Quantifying Physiologic Parameters of the Gastroesophageal Junction During Reoperative Anti-Reflux Surgery

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INTRODUCTION

Hiatal hernia re-approximation during index anti-reflux surgery (ARS) contributes approximately 80% of overall change in distensibility index (DI) and, potentially, compliance of the gastroesophageal (GEJ) while sphincter augmentation contributes approximately 20%. It is unclear whether these characteristics are seen in re-intervention ARS. We aim to quantify the physiologic parameters of the GEJ at each step of robotic reoperative ARS and compare these to index ARS.

METHODS

Robotic ARS with hiatal hernia repair was performed on 198 consecutive patients with pathologic reflux utilizing EndoFLIP™ technology, of which 29 previously had an anti-reflux procedure. Intraoperative EGJ measurements, including cross-sectional area (CSA), pressure, distensibility index (DI), and high-pressure zone (HPZ) length were collected pre-repair, post-diaphragmatic re-approximation, post-mesh placement, and post-lower esophageal sphincter (LES) augmentation.

RESULTS

The two cohorts were similar in age, sex, and BMI and underwent similar surgical procedures. The reoperative cohort had higher rates of pre-operative dysphagia (62.1% vs 42.6%, p=0.05) and esophageal dysmotility on barium swallow (66.7% vs 35.0%, p=0.002) but lower rates of hiatal hernia on endoscopy (34.5% vs 68.7%, p<0.001) compared to index procedures. Among the reoperative cohort, the CSA decreased by -27 (IQR -65,-15) mm^2 and and DI by -1.1 (IQR-2.4, 0.7) mm^2/mmHg, respectively (p<0.001). Pressure increased by 14.6 (IQR 4.7, 17.1) mmHg and HPZ increased by 1.5 (IQR 1,2)(both p<0.001). These changes were similar to those seen in the index cohort. Diaphragmatic re-approximation contributed to a greater percentage of overall change to the GEJ than did the augmentation procedure, with 72% of the change in DI occurring during hiatal closure, similar to that seem in index ARS.

CONCLUSIONS

During reoperative ARS, dynamic intraoperative monitoring can quantify the effects of each operative step on GEJ physiologic parameters. Diaphragmatic re-approximation appears to have a greater effect on GEJ physiology than does LES sphincter augmentation during both index and reoperative ARS. Ongoing investigation into the utility of EndoFLIP™ during anti-reflux surgery is warranted to optimize patient outcomes.

Patient Perioperative Characteristics			
Prior GEJ Intervention, n (%)	Index ARS (n=169)	Reoperative ARS (n=29)	P-Value
Fundoplication/ HH repair	0 (0)	26 (89.7)	
TIF	0 (0)	1 (3.4)	
Stretta	0 (0)	2 (6.9)	
Demographics			
Mean Age (yrs) ± STD	52.7 ± 16.2	58.6 ± 15.8	0.11
Body Mass Index (kg/m²) ± STD	27.6 ± 0.4	27.2 ± 1.0	0.67
Female, n (%)	96 (56.8)	18 (62.1)	0.60
Symptoms, n (%)			
Typical	152 (89.9)	28 (96.6)	0.25
Atypical	51 (30.4)	10 (34.5)	0.66
Bloat	30 (18.1)	3 (10.7)	0.34
Dysphagia	72 (42.6)	18 (62.1)	0.05
Manometry findings			
Median LES length (cm)	2.1 (1.7-2.5)	2.3 (1.9-2.8)	0.18
Median LES pressure (mmHg)	18.4 (9.8-29.4)	17.4 (10-20.4)	0.35
Hiatal hernia, n (%)	53 (40.8)	11 (35.4)	0.16
Median hiatal hernia size (cm)	1.2 (0.8-2.6)	0.6 (0.4-1.7)	0.46
Median distal contractile integral (mm Hg-s-cm)	1169.4 (560.9-1946.9)	1172.8 (557-2025.6)	0.83
Barium swallow, n (%)			
Reflux	81(66.8)	14 (50)	0.18
Hiatal Hernia	77 (61.6)	16 (59.3)	0.82
Dysmotility	43 (35.0)	18 (66.7)	0.002
Endoscopy Findings, n (%)			
Esophagitis	100 (60.6)	11(37.9)	0.023
Barrett's	20 (12.1)	4 (13.8)	0.80
Hiatal Hernia	112 (68.7)	10 (34.5)	<0.001
Operative characteristics, n (%)			
Hill	33 (19.5)	7 (24.4)	0.57
Nissen	46 (27.2)	5 (17.2)	0.26
Toupet	76 (45.0)	17 (58.6)	0.17
Dor	1 (0.6)	0 (0)	0.68
Linx	13 (7.7)	0 (0)	0.12
Collis	9 (5.3)	0 (0)	0.21
Mesh	166 (95.4)	25 (86.2)	0.04
Relaxing incisions	7 (4.2)	0 (0)	0.55

Figure 1: Lower Esophageal Sphincter Parameters Through Reoperative Anti-Reflux Surgery

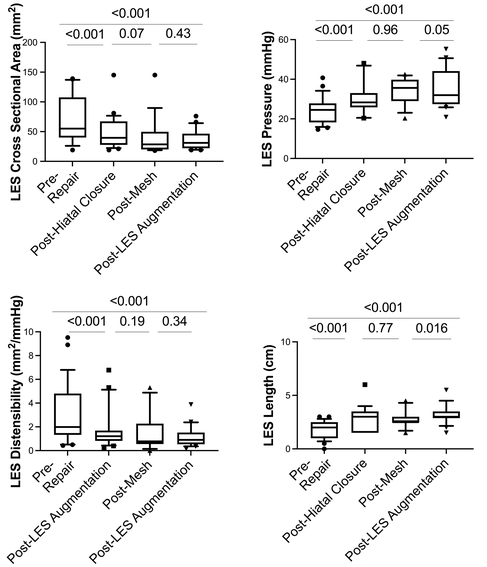
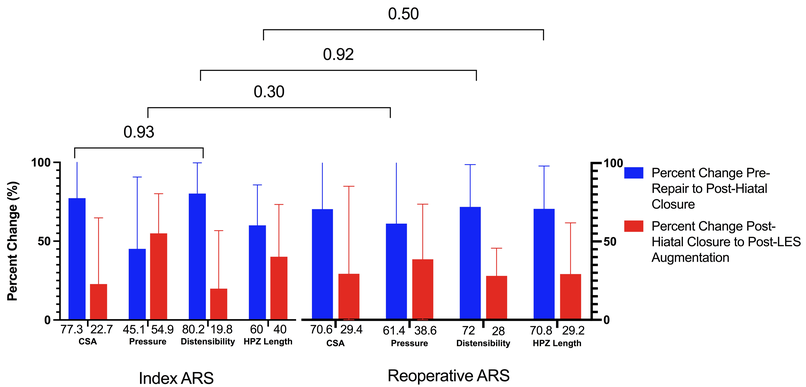


Figure 2: Percent Change in LES Parameters During Anti-Reflux Surgery



References and Affiliations

Stefanova DI et al. Quantifying Factors Essential to the Integrity of the Esophagogastric Junction During Antireflux Procedures. Ann Surg. 2020.

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