The Role of Surgery in GERD

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Objectives

1. Brief History of Surgical Treatment of GERD
2. Fundoplications-the good and the bad
3. Magnetic Sphincter Augmentation
4. Understanding the importance of the diaphragmatic crura
5. How we can work together to individualize interventional treatment for GERD patients
Flavors of Fundoplication

- Normal Stomach
- Nissen
- Dor
- Toupet
Nissen Fundoplication-the good, the bad

- Safe operation
- 90-95% successful short term
- Normalizes acid exposure roughly 90% of patients
- Controls ALL types of reflux
- Long term up to 62% of patients on PPI (Spechler study-only 45% of surgical group available for follow up). Reasons for PPI use?¹
- Inability to belch or vomit, bloating/flatulence, dysphagia, diarrhea.

¹ JAMA. 2001 May 9;285(18):2331-8
What About Partial Fundoplication?

- No long term difference in post-fundoplication side effects with Toupet\(^1\)
- Annals of Surgery 2013, Broeders et. al-Review and Meta-Analysis\(^2\)
  - Anterior 180 vs. Nissen: PPI use and satisfaction similar at 1 and 5 years
  - 1 year Inability to belch 19% vs. 31%, Inability to relieve bloating 34% vs. 44%, dysphagia 21% vs. 33%
  - Dysphagia decreased at 5 years
- Higher reoperation rate at 1 year for LAF (5.7% vs. 2.8%)

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RCT Anterior 180° Fundoplication vs. Nissen (10 year f/u)

Table 1 Outcomes at 10 years for heartburn

<table>
<thead>
<tr>
<th></th>
<th>Total fundoplication (n = 48)</th>
<th>Anterior fundoplication (n = 41)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heartburn (yes/no question)</td>
<td>7 (15)</td>
<td>8 (20)</td>
<td>0.580*</td>
</tr>
<tr>
<td>Heartburn analogue score  Mean</td>
<td>1.7</td>
<td>2.3</td>
<td>0.111†</td>
</tr>
<tr>
<td>0</td>
<td>28 (58)</td>
<td>16 (39)</td>
<td></td>
</tr>
<tr>
<td>1–3</td>
<td>14 (29)</td>
<td>13 (32)</td>
<td></td>
</tr>
<tr>
<td>4–6</td>
<td>2 (4)</td>
<td>9 (22)</td>
<td></td>
</tr>
<tr>
<td>7–10</td>
<td>4 (9)</td>
<td>3 (7)</td>
<td></td>
</tr>
<tr>
<td>Taking proton-pump inhibitors</td>
<td>9 (19)</td>
<td>11 (27)</td>
<td>0.448*</td>
</tr>
</tbody>
</table>

Values in parentheses are percentages. *Fisher’s exact test; †Mann–Whitney U test.

Table 4 Assessment of overall outcome at 10 years

<table>
<thead>
<tr>
<th></th>
<th>Total fundoplication (n = 48)</th>
<th>Anterior fundoplication (n = 41)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied with outcome (yes/no question)</td>
<td>45 (94)</td>
<td>38 (93)</td>
<td>1.000*</td>
</tr>
<tr>
<td>Mean analogue score of satisfaction</td>
<td>8.2</td>
<td>8.3</td>
<td>0.707†</td>
</tr>
<tr>
<td>Would choose operation again</td>
<td>43 (90)</td>
<td>40 (98)</td>
<td>0.212*</td>
</tr>
</tbody>
</table>

Values in parentheses are percentages. *Fisher’s exact test; †Mann–Whitney U test.
Magnetic Sphincter Augmentation
MSA-Results

Equivalent to Nissen Fundoplication with regard to pH normalization
Equivalent to Nissen with regard to decrease in PPI usage (80-90% off PPI at 5 years)\(^1,2\)

Much improved preservation of belch (95% vs. 66%)\(^2\)*
Much improved preservation of ability to vomit (94% vs. 50%)\(^2\)*
Much improved gas/bloating (27% vs 53%) \(^{2**}\)

Erosion Rate 0.3\(\%\)\(^3\)
Explantation Rate 3.3\(\%\)\(^3\)

\(^*\)statistically significant
\(^{**}\)did not reach statistical significance

GERD Barrier: LES + Diaphragmatic Crura

- Crural sling analogous to puborectalis
- Vagal Sensory and Motor Neurons Innervate BOTH the crura and the distal esophagus
- World J. of Surgery (2006), EMG response of crura to gastric and esophageal distension
  - 20 ventral/incisional hernia patients
- Distension of esophagus = crural relaxation
- Distention of stomach = crural contraction
GERD and defective LES

- Patients with GERD have a defective anti-reflux barrier
- External and Internal components of LES must work together to be effective
- High rate of hiatal hernias in patients with GERD-like symptoms
  - 108 patients underwent MRI and Endoscopy
  - 79.4% had hiatal hernia identified by at least one of the modalities
- Anti-reflux procedures then have 2 crucial components
  - Crura must be repaired
  - LES must be augmented

Hiatal hernias in patients with GERD-like symptoms: evaluation of dynamic real-time MRI vs endoscopy.
Seif Amir Hosseini A¹, Uhlig J², Streit U², Uhlig A³, Sprenger T⁴, Wedi E⁵, Ellenrieder V⁶, Ghadimi M⁷, Uecker M², Voit D⁷, Frahm J⁶, Lotz J², Biggemann L².
What Contributes the Most to Repair?

J. Gastrointestinal Surgery ¹

- 18 patients randomized to nissen-crural closure or crural closure-nissen
- Overall, LES length increased 1.3 cm, pressure increased 13.7 mm Hg
- Crural closure added 0.54 cm, Fundoplication added 0.72 cm
- Crural closure added 10.2 mm Hg vs. 3.5 mm Hg for fundoplication

Conclusion - Crural closure is vital to restoring LES pressures and creating effective anti-reflux barrier.

This is why endoscopic ONLY modalities fail to normalize acid exposure as effectively as surgical modalities.


Length and pressure of the reconstructed lower esophageal sphincter is determined by both crural closure and Nissen fundoplication. Louie BE¹, Kapur S, Blitz M, Farivar AS, Vallières E, Aye RW.
Which is Best?

Meta-analysis LNF vs. TIF vs. PPI

- LNF far superior at normalizing acid exposure (despite the fundoplication itself only adding 3.5 mm Hg to pressure at LES)
- LNF had highest probability of increasing LES pressure
- TIF had the highest probability of increasing HRQL (interesting)
  - GERD is a very subjective disease
  - Normalization of acid exposure is not necessary to improve Sx

Efficacy of Laparoscopic Nissen Fundoplication vs Transoral Incisionless Fundoplication or Proton Pump Inhibitors in Patients With Gastroesophageal Reflux Disease: A Systematic Review and Network Meta-analysis.
Richter JE¹, Kumar A², Lipka S³, Miladinovic B², Velanovich V⁴.
Conclusions

1. There is no perfect intervention for GERD
2. GERD is a SUBJECTIVE and OBJECTIVE disease (Barrett’s with dysplasia patient is a different animal than typical GERD patient)
3. There is a place at the buffet table for all of these interventions (potentially)
4. The role of surgery may evolve, but proper interventional treatment of reflux almost always requires anatomic repair of the crura
5. Only surgery can accomplish repair of the crura