The GI Blues:
Heartburn, Acid Reflux and Indigestion

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Upper GI Symptoms are Common

Caucasian Female Population
(45-75 years of age)

- Dyspepsia: 19%
- Heartburn: 39%
- Acid Regurgitation: 46%

Locke HR et al. Gastroenterology. 1997;112(5):1448-1456
Gastroesophageal Reflux
GERD

Defined

Acid reflux (gastroesophageal reflux) is a back-flow of stomach contents upward into the esophagus.

Acid reflexes when the lower esophageal sphincter is not functioning properly.
The patient with GERD
Gastroesophageal Reflux
Signs, Symptoms & Complications

**Symptom:** Heartburn

**Sign:** Esophagitis.

**Complications:**
- Esophageal ulcer
- Bleeding
- Barrett’s esophagus (replacement of squamous with columnar epithelium)
- Adenocarcinoma.

Heartburn
The Cardinal Symptom of GERD

• An uncomfortable, burning sensation located beneath the sternum
• Radiates up the chest
• Described with wave of open hand
• Often associated with regurgitation
• Relieved by antacids and antisecretory medications
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Factors that Promote Gastroesophageal Reflux

1. Increased gastric volume (after meal, gastric stasis, acid hypersecretion).

2. Contents near esophageal junction (bending, recumbency).

3. Increased gastric pressure (obesity, tight clothes, pregnancy, ascites).

4. Loss of LES-gastric pressure gradient: LES pressure decrease by smoking, anticholinergics, Ca antagonists, pregnancy, scleroderma.

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Normal Resting Pressures

Intra-thoracic
- 5 mm Hg

Lower esophageal sphincter (LES)
+25 mm Hg

Intra-abdominal
+ 5 mm Hg
Antireflux Function of Crural Diaphragm
<table>
<thead>
<tr>
<th>Manifestation</th>
<th>Due to reflux into</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain</td>
<td>Esophagus</td>
</tr>
<tr>
<td>Globus</td>
<td>Oropharynx</td>
</tr>
<tr>
<td>Sore throat</td>
<td></td>
</tr>
<tr>
<td>Burning tongue</td>
<td></td>
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<tr>
<td>Dental erosions</td>
<td></td>
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<tr>
<td>Sinusitis</td>
<td></td>
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<tr>
<td>Laryngitis</td>
<td>Airway</td>
</tr>
<tr>
<td>Chronic cough</td>
<td></td>
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**Gastroesophageal Reflux**

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Gastroesophageal Reflux Disease (GERD)

The condition in which gastric juice that refluxes into the esophagus and oropharynx causes symptoms, tissue injury, or both.
Peptic Esophageal Stricture
Gastroesophageal Reflux Treatment

**Lifestyle modifications:**
Weight reduction, sleeping with head elevated or on wedge. Avoidance of smoking, large meals, caffeine, alcohol, chocolate, fatty foods, citrus juices, NSAIDs.

**Medical Therapy:**
- **Antacids:** mostly used prn
- **H₂-blockers:**
  (cimetidine, ranitidine, famotidine, nizatidine) all BID
- **Proton Pump Inhibitors:**
  Esomeprazole, Lansoprazole, Omeprazole
  Pantoprazole, Rabeprazole
- **Agents that increase LES pressure:**
  Cisapride 10-20 mg PO QID
  Metoclopramide 10 mg PO QID

**Surgical Therapy:**
In severe and refractory cases:
Nissen fundoplication

Antireflux Life-Style Modifications

- Elevate head of bed
- Weight loss for overweight patients
- Avoid:
  - Recumbency after meals
  - Bedtime snacks
  - Cigarette smoking
  - Alcohol
  - Foods that promote reflux
  - Medications that promote reflux
Lifestyle modifications for GERD: Often Illogical!
Gastroesophageal Reflux Treatment

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Endoscopic anti-reflux procedures:

Secretion of gastric acid by parietal cells

Gastric acid (hydrochloric acid [HCl]) is produced by the proton pump (H⁺, K⁺-ATPase) of the parietal cell. On the surface of each parietal cell are receptors for histamine, gastrin and acetylcholine. Stimulation of any of these receptors activates the proton pump and increases hydrochloric acid secretion.
Gastroesophageal Reflux
Treatment

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$H_2$ – Receptor Antagonists
Histamine H2-Receptor Blockers

- Cimetidine (Tagamet), ranitidine (Zantac), famotidine (Pepcid), nizatidine (Axd)
- Heal GERD symptoms and signs in 50% to 65%
- Few side effects
- Most useful for mild GERD
- Tolerance develops frequently
Medical Therapy of GERD

- The modern medical therapy of GERD is directed primarily at decreasing gastric acid secretion.
- “Step-up” vs. “step-down” approach
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Endoscopic anti-reflux procedures:

Proton Pump Inhibitors
Proton Pump Inhibitors (PPIs)

- Omeprazole (Prilosec), lansoprazole (Prevacid), rabeprazole (Aciphex), pantoprazole (Protonix), esomeprazole (Nexium)
- Heal GERD symptoms and signs in 80% to 100%
- Few side effects
- Tolerance not documented
- First-line therapy for severe GERD
Maintenance of GERD Remission

![Graph showing the percentage of patients in remission over months of maintenance therapy with different treatments.]

- **PPI Daily**
- **PPI Weekend**
- **H2-Blocker Daily**

Therapeutic Options in the Treatment of GERD

- Lifestyle modifications
- Pharmacological Agents
  - Prokinetic Agents
  - Anti-secretory Agents
    - $H_2$-receptor antagonists
    - Proton pump inhibitors
- **Anti-reflux surgery**
- Endoscopic anti-reflux procedures
Principles of Anti-Reflux Surgery

- **Restore** Intra-abdominal esophagus
- **Approximate** Diaphragmatic crurae
- **Reduce** Hiatal hernia
- **Perform** Fundoplication
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Bard® Endoscopic Suturing System

Endoscope advanced into gastric cardia.

Vacuum applied, tissue captured, and stitch placed.

Knot tied.

Gastroplication formed.
The EndoCinch Procedure
The EndoCinch Procedure
Failed EndoCinch Procedure
Stretta™ Radiofrequency Energy System

Electrodes
The Stretta Procedure

- Four antegrade rings
- Two gastric cardia rings
- 8 lesions at each of 4 esophageal levels
- 12 lesions at each of 2 cardia levels

\[ = 56 \text{ lesions} \]
The Stretta Procedure
Endoscopic Plication System

- pledges
- retractor
- gastroscope
Endoscopic Full-Thickness Plication

1. Plicator and gastroscope retroflexed to GEJ in anterior position.
2. Arms opened, tissue retractor advanced to serosa.
3. Gastric wall retracted, arms closed.
4. Single, pre-tied implant is deployed, securing serosa-to-serosa plication.
5. Full-thickness plication restructures normal anti-reflux barrier.
Endoscopic Full-Thickness Plication Technique

1. Wall retractor advanced to serosa; device arms opened

2. Gastric wall retracted

3. Device arms close deploying pre-tied implant

4. Full-thickness plication

This device has not been approved by the Food & Drug Administration.
Enteryx™ injection into the region of the LES
GERD: The role of surgery