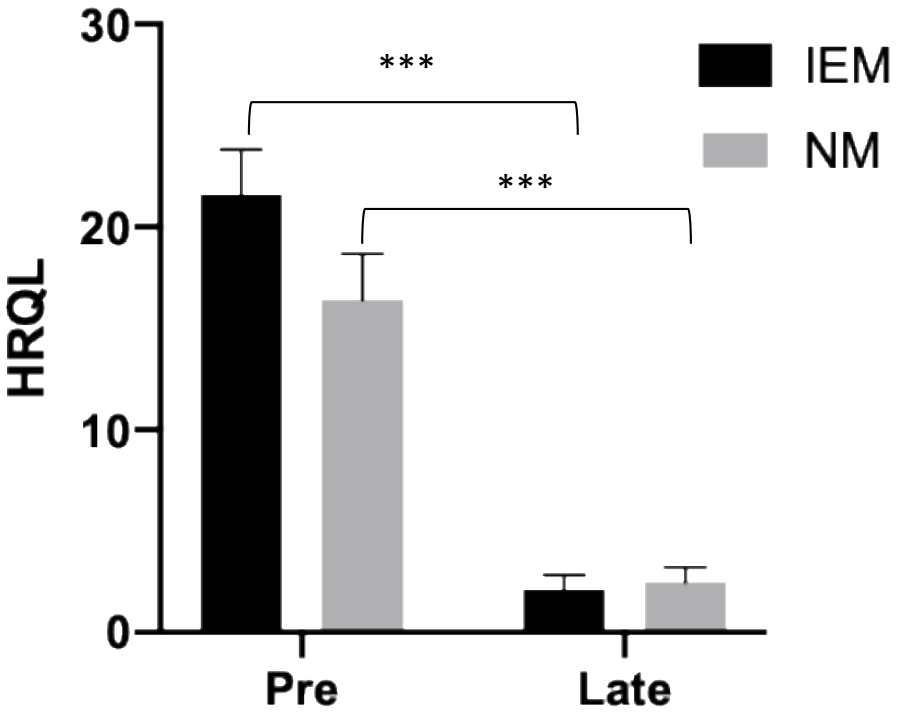

Figure 1: HRQL scores in patients with IEM and NM at early(pre) and longer-term follow up(late).

Larger Sizing of the Magnetic Sphincter Augmentation LINX® Device Reduces Need for Endoscopic Dilation or Device Removal

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Background

Magnetic sphincter augmentation (MSA) is an effective surgical option for gastroesophageal reflux disease (GERD), with long-term data supporting its safety. Nevertheless, postoperative dysphagia necessitating dilation has a prevalence of up to 30%. Our group increased the relative size of the LINX® device used on each patient beginning January 1, 2018. We hypothesized that this change would reduce post-operative interventions without affecting efficacy of the device.

Methods

All LINX® implantation procedures performed at two tertiary care institutions were retrospectively reviewed. Background demographics, preoperative GERD workup variables, including the GERD health-related quality of life (GERD-HRQL) score, and postoperative outcomes were reviewed. Larger sizing was defined as three sizes greater than the point at which the magnetic bond on the sizing device broke, ie “three over pop” versus the standard “2 over pop.” Chi square tests were used for categorical variables. T-test or Kruskal-Wallis rank sum test were used for continuous variables depending on distribution. A multivariable logistic regression model was created to assess need for postoperative endoscopic dilation.

Results

Demographics, preoperative, and postoperative details comparing the two cohorts are shown in Table 1. There was no difference in operative times between the two groups (1.68 vs 1.57 hours). The mean follow-up was longer in the larger device group (595 vs 127 days, $p<0.001$). On multivariable regression, device sizing, preoperative dysphagia, and concurrent hiatal hernia repair were found to be significant predictors of postoperative dilation (Table 2).

Table 1: Demographics and Outcomes

Variable	Larger LINX®	Smaller LINX®	p-value
n	167	517	
Age, years (mean (SD))	54.83 (14.72)	55.05 (15.73)	0.89
Male Gender (n (%))	73 (55.3)	247 (53.5)	0.783
Body Mass Index (mean (SD))	24.08 (11.44)	22.61 (10.63)	0.156
Follow Up in Days (mean (SD))	126.90 (140.48)	594.69 (566.60)	**<0.001**
Preop Dysphagia (n (%))	53 (43.4)	167 (36.6)	0.203
Preop Demeester Score (mean (SD))	40.12 (24.56)	45.27 (27.84)	0.653
Preop HRQL Score (mean (SD))	26.21 (12.39)	18.66 (8.39)	**<0.001**
Postop HRQL Score (mean (SD))	8.95 (9.60)	11.84 (14.74)	0.301
PPI Usage at Last Follow up (n (%))	5 (12.5)	101 (22.1)	0.222
Postop Dilation (n (%))	18 (13.4)	101 (22.4)	**0.032**
Device Removal (n (%))	3 (1.8)	47 (9.1)	**0.003**

Table 2: Multivariable Logistic Regression Model Examining Need for Dilation

Variable	Odds Ratio (95% Confidence Interval)	p-value
Preoperative Dysphagia	2.83 (1.12-7.46)	0.01
Concurrent Hiatal Hernia Repair	0.358 (0.126-1.06)	0.055
Smaller MSA	3.31 (1.17-9.16)	0.02

Conclusion

Use of a larger-sized LINX® device is associated with decreased postoperative endoscopic dilations and device explantations while maintaining similar effectiveness for reflux control.

Title: Collis Gastoplasty Reduces PEH Recurrence Rates

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Background
Hernia recurrence after paraesophageal hernia (PEH) repair remains a common problem. Tension on the repair likely contributes to the high rate of hernia recurrence. Collis gastroplasty (CG) addresses the axial tension by lengthening a foreshortened esophagus. The aim of this study was to evaluate whether CG reduces recurrence rates after PEH repair.

Methods
All patients undergoing elective PEH repair between January 2016 and December 2018 were reviewed. Cruroplasty was performed using resorbable mesh. CG was performed using a wedge fundectomy technique at the discretion of the operating surgeon. Patients who underwent CG were offered an EGD at 3 months to assess for esophagitis. All patients had an UGI at 1 year. Patients without follow up EGD or UGI were excluded. Recurrences were determined by EGD or UGI and defined as any size hernia.

Results
The study group was 245 patients and 86 underwent CG (35%). There were no post-operative leaks related to the CG. The median follow-up was 12 months. At 3-month endoscopy, 19 CG patients (22%) had esophagitis; 9 LA Grade A, 5 Grade B, 4 Grade C, and 1 Grade D. Only 5 patients (26%) with esophagitis reported dysphagia. Of the 19 patients with esophagitis, 11 had a subsequent endoscopy; 7 had improvement or resolution on PPIs, 3 were stable and 1 worsened. There were significantly fewer recurrences in patients that had a CG (6/86 [7%] vs 37/159 [23%], $p = 0.016$). Esophagitis was not associated with hernia recurrence.

Conclusions
Collis gastroplasty led to fewer hernia recurrences and is recommended when esophageal length is inadequate. High recurrences rates in patients without CG suggest that esophageal shortening is likely underappreciated in this patient population. Approximately a fifth of patients will have esophagitis after CG and endoscopy post-op is recommended since a minority of patients will report symptoms.

Endoluminal functional lumen imaging probe (EndoFLIP) for Post-POEM follow-up: A prospective study evaluating clinical success and distensibility index

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Background:
Clinical improvement after Per-Oral Endoscopic Myotomy (POEM) can be measured by Eckardt score (ES) and with objective data from high-resolution esophageal manometry (HRM) and/or a timed barium esophagram, both of which have poor patient tolerance and compliance. Endoluminal functional lumen imaging probe (EndoFLIP) is an alternative diagnostic modality that has a potential role in post-POEM follow-up. The aim of this study was to assess the distensibility index (DI) on EndoFLIP after POEM and 2) correlation between ES and DI.

Methods:
This was a prospective study of patients from 11/2017-11/2019 who had EndoFLIP assessment after POEM. The 16-cm EndoFLIP-322N balloon catheter was advanced across the gastro-esophageal junction under endoscopic guidance and the balloon distended to 60mL where DI and diameter were measured. DI >2.8 mm^2/mm Hg was considered as adequate treatment. Clinical success of POEM was defined as post procedure ES $\leq$3 with a dysphagia component $\leq$2. Pre and post POEM ES were compared using a paired t-test.

Results:
33 patients were enrolled in the study **(Table).** Clinical success after POEM was 97% (32/33) with significant improvement in ES (mean decreased from 6.91 $\pm$ 1.94 pre-POEM to 0.88 $\pm$ 0.99 post-POEM, p<0.001). 30 patients (91%) achieved a post procedure DI >2.8. Reflux esophagitis was seen in 12/33 (36%) patients and there was no difference in mean DI in those with versus without esophagitis (5.73 $\pm$ 1.81 versus 5.22 $\pm$ 1.88, p=0.78.) There were two (6.1%) adverse events related to POEM (ER visit for chest pain with negative workup) and none associated with EndoFLIP.

Conclusions:
These results suggest that sedated upper endoscopy with EndoFLIP may be useful in evaluating response to POEM and examining for esophagitis. Additional data, specifically for patients with clinical failures, are needed to elucidate if ES correlates with DI.

Table. Characteristics of individuals who underwent POEM and subsequent EndoFLIP

Baseline Characteristics (n=33)	
Female sex, n (%)	18 (54.55)
Age, years, mean (range)	54.12 (22-82)
Indication, n (%) Type I achalasia Type II achalasia Type III achalasia Esophago-gastric junction outflow obstruction	 4 (12.12) 19 (57.58) 6 (18.18) 4 (12.12)
Integrated Relaxation Pressure, mm Hg, median (IQR)	29 (22.2, 35.5)
Prior Achalasia Treatment, n (%) None Pneumatic Dilation Botulinum toxin injection Surgical Heller myotomy	 21 (63.64%) 2 (6.06%) 5 (15.15%) 5 (15.15%)
Eckardt Score, mean ± SD	6.91 ± 1.94
Eckardt Score, median (IQR)	7 (6,8)
Adverse Events	2 (6.06%)*
Post Intervention Characteristics (n=33)	
Eckardt Score, mean ± SD	0.88 ± 0.99
Eckardt Score, median (IQR)	1 (0,2)
Clinical Success, n (%)	32 (97%)
Time to EndoFLIP, days, median (IQR)	92 (87,99)
Reflux esophagitis (LA Grade), n (%) None A B C D	 21 (63.64) 4 (12.12) 5 (15.15) 1 (3.03) 2 (6.06)
EGJ Distensibility Index, 60mL mm^2/mm Hg, mean ± SD	5.41 ± 1.84
Minimum Diameter at 60mL, mm, mean ± SD mm	12.12 ± 1.84

*Emergency room visit for chest pain with negative workup