Ratio of Lower Esophageal Sphincter to Mid-Esophageal Diameter based on Upper Gastrointestinal Study as an Adjunct in the Evaluation of Reflux

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BACKGROUND

- Gastroesophageal reflux disease (GERD) is a commonly encountered chronic condition, and for severe or refractory GERD, anti-reflux surgery is a valuable treatment option.
- The utility of upper gastrointestinal series (UGI) in the pre-operative workup for anti-reflux surgery has been challenged.
- We believe the UGI can provide additional anatomic information not provided by other modalities.
- We studied the ratio of lower esophageal sphincter diameter to the mid-esophageal diameter (LESME ratio) in patients undergoing concomitant hiatal hernia repair and transoral incisionless fundoplication (cTIF).
- We hypothesize that the LESME ratio correlates with other pre-operative evaluations for anti-reflux surgery.

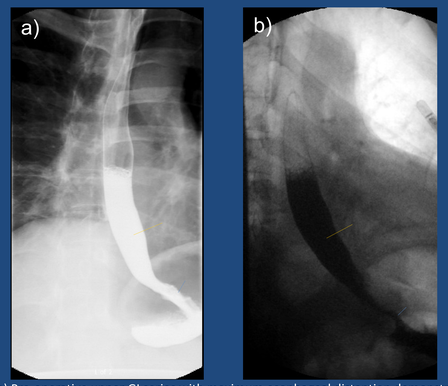
METHODS

- A single institution retrospective study was performed on patients undergoing cTIF.
- Inclusion criteria included patients undergoing cTIF who had completed pre- and post-operative UGI, upper endoscopy, and pH monitoring.
- Determination of lower esophageal sphincter and mid-esophageal diameters were performed by taking the mean of 3 measurements on images with greatest distension of the esophagus and GE junction.
- Pearson correlation and chi-squared tests were performed to determine correlation between LESME ratio and Hill grade, DeMeester score, and LA grade of esophagitis.

PATIENT DEMOGRAPHICS

Demographics	
Age, year, median (IQR)	56 (52-64)
Male, n (%)	6 (40%)
BMI, kg/m2, median (IQR)	27.8 (25.8-33.2)
Comorbidities, n (%)	
HTN	5 (33.3%)
CAD	1 (6.7%)
DM	1 (6.7%)
Smoker	3 (20%)
GERD characteristics, n (%)	
Dysphagia	5 (33.3%)
Hill Grade	
2	4 (26.7%)
3	5 (33.3%)
4	5 (33.3%)
unspecified	1 (6.7%)
DeMeester, median (IQR)	48.7 (37.9, 60.2)
LA Esophagitis	
A	4 (26.7%)
B	4 (26.7%)
C	1 (6.7%)
D	0 (0%
unspecified	6 (40%)

PRE- AND POST-OPERATIVE UPPER GI SERIES



a) Pre-operative upper GI series with maximum esophageal distention demonstrated by yellow dotted line, and gastroesophageal junction demonstrated by blue dotted line. b) Post-operative upper GI series with similar measurements demonstrated.

OUTCOMES

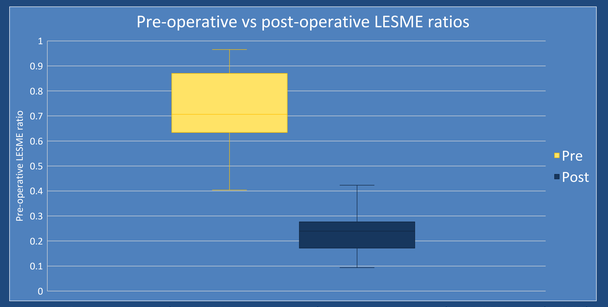


Figure 1: Pre-operative median LESME ratio compared to post-operative median LESME ratio. (p<0.01)

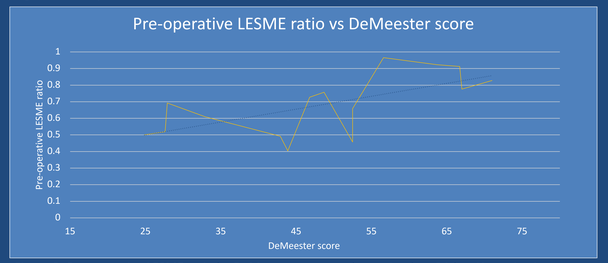


Figure 2: Pre-operative LESME ratio by DeMeester score as determined on 24-hr pH monitoring, depicted by the yellow line. Dotted blue line depicts line of best-fit. (r = 0.65, p< 0.01)

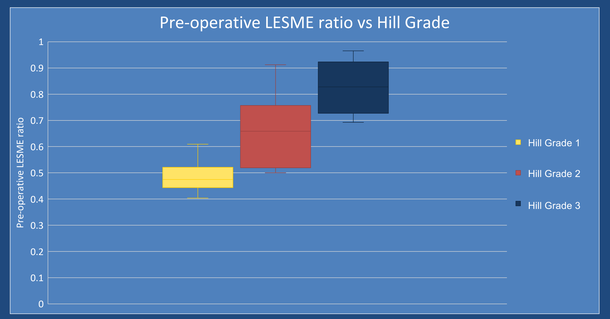


Figure 3: Comparison of pre-operative LESME ratio by Hill Grade as determined on upper endoscopy (p = 0.017)

RESULTS

- 15 patients met inclusion criteria and were included in this study.
- The post-operative LESME ratio was significantly smaller than the pre-operative LESME ratio (0.69 vs 0.23, p<0.01), a reduction of 67.5%.
- Pre-operative LESME ratio was significantly positively correlated with patient's DeMeester score (r = 0.65, p<0.01).
- Pre-operative LESME ratio also was significantly positively correlated with patients' Hill Grade (p = 0.017).

CONCLUSIONS

- The LESME ratio provides additional anatomic information that can be used in the surgical evaluation of GERD.
- A LESME ratio > 0.5 suggests a patulous esophagus that can benefit from anti-reflux surgery.
- Pre-operative LESME ratio correlates with other modalities commonly used in the pre-operative workup of reflux such as DeMeester score and Hill Grade.
- The LESME ratio can be used in conjunction with these modalities as an additional metric in the evaluation of GERD.