Impedance planimetry (EndoFLIP) after Hill compared to Toupet

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Introduction

Endoluminal functional lumen imaging probe (EndoFLIP) has been used to provide objective measurements of the gastroesophageal junction during anti-reflux Nissen and Toupet fundoplication. However, there is limited data on EndoFLIP measurements during Hill fundoplication. We aim to describe our institutional experience in performing EndoFLIP during Hill fundoplication and to compare these measurements to those obtained during Toupet fundoplication.

Method

A retrospective chart review of a prospectively maintained database was performed. Patients who underwent an index Hill or Toupet fundoplication and intraoperative EndoFLIP between October 2017 and August 2022 were included. Intra-operative EndoFLIP measurements of the lower gastroesophageal junctior (GEJ) included cross sectional surface area (CSA), intra-balloon pressure, high pressure zone length (HPZ), and distensibility index (DI). These were obtained at 10mmHg of pneumoperitoneum and 30 m balloon fill volume of a 325 Endoflip balloon at three distinct time points: pre-procedure, post hiatal hernia repair, and post fundoplication.

Results

Table 1: Patient demographic and operative details

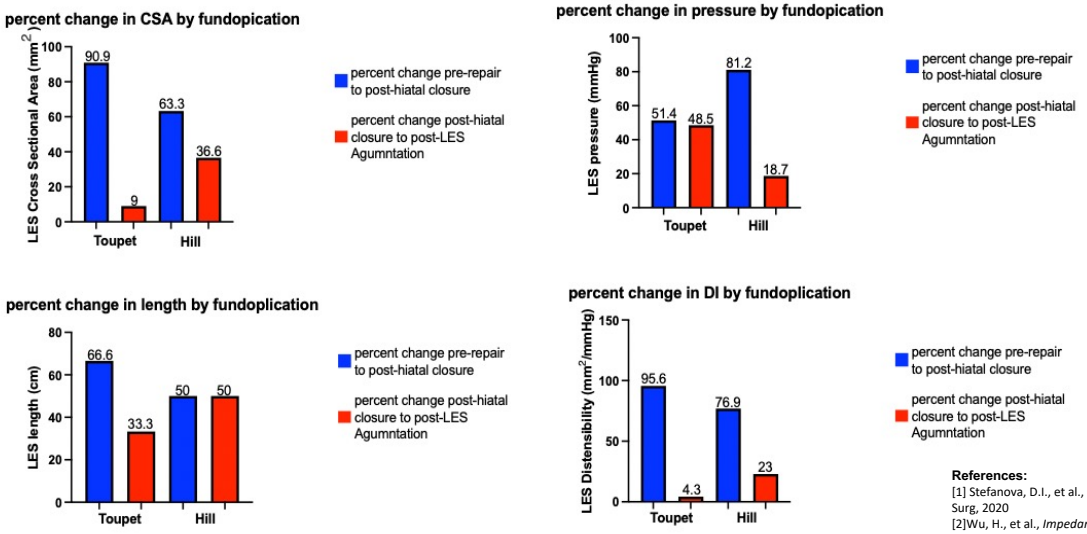
Subjects (n)	Toupet (n = 154)	Hill (n = 60)	p-value
Mean Age at surgery (yrs) (SD)	55.15±16.79	46.42±16.45	0.0007
Female, *n* (%)	85 (55.1)	34 (56.6)	0.84
Median body Mass Index (kg/m2) (IQR)	27.1 (24.3-30.4)	25.3 (22.4-28.4)	0.07
Mean GERD-HRQL score (SD)	36.5±19.1	36.2±17.7	0.99
Symptoms, *n* (%)			
Typical	140 (90.9)	55 (91.6)	0.86
Atypical	66 (42.8)	29 (28.3)	0.46
Intra-operative characteristics			
Collis procedure, n (%)	17 (11)	0 (0)	0.001
Mesh use, n (%)	114 (74)	58 (96.6)	0.0002
Relaxing incisions, n (%)	12 (7.7)	0 (0)	0.02
Mean Intra-operative HH size (SD)	3.6±1.2	3.5±0.8	0.77
Median length of stay (days) (IQR)	0 (0-1)	1 (0-2)	0.44

Table 2: Median LES parameters through surgery

	Toupet	Hill	p-value
Pre-repair			
Cross-sectional area (mm2)	74 (52-105)	69 (46.5-93.5)	0.23
Pressure (mmHg)	20 (17.1-28.3)	21 (17.3-24.9)	0.95
High-pressure zone (cm)	1.5 (1-2)	2 (1-2)	0.6
Distensibility (mm2/mmHg)	3.5 (2.1-5.4)	3.4 (2.1-4.8)	0.31
Post-hiatal hernia repair			
Cross-sectional area (mm2)	44 (28-62)	40.5 (27-52.2)	0.67
Pressure (mmHg)	27.1 (22.9-31.9)	27.5 (22.7-30.4)	0.9
High-pressure zone (cm)	2.5 (2-3)	2.5 (2-3)	0.43
Distensibility (mm2/mmHg)	1.3 (0.9-2.4)	1.4 (1.1-1.9)	0.98
Post-fundoplication			
Cross-sectional area (mm2)	41 (28-54.5)	24 (19-32.2)	<0.0001
Pressure (mmHg)	33.8 (27.2-39.1)	29 (24.7-33.6)	0.0005
High-pressure zone (cm)	3 (3-3.5)	3 (2.5-3)	0.19
Distensibility (mm2/mmHg)	1.2 (0.8-1.6)	0.8 (0.6-1.1)	0.001

Median presented as IQR

Figure 1: Percent change in LES parameters through surgery



Conclusion

The Hill procedure significantly lowers the GEJ's CSA and DI when compared to Toupet. Further studies evaluating the clinical correlation with outcomes is warranted and may dictate intraoperative targets

References:

[1] Stefanova, D.I., et al., *Quantifying Factors Essential to the Integrity of the Esophagogastric Junction During Antireflux Procedures.* Ann Surg, 2020

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