Gastroesophageal Reflux Disease – Evaluation and Treatment

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Outline:
- Pathophysiology – Components: hypotensive LESP, hiatus hernia (intrathoracic GEJ)
- Evaluation of the patient: endoscopy, esophageal motility and manometry, pH studies (the gold standard of GERD)
- Medical treatments: H2 receptor antagonists, proton pump inhibitors
- Endoscopic options - promise not practice yet
- Laparoscopic Nissen fundoplication.

Gastroesophageal Reflux Disease

- Over one-third of population in USA has heartburn at least once per month
- 27% of population use anti-acid medication monthly
- Vast majority of population does not seek medical attention for heartburn

Pathophysiology of GERD

<table>
<thead>
<tr>
<th>Defensive Factors</th>
<th>Aggressive Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>gravity</td>
<td>acid exposure time</td>
</tr>
<tr>
<td>upright posture</td>
<td>acid+bile</td>
</tr>
<tr>
<td>esophageal peristalsis</td>
<td>acid+pepsin</td>
</tr>
<tr>
<td>salivary/esophageal gland bicarbonate</td>
<td>delayed gastric emptying</td>
</tr>
<tr>
<td>surface mucus</td>
<td>duodenogastric reflux</td>
</tr>
<tr>
<td>epithelial cell tight junctions</td>
<td></td>
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<tr>
<td>lower esophageal sphincter</td>
<td></td>
</tr>
<tr>
<td>diaphragmatic crural sling</td>
<td></td>
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<tr>
<td>intra-abdominal esophagus</td>
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</table>
Acid Reflux in GERD

- Daytime upright reflux: most commonly found, food stimulated, associated with short duration episodes of hypotensive LESP
- Nocturnal GERD: associated with esophagitis and complications (less common than above)
- Most patients have normal acid and pepsin output and normal gastric emptying
- The usual consequence: prolonged exposure of esophagus to acid and pepsin

GERD - Medical Evaluations

- UGIS – now rarely done – if spontaneous reflux present – it’s real!!
- Endoscopy – detects HH and esophagitis
- NOTE: normal esophagus doesn’t mean the absence of reflux
- Esophageal motility and manometry
- pH monitoring – 24 hr pH transesophageal wire
- Bravo 48 hour wireless pH studies
- Impedance studies

GERD - Endoscopic Evaluation

- Esophagitis - not always (histology helpful where EGD grossly normal)
- Hiatus hernia - not an invariable finding
- Barrett's mucosal changes - specialized small bowel columnar epithelium
- Stricture
- Gastric outlet status
The Classic Endoscopic findings for GERD – linear esophagitis coming from GE junction

GERD Evaluations - Esophageal Motility and Manometry
- Until 2010 – water perfused pull-through system – now largely antiquated!!!
- Resting LESP - normal 20±10 mm Hg
- LES relaxation with swallowing
- Esophageal peristalsis
- Resting UESP - normal 30±10 mm Hg
- Coordination of UES relaxation with pharyngeal contraction

Solid State Manometry – Set-up/Equipment
Solid State Manometry - > 30 baroreceptors

Inlet - UES

GEJ - LES

Time

24 hour pH study

- Percent time refluxing supine
- Percent time refluxing upright
- Number of reflux events
- DeMeester score - normal < 14.72
- Traditionally done with wire pH system – sensitive only to acid pH.

Wired pH System – 24 hours of monitoring

Standard Reporting – 24 hour pH recording (Acid only)

<table>
<thead>
<tr>
<th>Item</th>
<th>Total</th>
<th>Upright</th>
<th>Supine</th>
<th>Meal</th>
<th>PostP</th>
<th>NONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of period (HH:MM)</td>
<td>23:58</td>
<td>17:21</td>
<td>06:37</td>
<td>01:23</td>
<td>12:00</td>
<td>02:24</td>
</tr>
<tr>
<td>Number of acid refluxes ( # )</td>
<td>161</td>
<td>124</td>
<td>37</td>
<td>27</td>
<td>77</td>
<td>19</td>
</tr>
<tr>
<td>Number of long acid refluxes ( # )</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Longest acid reflux (min)</td>
<td>67</td>
<td>20</td>
<td>67</td>
<td>2</td>
<td>87</td>
<td>2</td>
</tr>
<tr>
<td>Total time pH below 4.00 (min)</td>
<td>290</td>
<td>118</td>
<td>118</td>
<td>118</td>
<td>118</td>
<td>118</td>
</tr>
<tr>
<td>Fraction time pH below 4.00 (%)</td>
<td>20.2</td>
<td>11.3</td>
<td>43.4</td>
<td>22.0</td>
<td>21.8</td>
<td>7.6</td>
</tr>
<tr>
<td>Symptom Index ( % )</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>60.0</td>
</tr>
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DeMeester score
Total score = 90.4  DeMeester normals <14.72 (95th percentile)
New Additions to pH testing

- Bravo – wireless system – acid pH sensitive, pinned to esophagus with sensor 5 cms above visible GE junction
- Impedance – wire system but sensitive to acid, alkaline and neutral fluxes

Indications for pH monitoring

- Endoscopy negative patients
- Pts < 40 years with typical GERD
- Symptoms refractory to PPI
- Non-cardiac chest pain
- Suspected ENT problem (sinusitis)
- Adult onset of non-allergic asthma, COPD, aspiration pneumonia, bronchiectasis
- Pre lung transplantation

Normal Esophageal Motility
Normal pH Study - No Acid Reflux Noted

Despite normal M/M, severe acid reflux.

EC: hypotensive LESP, no peristalsis
Endoscopic Treatments

- All very limited experience
- No good randomized controlled trials
- Stretta procedure - circumferential radiofrequency ablation of cardia - withdrawn
- Endoscopic plication of the cardia - novel endoscopic suturing device - withdrawn
- Endoscopic injection of polymer - withdrawn
- Promising but need the "test of time" and more data.

GERD - Surgical options

- Laparoscopic Nissen
- Changing indications: now strongly considered for younger patients responsive to PPI's
- Must meet objective criteria: hypotensive LESP, nl Peristalsis, DeMeester score > 14.72