**Laparoscopic Management of GERD**

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**Objectives**

- Discuss the current application of laparoscopic anti-reflux surgery
- Discuss the anatomy and technical aspects of hiatal hernia repair

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**Disclosures**

- None

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**GERD: Epidemiology and Cost**

- In the U.S., more than 60 million adults experience GERD-like symptoms at least monthly  
  - Most common outpatient diagnosis for patients with a GI complaint
- $12 billion spent on GERD treatment in 2004  
  - 2/3 attributed to PPIs  
  - % of patients prescribed a PPI during outpatient visit doubled between 2002 and 2009
Why do we treat GERD?

1. Symptom control - patient QoL
2. Acid control - management or prevention of complications
   - Esophagitis
   - Stricture
   - Barrett’s esophagus

Medical Treatment

- Proton Pump Inhibitors
  - Most commonly used medications for GERD
  - Powerful acid blockers
  - Control symptoms and heal esophageal lining in most patients with GERD
    - High failure rate in pts w/ severe esophagitis
    - Requires continuous therapy, and may become less effective over time

Complications of PPI Therapy

- Increased risk of osteoporosis
  - Calcium non-absorption and bone fractures
- Increased enteric infections
  - C. difficile colitis
- Cost?
  - Name brand PPI → $$$
  - Six month cost can range from $204 to $4200
  - BID Nexium → $2,800 (235/mo)
- Drug-drug interaction issues
  - Plavix with PPI and increased risk of heart disease

Indications for Procedural Treatment of GERD

- Complicated GERD (Stricture, Aspiration)
- GERD refractory to medical therapy
- GERD requiring daily PPI for control of symptoms
Predictors of Patient Satisfaction with Surgery

- Typical Symptoms of GERD
- Responsive to PPI's
- Abnormal 24 hour pH study
- Normal Esophageal Motility

Laparoscopic Nissen Fundoplication

<table>
<thead>
<tr>
<th>Technique: The current surgical standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>- for virtually all GERD except severe esophageal dysmotility</td>
</tr>
<tr>
<td>- Short (1-2cm), floppy, 360 degree laparoscopic fundoplication performed over a large bougie (&gt;56 french)</td>
</tr>
<tr>
<td>- Short gastric vessels divided</td>
</tr>
<tr>
<td>- Closure of right and left crus</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Laparoscopic Nissen Fundoplication</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Overnight stay required</td>
</tr>
<tr>
<td>- Modified diet for 4-6 weeks</td>
</tr>
<tr>
<td>- Excellent Long Term Results (11 yrs):</td>
</tr>
<tr>
<td>- 85% patients off PPI</td>
</tr>
<tr>
<td>- Improved Quality of life</td>
</tr>
<tr>
<td>- High rates of patient satisfaction</td>
</tr>
</tbody>
</table>
**Objective Follow-up: Normalization of esophageal pH**

<table>
<thead>
<tr>
<th>Author</th>
<th># pts pH Negative</th>
<th>Follow-up (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinder</td>
<td>21/24 (87%)</td>
<td>3-12</td>
</tr>
<tr>
<td>Hunter</td>
<td>49/54 (91%)</td>
<td>12</td>
</tr>
<tr>
<td>Watson</td>
<td>42/48 (87%)</td>
<td>3</td>
</tr>
<tr>
<td>Peters</td>
<td>26/28 (93%)</td>
<td>21</td>
</tr>
</tbody>
</table>

**Subjective Follow-up: Long-Term**

<table>
<thead>
<tr>
<th>Series</th>
<th>FU (yrs)</th>
<th>HB relief (%)</th>
<th>Revisions (%)</th>
<th>Off meds (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morganthal (USA)</td>
<td>11.0</td>
<td>89</td>
<td>10.8</td>
<td>70</td>
</tr>
<tr>
<td>Dallemange (BEL)</td>
<td>10.3</td>
<td>96</td>
<td>1.4</td>
<td>92</td>
</tr>
<tr>
<td>Bammer (USA)</td>
<td>6.4</td>
<td>94</td>
<td>1.0</td>
<td>86</td>
</tr>
<tr>
<td>Lafullarde (AUS)</td>
<td>6.0</td>
<td>87</td>
<td>14.2</td>
<td>88</td>
</tr>
<tr>
<td>Anvari (CAN)</td>
<td>5.0</td>
<td>--</td>
<td>3.6</td>
<td>89</td>
</tr>
<tr>
<td>Booth (GBR)</td>
<td>4.0</td>
<td>90</td>
<td>6.3</td>
<td>86</td>
</tr>
</tbody>
</table>

Morganthal et al, J Gastrointest Surg 2007;11:693-700

**Head to Head: Surgery versus PPI’s**

- 554 pts randomized to 2 arms (multi center)
  - 288 standardized LNF
  - 266 20mg esomeprazole (could be increased)
- No significant difference in remission rate between PPI (92%) and LNF (85%) at 5 years of follow-up

**Surgery versus PPI’s**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>LNF (180)</th>
<th>PPI (192)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heartburn</td>
<td>8%</td>
<td>16%</td>
<td>0.140</td>
</tr>
<tr>
<td>Regurgitation</td>
<td>2%</td>
<td>13%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>11%</td>
<td>5%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Bloating</td>
<td>40%</td>
<td>28%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Flatulence</td>
<td>57%</td>
<td>40%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Conclusion: Laparoscopic Nissen Fundoplication

- Excellent control of both symptoms and acid control
- Operator dependent
- Associated with side effects
- Fundoplication is best applied to the individual with severe symptomatic reflux disease, and/or mild to moderate esophageal damage.

Update on GERD Treatment, Techniques, and Technology

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Objectives

- Discuss the evolving trends in reflux management
- Review the currently available laparoscopic and endoscopic treatments and identify their niche in the management of GERD

Why Do We Treat GERD?

1. Symptom control - patient QoL
2. Acid control - management or prevention of complications
   - Esophagitis
   - Stricture
   - Barrett’s esophagus
### Indications for Procedural Treatment of GERD

- Complicated GERD (Stricture, Aspiration)
- GERD refractory to medical therapy
- GERD requiring daily PPI for control of symptoms
  - Intolerance to PPIs
  - Concern about long-term effects

### Why do we need new treatment approaches for GERD?

- Proton Pump Inhibitors
  - Most commonly used medications for GERD
  - High failure rate in pts w/ severe esophagitis
  - Requires continuous therapy, and may become less effective over time (30% have breakthrough sx)
  - Concern about cost and risk of osteoporosis and enteric infections

### Why do we need new treatment approaches for GERD?

- Laparoscopic Fundoplication
  - Highly efficacious – normalizes acid exposure
  - Invasive procedure with GI side effects
    - Dysphagia, flatulence and Bloating

### Typical GERD Patient in Surgery Clinic

- **2009:**
  - Severe GERD with very poor symptom control
  - Large hiatal hernia

- **2015**
  - Patient with mild/moderate GERD symptoms +/- hiatal hernia with concerns about costs and side effects of long-term PPI use
## Endolumenal GERD Treatments

- Radiofrequency energy application – Stretta
- Transoral Fundoplication – EsophyX

## Indications for Endoscopic GERD Therapy

- Mild to moderate GERD symptoms
- Responsive to PPI therapy
- Objective evidence of GERD (pH study)
- Absent to minimal (<2cm) hiatal hernia

**Forget it if:**

- Complicated GERD
- Long-segment Barrett’s esophagus
- Previous gastroesophageal surgery

## Stretta: Procedure

- EGD with identification of GE junction
- Placement of catheter above GEJ
  - Rf Application, 45 degree rotation
  - 8 applications, 2 below, 6 above GE jxn
- Total time about 30 minutes
  - Outpatient
  - Under sedation in the GI suite

## Summary of Stretta Outcomes

- Median drug requirement: PPI bid (baseline)—prn antacids (follow-up)
- Improvement in symptom scores and disease specific quality of life
- Acid exposure improved, but not normalized
- Low incidence of side effects
- Long-term data emerging with sustained efficacy in small cohort studies (8-10 years)
**Stretta Conclusions**

- Efficacy inferior to that achieved with fundoplication
- Relatively inexpensive outpatient procedure
- May represent a good option for patients with symptoms well controlled with medication but are:
  - Intolerant of PPIs
  - Concerned about long-term effects of PPI use
- Long-term data are needed to establish the cost-effectiveness of this approach

**Transoral Fundoplication**

- Over-the-scope device
- 45 - 60 minute procedure
- General anesthesia
- 14-20 transmural fasteners
- Overnight stay
- Post-op discomfort minimal
- Rapid recovery
Summary of TF Outcomes

- 2 RCT, several cohort studies
- Improved GERD symptoms and disease specific QoL at 6 mo (up to 3 yrs in cohort studies)
- Improved control of regurgitation symptoms compared to PPI therapy in sham controlled RCT
- Reduction in PPI use
- Esophageal perforations and GI bleeding have been reported
- Low incidence of GI related side effects

TF Conclusions

- Effectively reduces GERD symptoms in select patients
- Low incidence of side effects, but does not consistently normalize esophageal pH
- RCT data emerging to solidify efficacy of this procedure
- Expensive

Endolumenal Therapy Conclusions

- Generally less efficacious, but with more favorable side effect profile compared to LNF
- May find a role for management of patients with symptoms well controlled with daily PPI and minimal or no hiatal hernia
- Need to achieve adequate efficacy at a relatively low cost to gain wider acceptance
**Linx: Technique**

- 4 port laparoscopy – Similar to LNF
- Minimal dissection at the hiatus
- Device placed between the esophageal wall and posterior vagus nerve

**Linx: Device**
### Linx: Technique

[Images of LINX procedure]

### Linx: Results

- 100 patients with 3 year follow up
- Primary endpoint - pH reduced by 50%
  - Achieved in 64%
  - pH normalized in 58%
- Secondary Endpoints
  - Symptom control
  - Quality of Life/Satisfaction
  - Complications
**Linx: Results**

- **Quality of Life**
  - Median Score
    - Without Proton-Pump Inhibitors at Baseline: 27
    - With Proton-Pump Inhibitors at Baseline: 11
    - 3 Yr after Sphincter Augmentation: 2

**Linx: Complications/Side Effects**

- Dysphagia in 68%
  - Moderate to severe in 21%
  - 3% required device removal
- Bloating – 14% (almost all mild)
- 6 devices removed
  - 3 for dysphagia
  - 1 each for pain, emesis, and persistent symptoms

**Linx: Potential Advantages**

- Easy to standardize procedure
- Potential for durable GERD relief
### Linx: Questions

- Durability
- Erosion?
- Cost-benefit analysis

### GERD Treatment Strategy

- Symptoms well controlled with PPI
  - Medical acid suppression
  - May consider Stretta in select patients
- Breakthrough symptoms without HH
  - Consider stretta, TF, Linx, LNF
- Breakthrough symptoms with small HH
  - Consider Linx, LNF
- Large HH or Complicated GERD → LNF