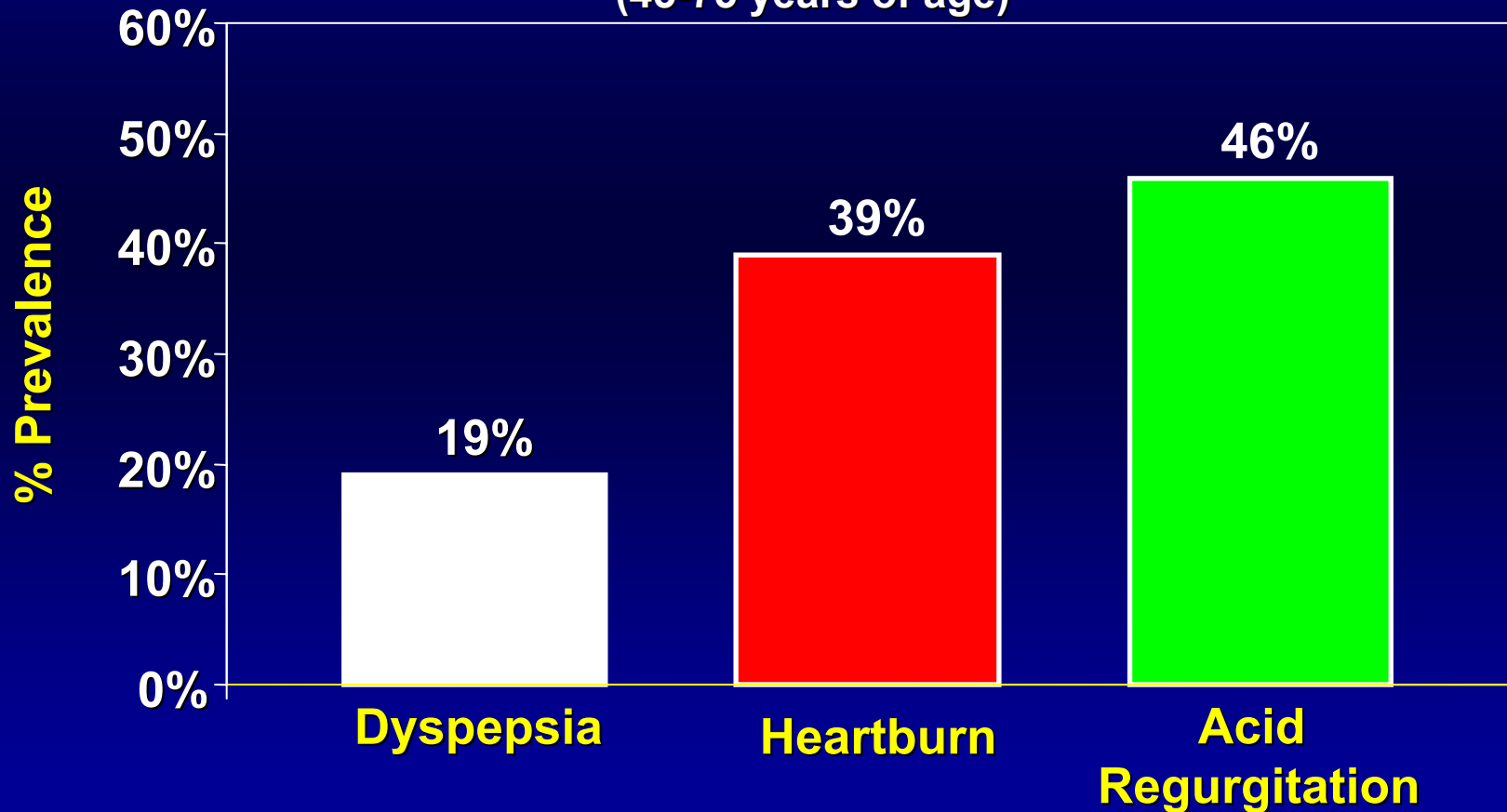


**The GI Blues:
Heartburn, Acid Reflux and Indigestion**

**Byron Cryer, M.D.
Dallas VA Medical Center**

Upper GI Symptoms are Common

Caucasian Female Population
(45-75 years of age)



Gastroesophageal Reflux GERD

Defined

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

Acid refluxes 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



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

The patient with GERD



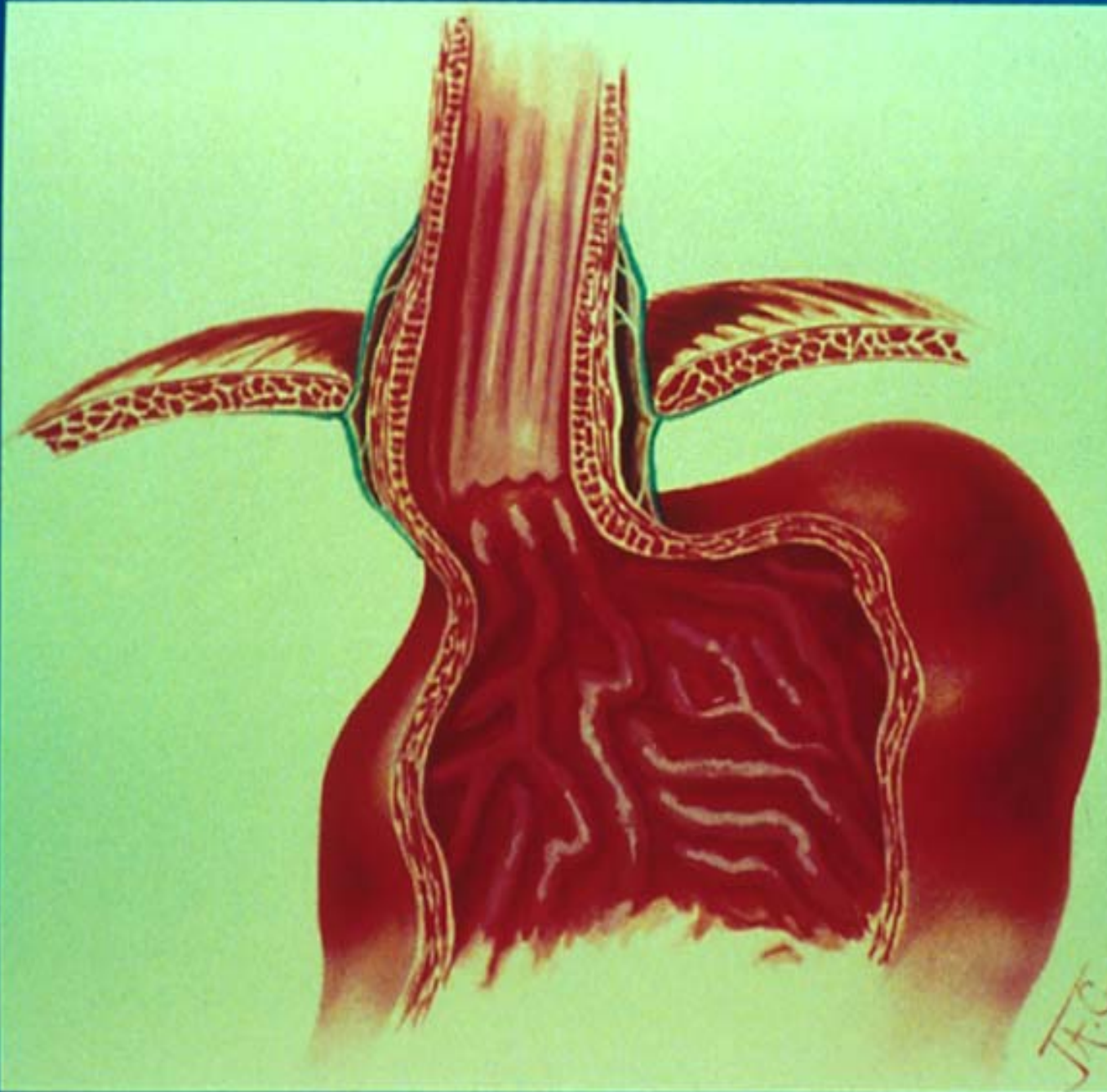
Heartburn

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

Factors that Promote Gastroesophageal Reflux

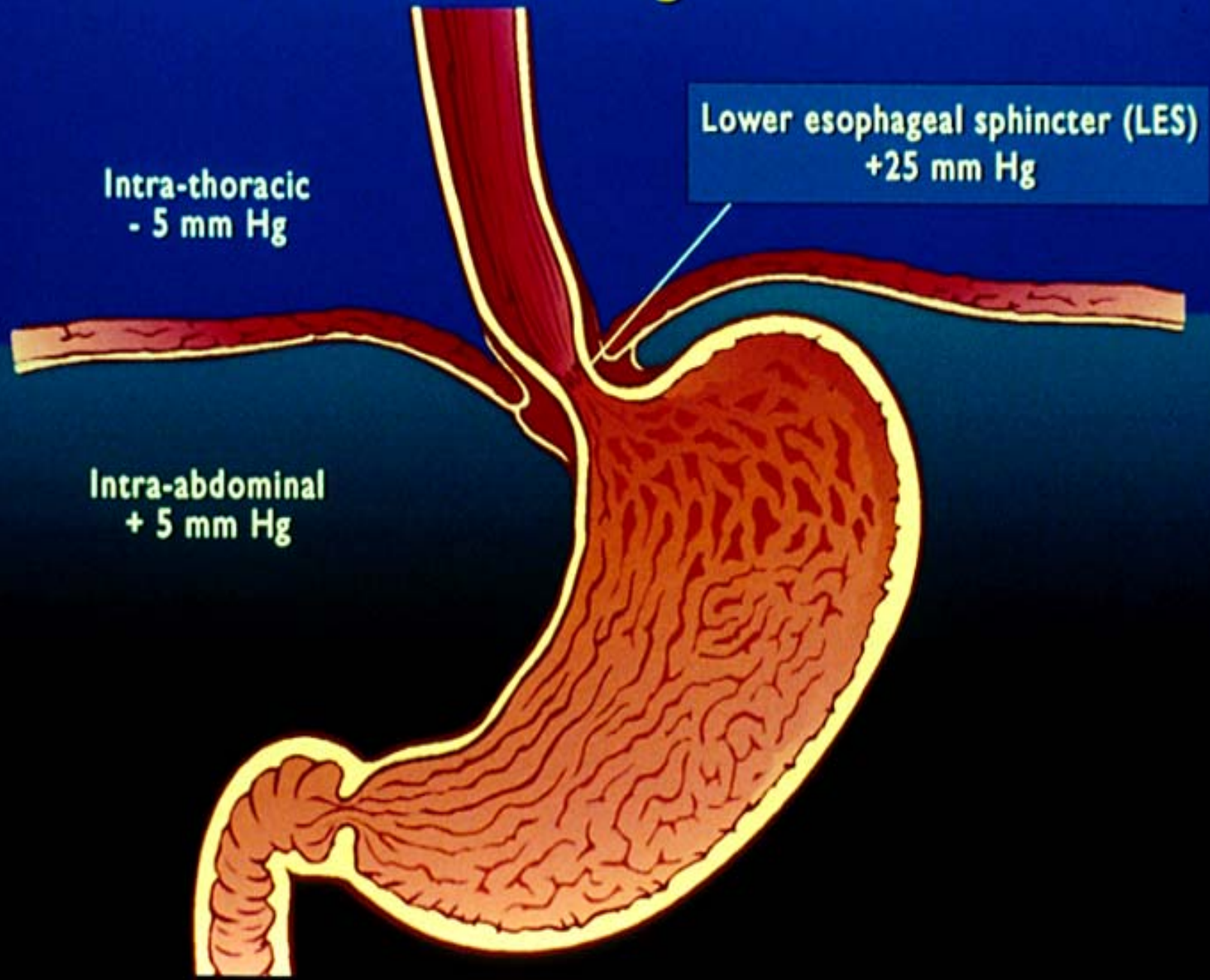
- 1. Increased gastric volume** (after meal, gastric stasis, acid hypersecretion).
- 2. Contents near esophageal junction** (bending, recumbency).
- 3. Increased gastric pressure** (obesity, tight clothes, pregnancy, ascites).
- 4. Loss of LES-gastric pressure gradient: LES pressure decrease** by smoking, anticholinergics, Ca antagonists, pregnancy, *scleroderma*.



Factors that Promote Gastroesophageal Reflux

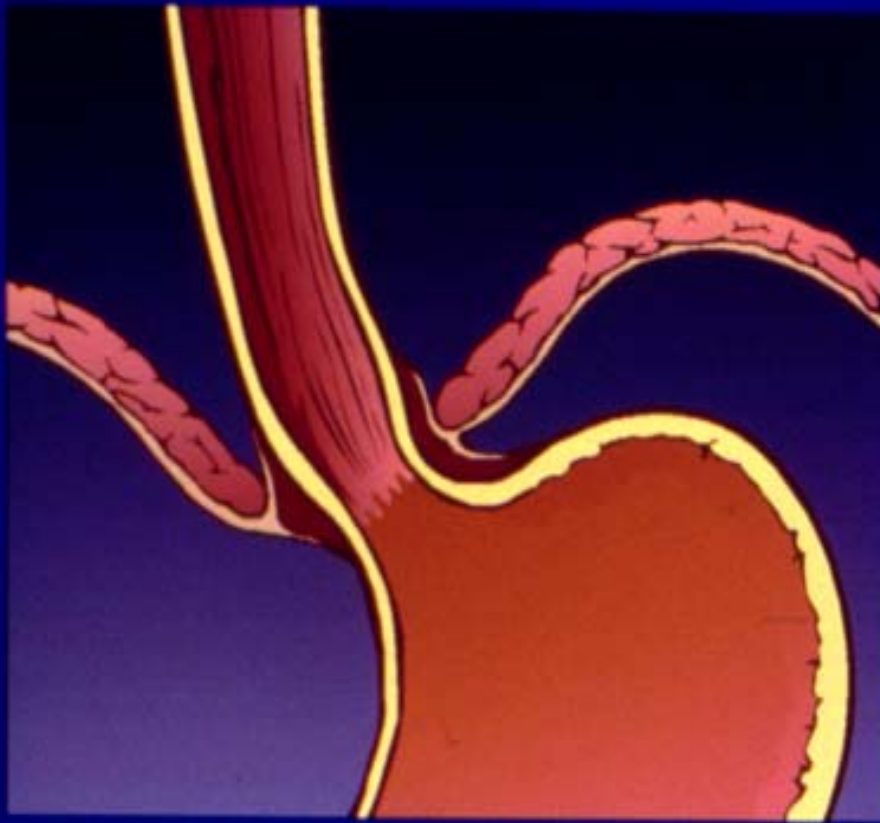
1. Increased gastric volume (after meal, gastric stasis, acid hypersecretion).
2. Contents near esophageal junction (bending, recumbency).
3. Increased gastric pressure (obesity, tight clothes, pregnancy, ascites).
4. **Loss of LES-gastric pressure gradient:** LES pressure decrease by smoking, anticholinergics, Ca antagonists, pregnancy, *scleroderma*.

Normal Resting Pressures

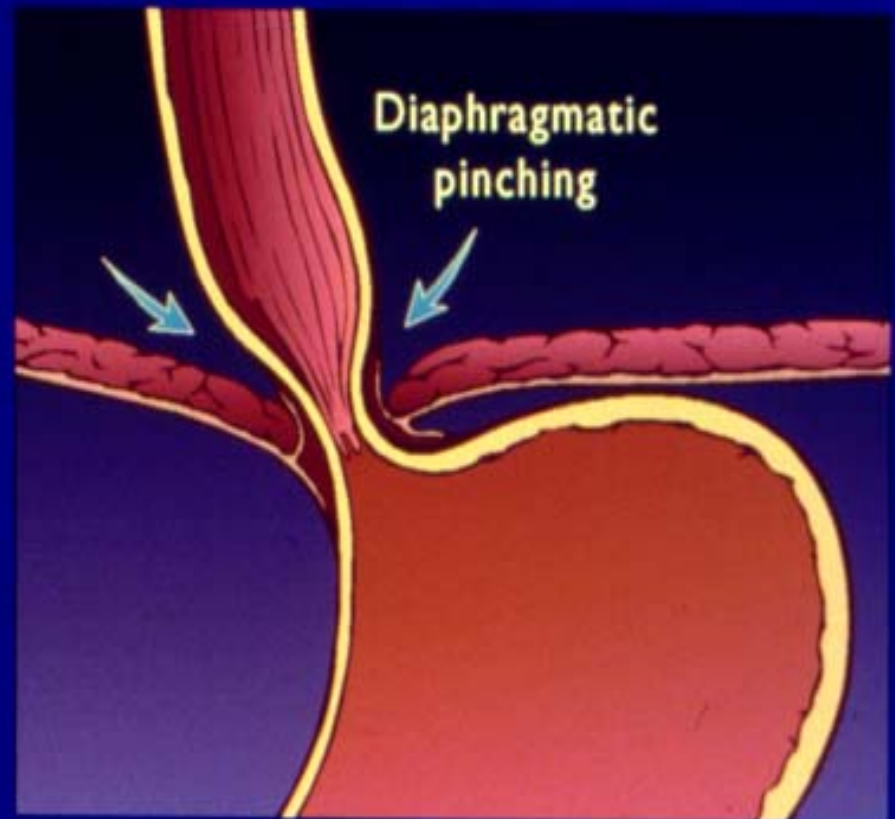


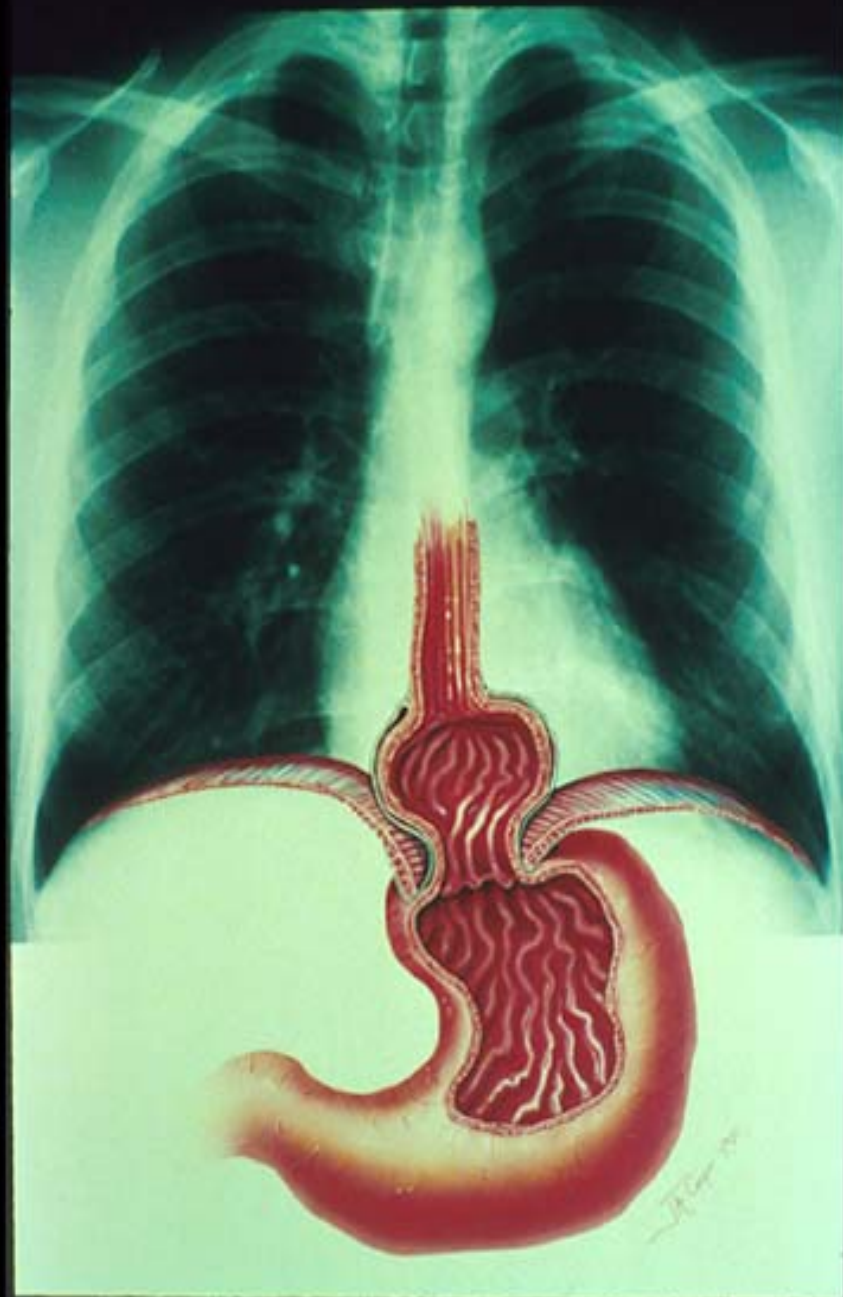
Antireflux Function of Crural Diaphragm

Expiration



Inspiration





“Atypical” Manifestations of GERD

Manifestation

Chest pain

Globus

Sore throat

Burning tongue

Dental erosions

Sinusitis

Laryngitis

Chronic cough

Asthma

Due to reflux into

Esophagus

Oropharynx

Airway

Gastroesophageal Reflux

Signs, Symptoms & Complications

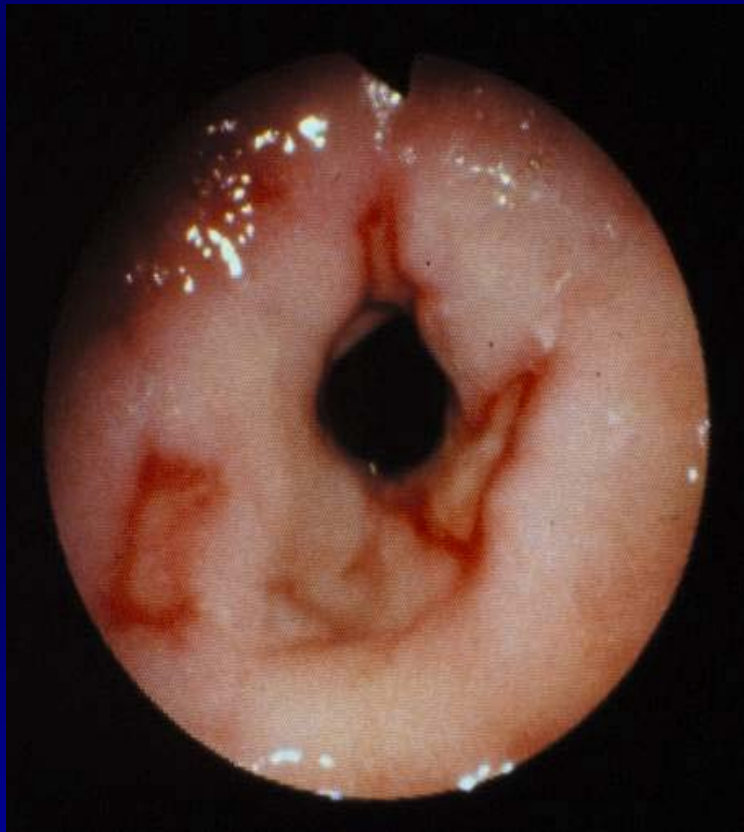
Symptom: Heartburn

Sign: Esophagitis.

Complications:

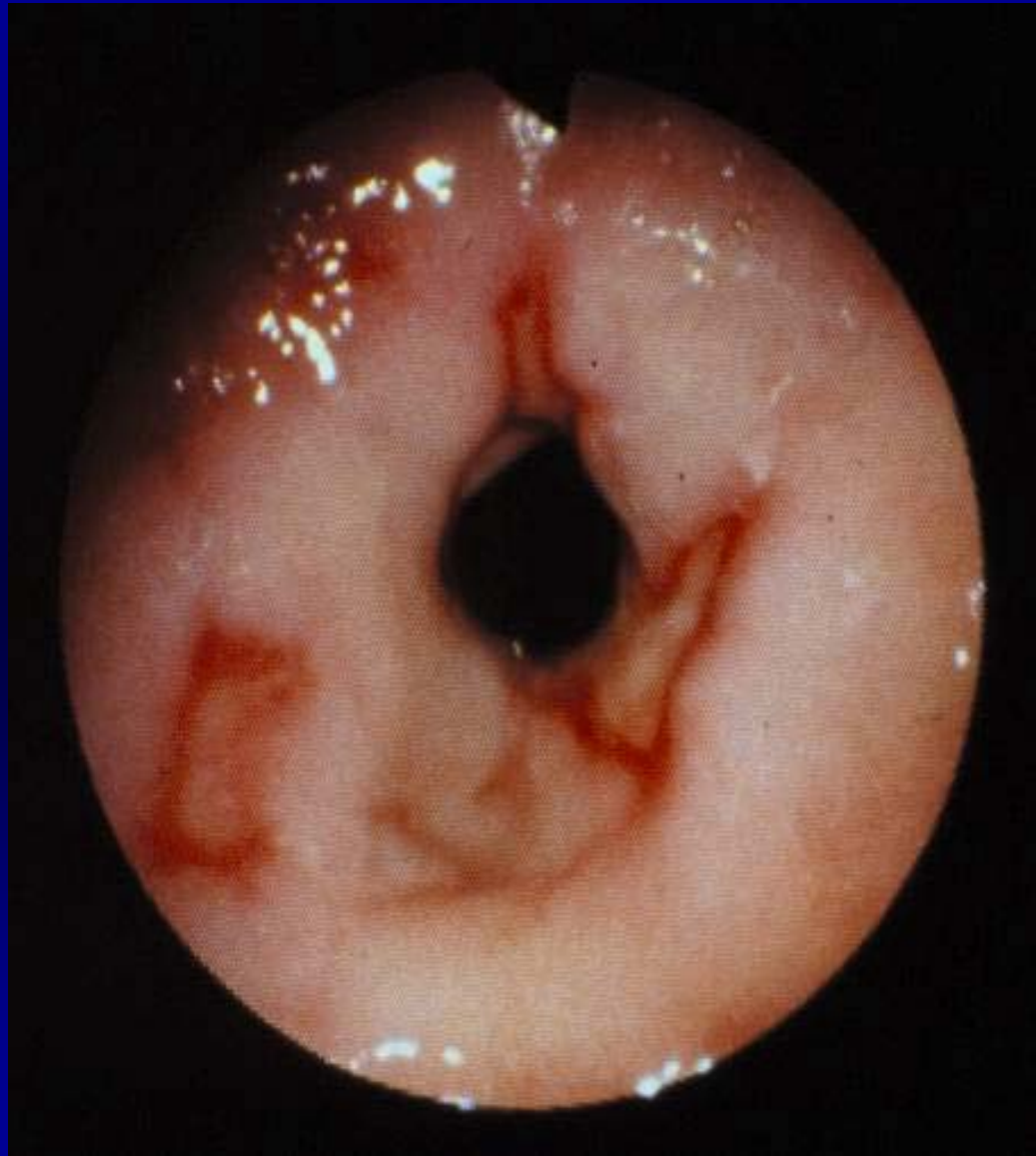
- Esophageal ulcer
- Bleeding
- Barrett's esophagus (replacement of squamous with columnar epithelium)
- Adenocarcinoma.

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

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:

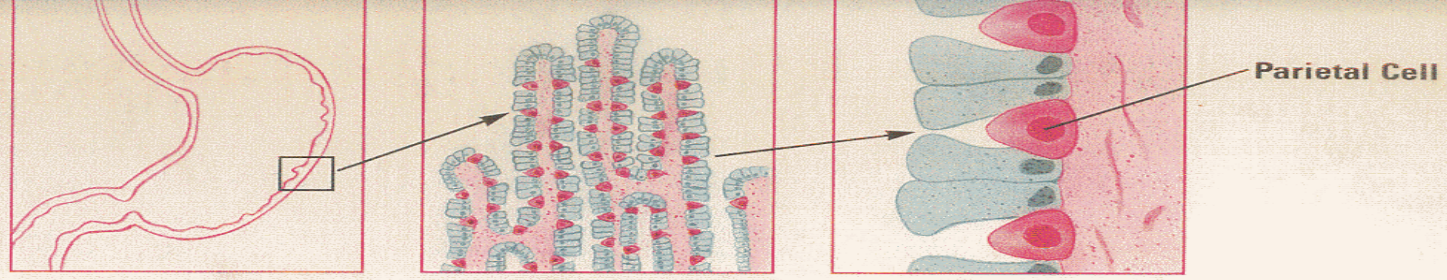
- **Antacids:** mostly used prn
- **H₂-blockers :**
(cimetidine, ranitidine, famotidine, nizatidine) all BID
- **Proton Pump Inhibitors:**
Esomeprazole, Lansoprazole, Omeprazole
Pantoprazole, Rabeprazole
- **Agents that increase LES pressure:**
Cisapride 10-20 mg PO QID
Metoclopramide 10 mg PO QID

Surgical Therapy:

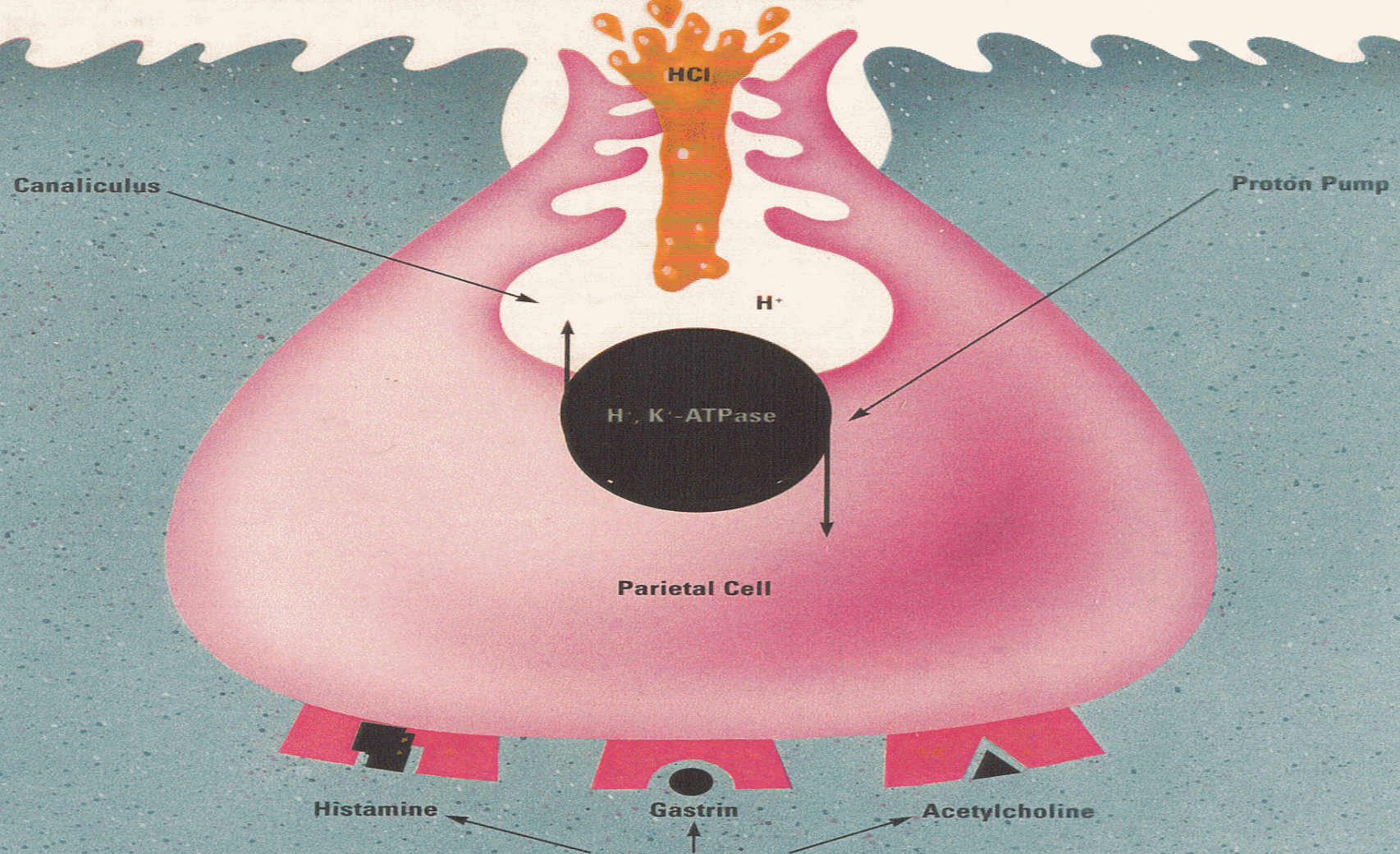
In severe and refractory cases:
Nissen fundoplication

Endoscopic anti-reflux procedures:

Fennerty, M.B. "Medical treatment of gastroesophageal reflux disease in the managed care environment" Seminars in Gastrointestinal Disease 1997;8 (2):90-99.



Parietal Cell



Canaliculus

Proton Pump

HCl

H⁺

H⁺, K⁺-ATPase

Parietal Cell

Histamine

Gastrin

Acetylcholine

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

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

Endoscopic anti-reflux procedures:

Fennerty, M.B. "Medical treatment of gastroesophageal reflux disease in the managed care environment" Seminars in Gastrointestinal Disease 1997;8 (2):90-99.

H₂ – Receptor Antagonists



Histamine H2-Receptor Blockers

- Cimetidine (Tagamet), ranitidine (Zantac), famotidine (Pepcid), nizatidine (Axid)
- 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

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

Endoscopic anti-reflux procedures:

Fennerty, M.B. "Medical treatment of gastroesophageal reflux disease in the managed care environment" Seminars in Gastrointestinal Disease 1997;8 (2):90-99.

Proton Pump Inhibitors

PROTONIX[®]
(Pantoprazole Sodium) Delayed-Release Tablets **40mg**

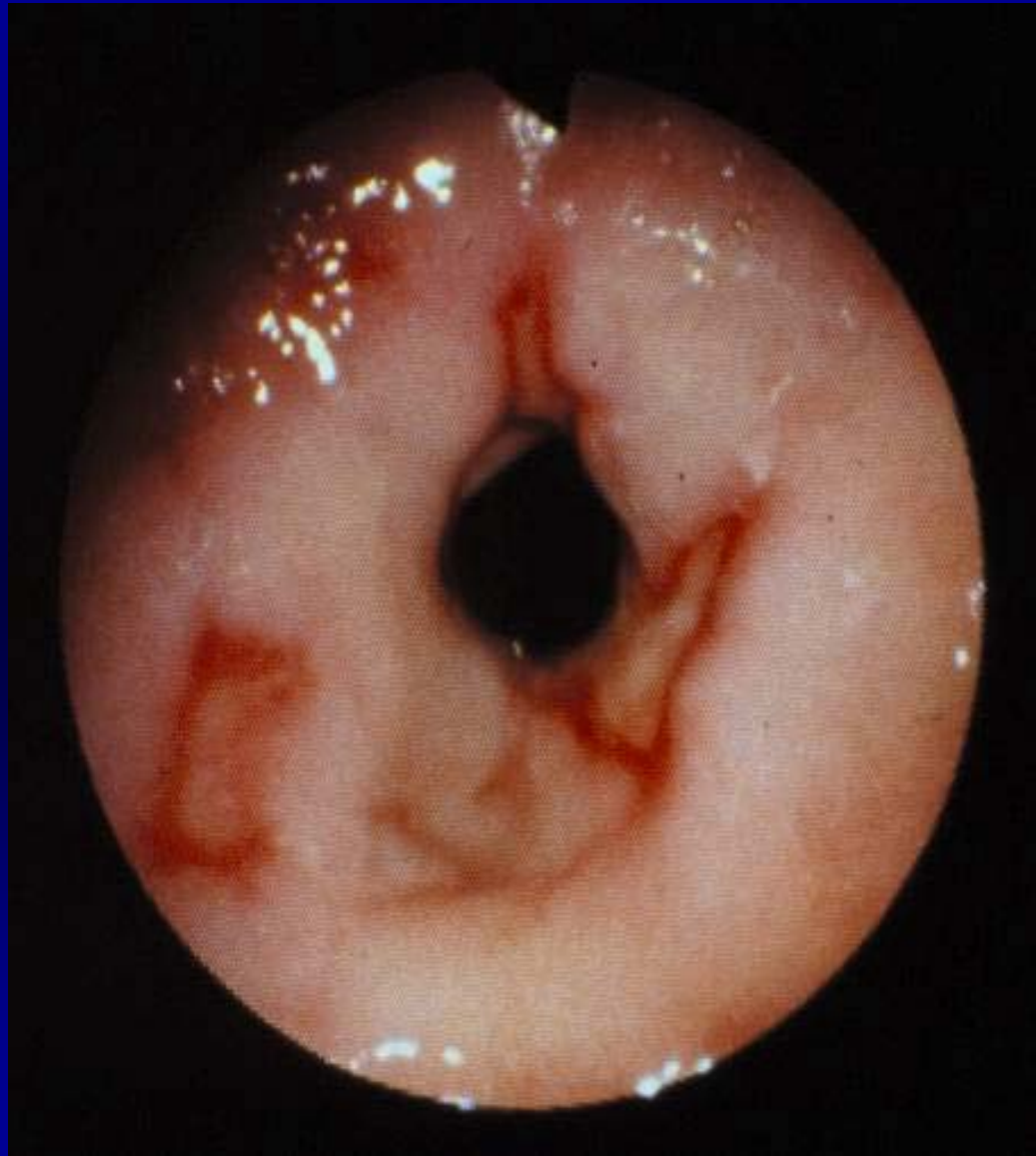


PREVACID[®]
LANSOPRAZOLE
HELP PREVENT THE ACID

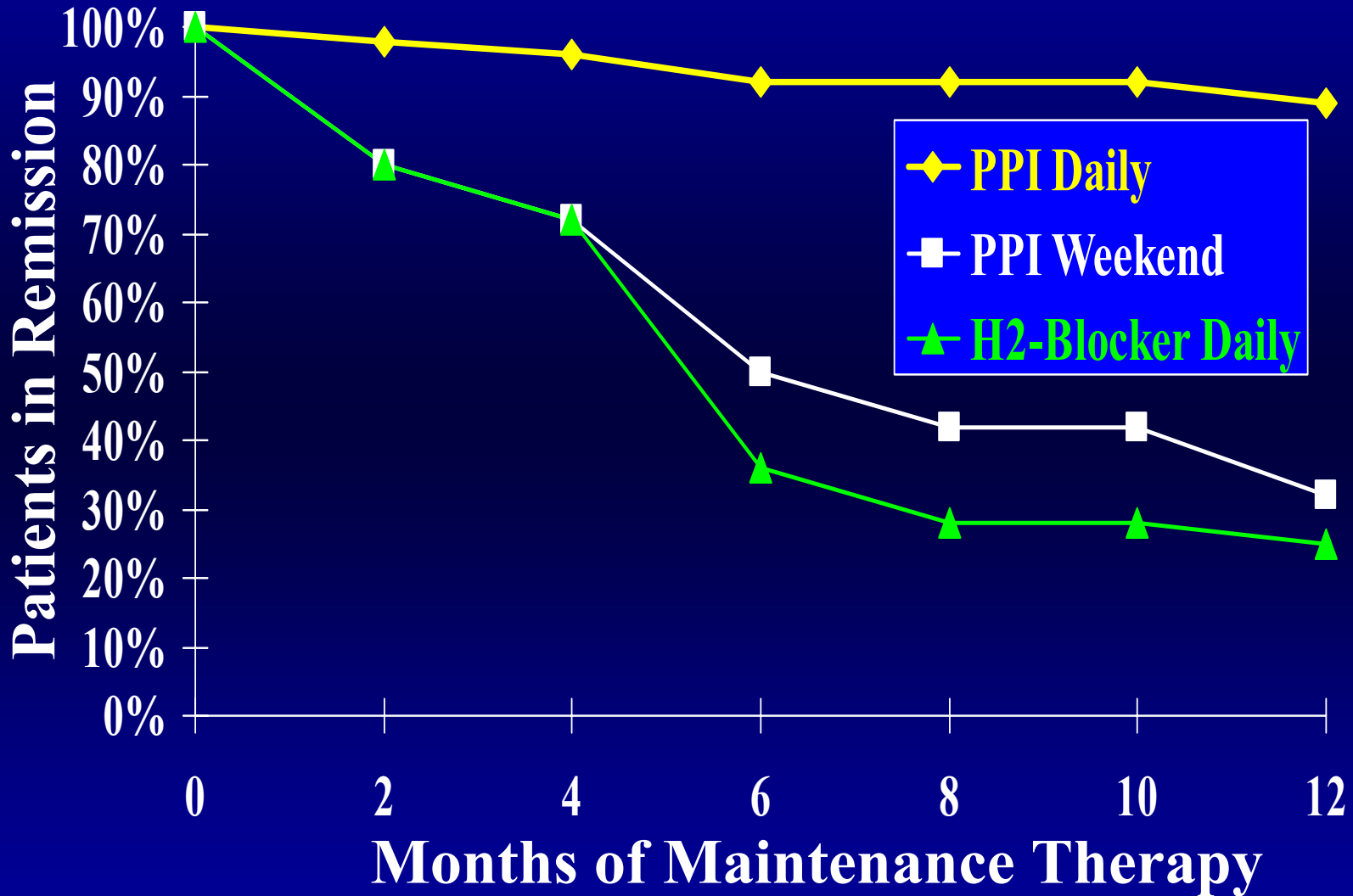


Proton Pump Inhibitors (PPIs)

- 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**

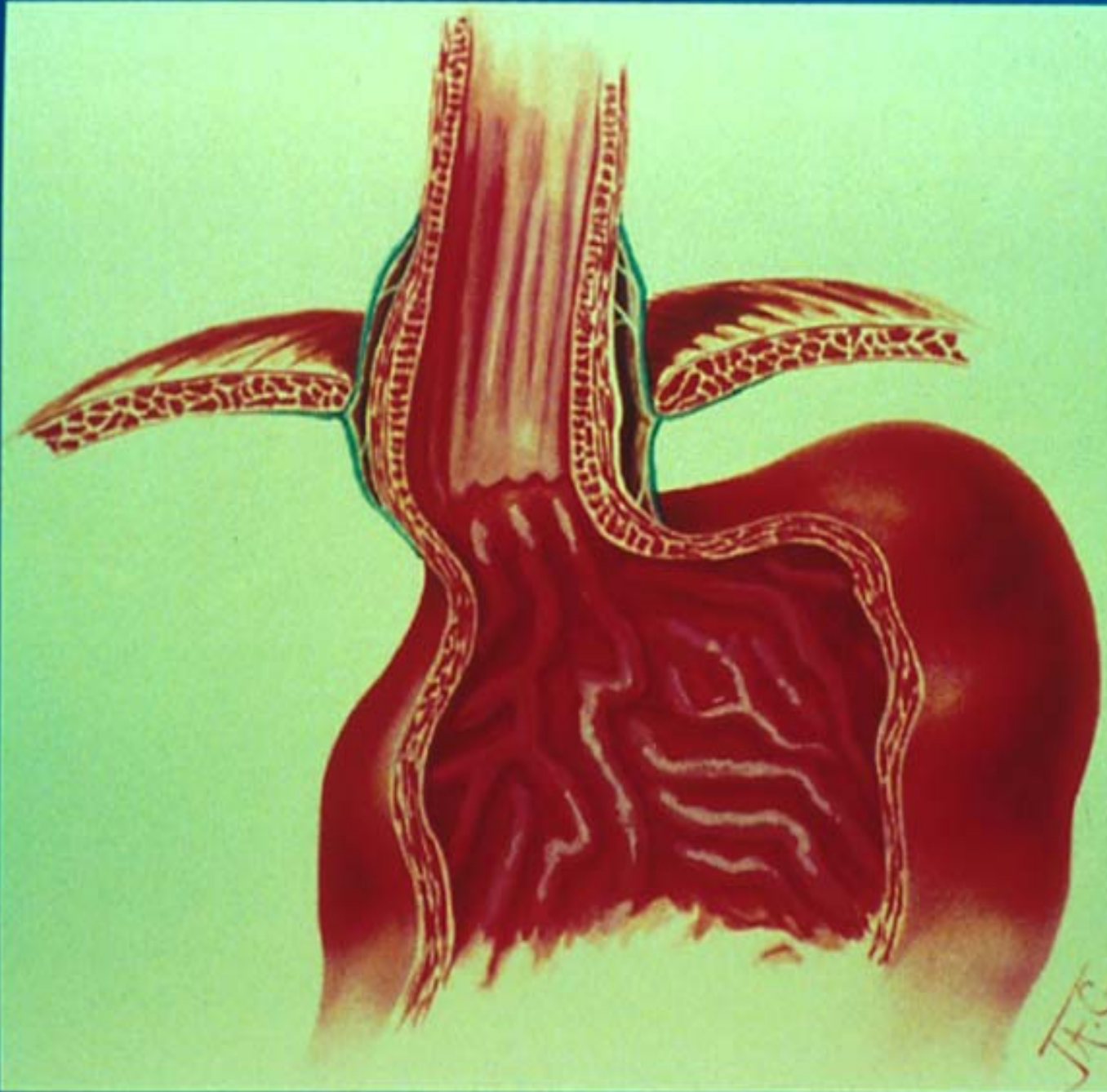


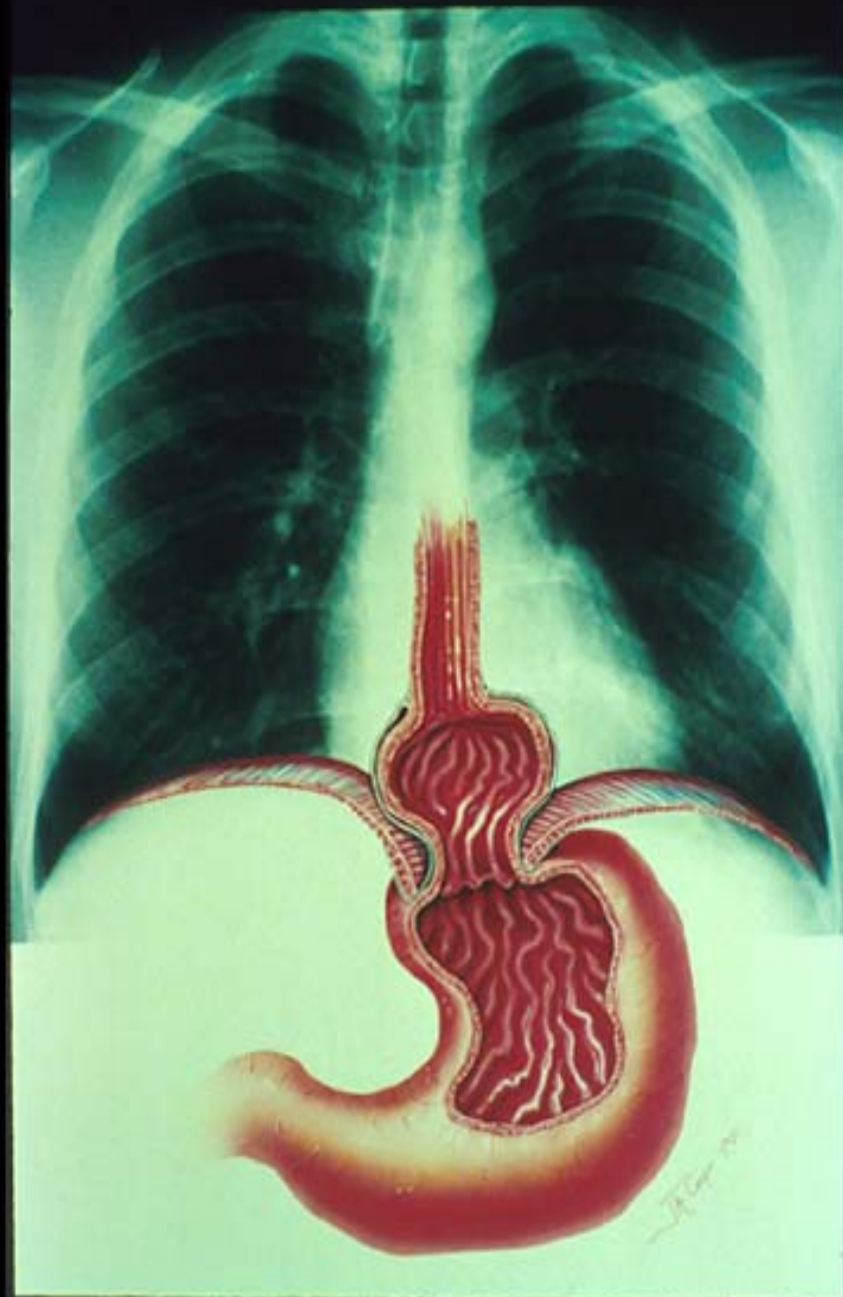
Maintenance of GERD Remission



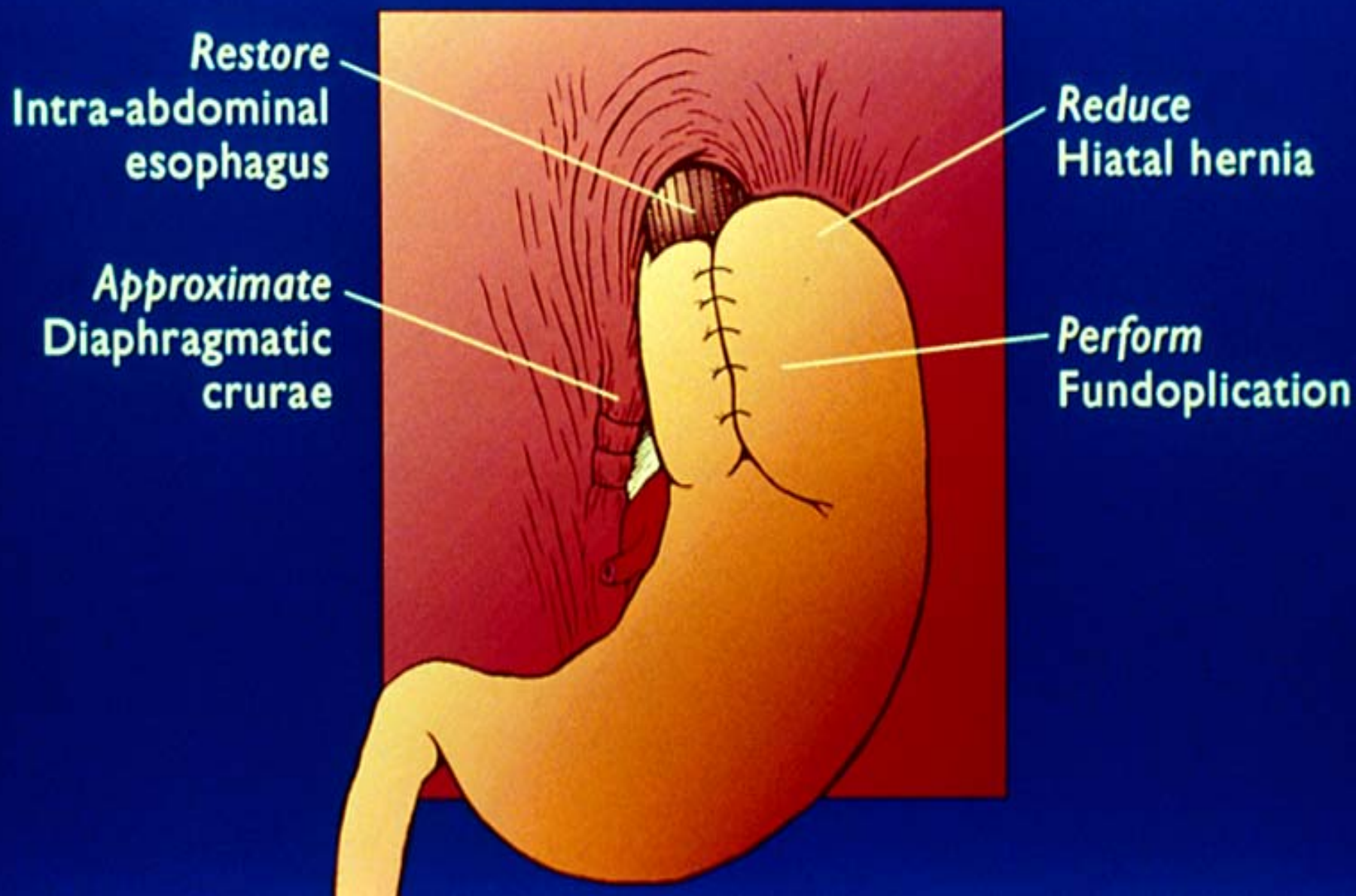
Therapeutic Options in the Treatment of GERD

- Lifestyle modifications
- Pharmacological Agents
 - Prokinetic Agents
 - Anti-secretory Agents
 - H₂-receptor antagonists
 - Proton pump inhibitors
- **Anti-reflux surgery**
- Endoscopic anti-reflux procedures





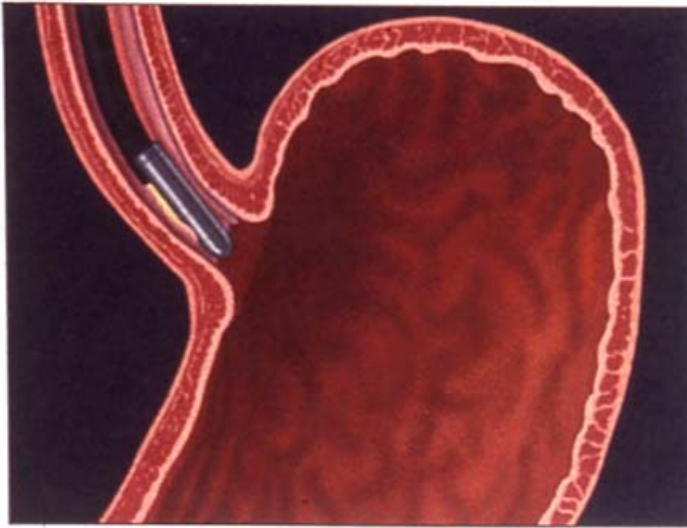
Principles of Anti-Reflux Surgery



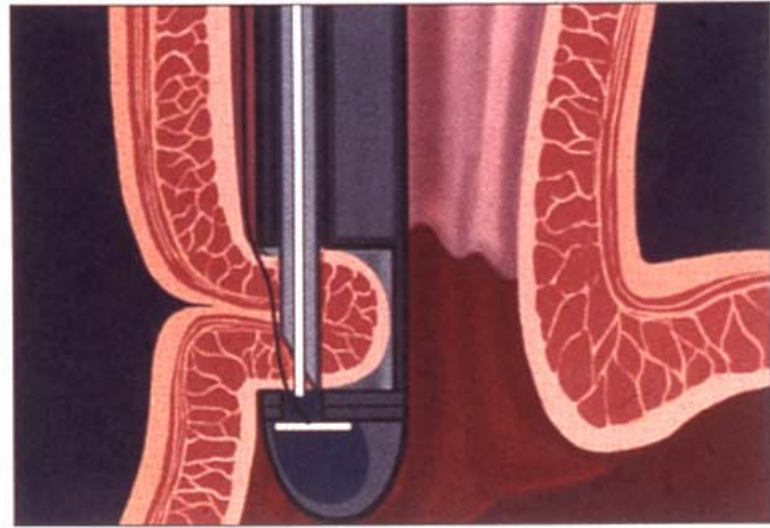
Therapeutic Options in the Treatment of GERD

- Lifestyle modifications
- Pharmacological Agents
 - Prokinetic Agents
 - Anti-secretory Agents
 - H₂-receptor antagonists
 - Proton pump inhibitors
- Anti-reflux surgery
- **Endoscopic anti-reflux procedures**

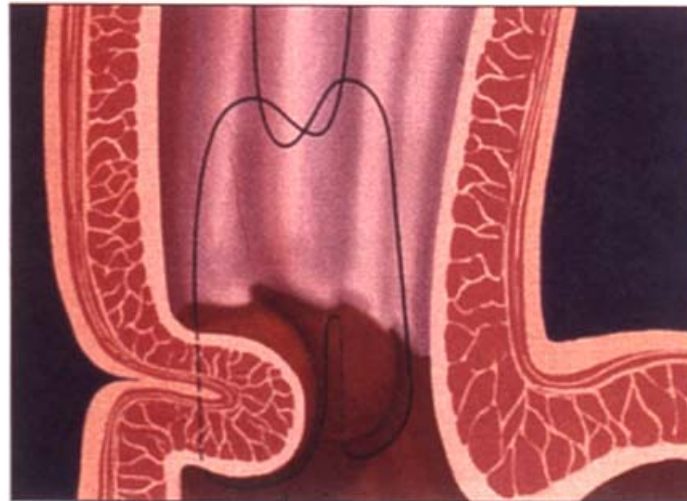
Bard® Endoscopic Suturing System



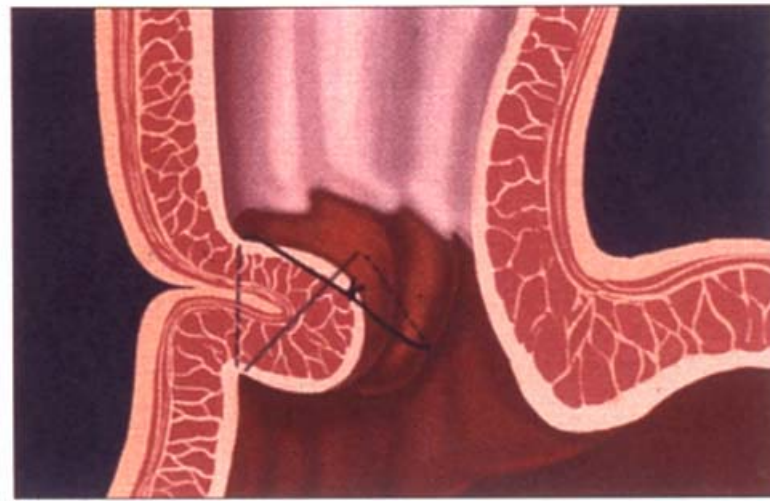
Endoscope advanced into gastric cardia.



Vacuum applied, tissue captured, and stitch placed.

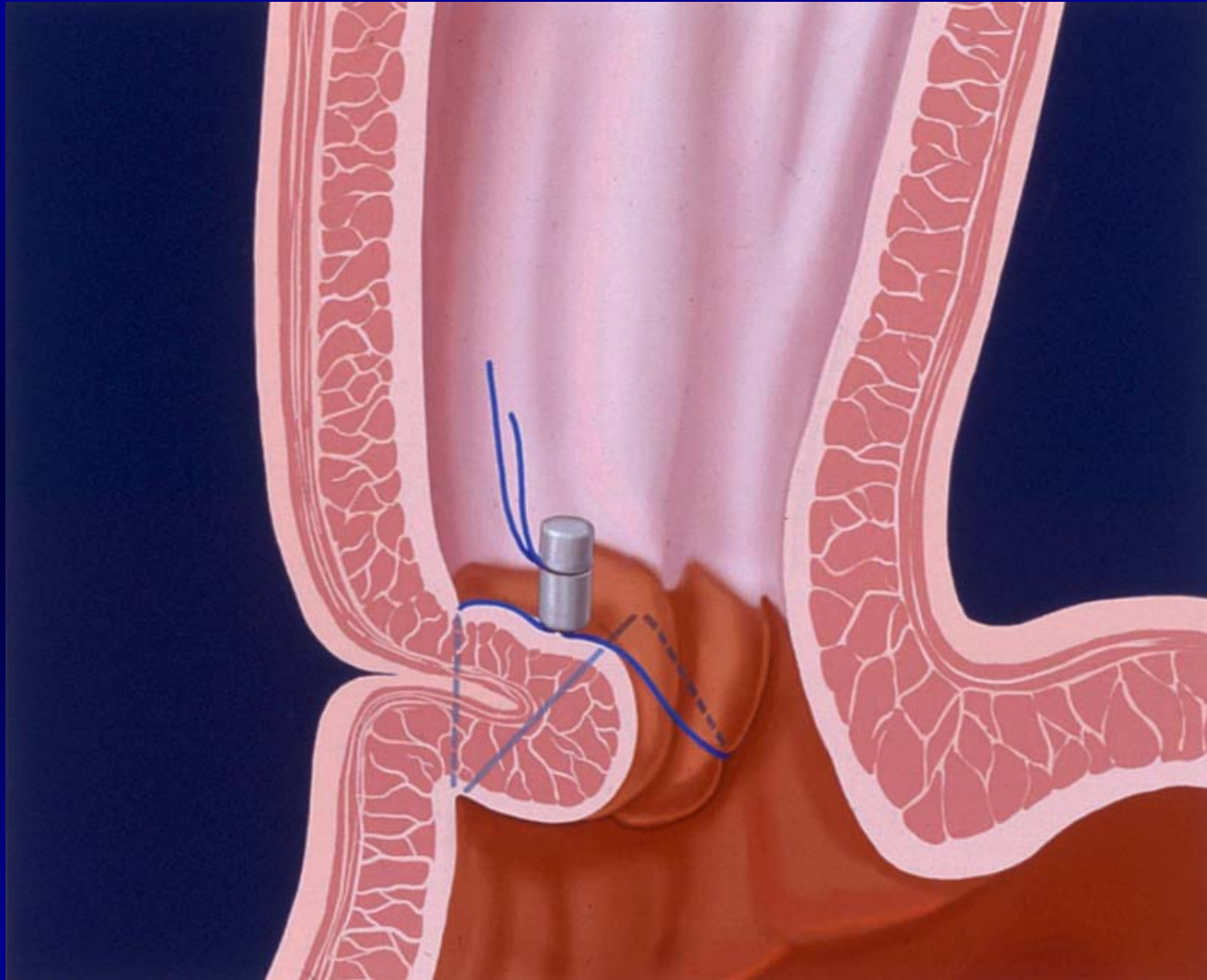


Knot tied.

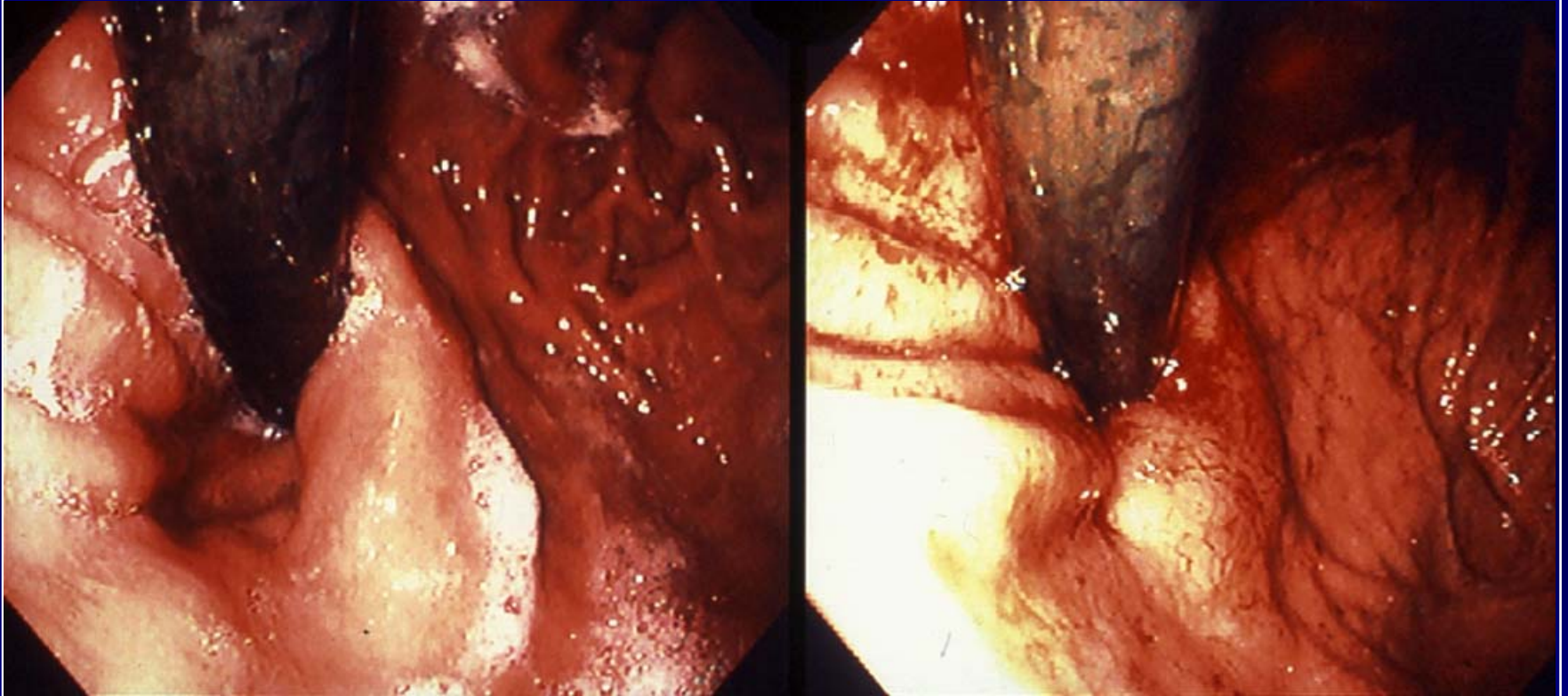


Gastroplication formed.

The EndoCinch Procedure



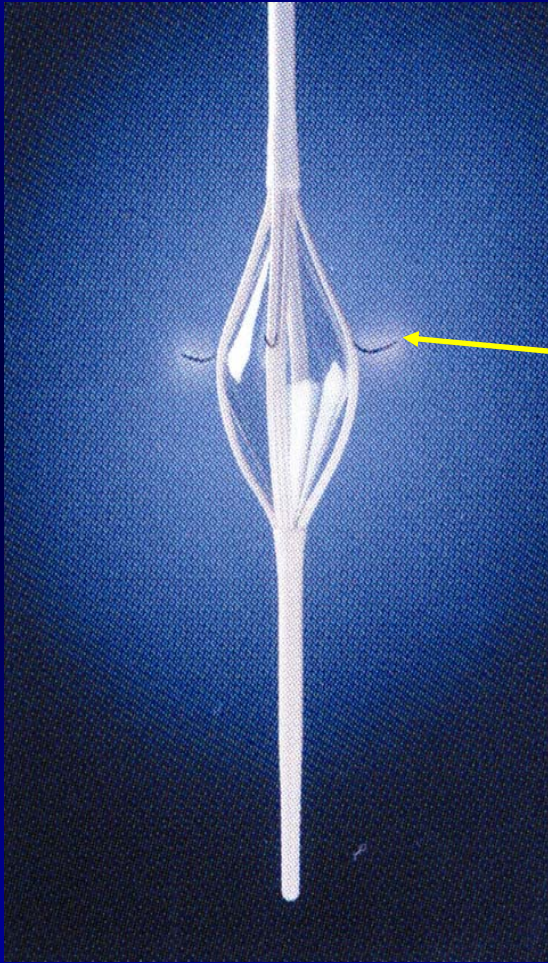
The EndoCinch Procedure



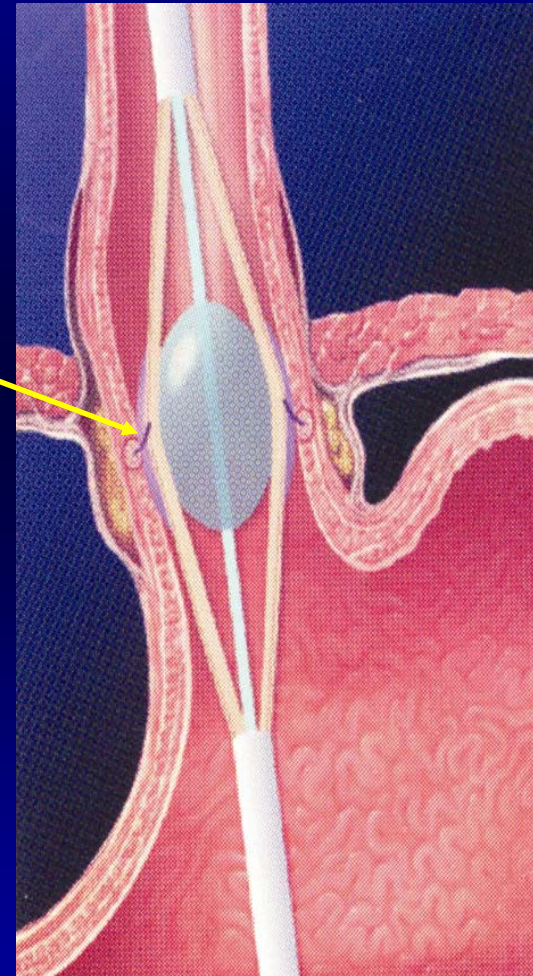
Failed EndoCinch Procedure



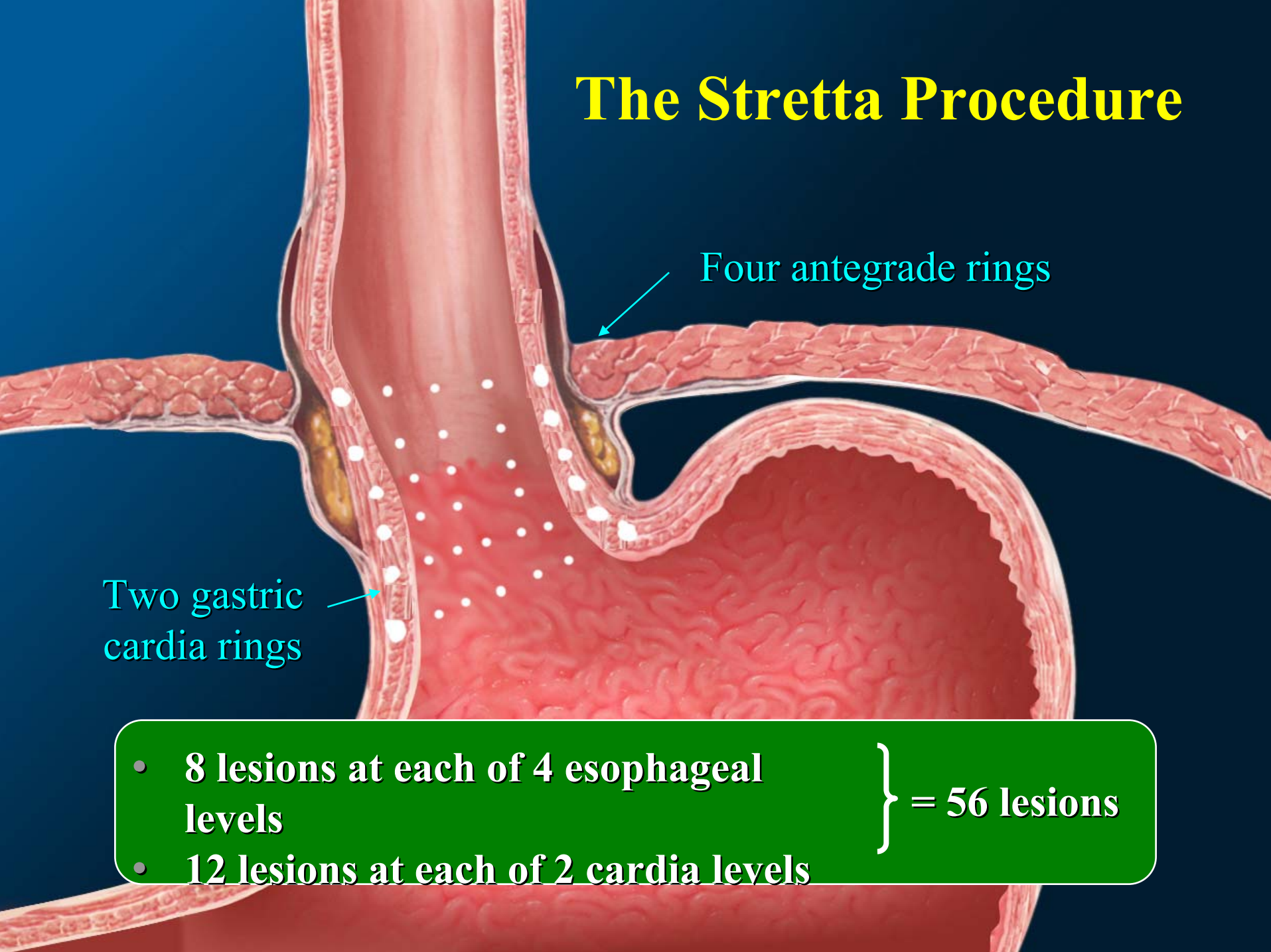
Stretta™ Radiofrequency Energy System



Electrodes



The Stretta Procedure

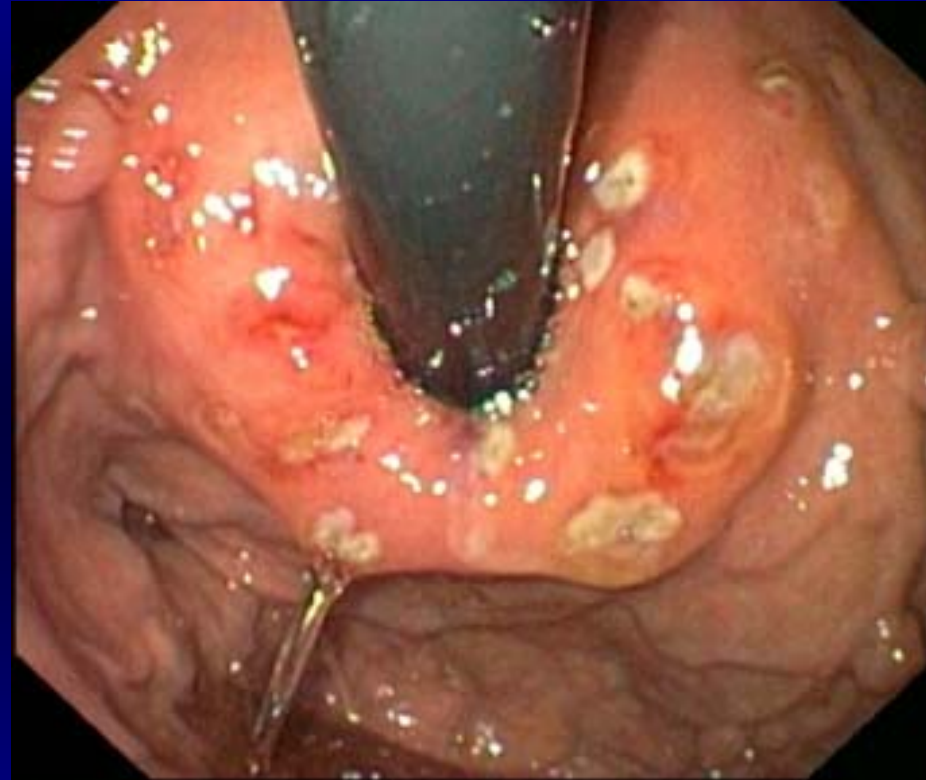


Four antegrade rings

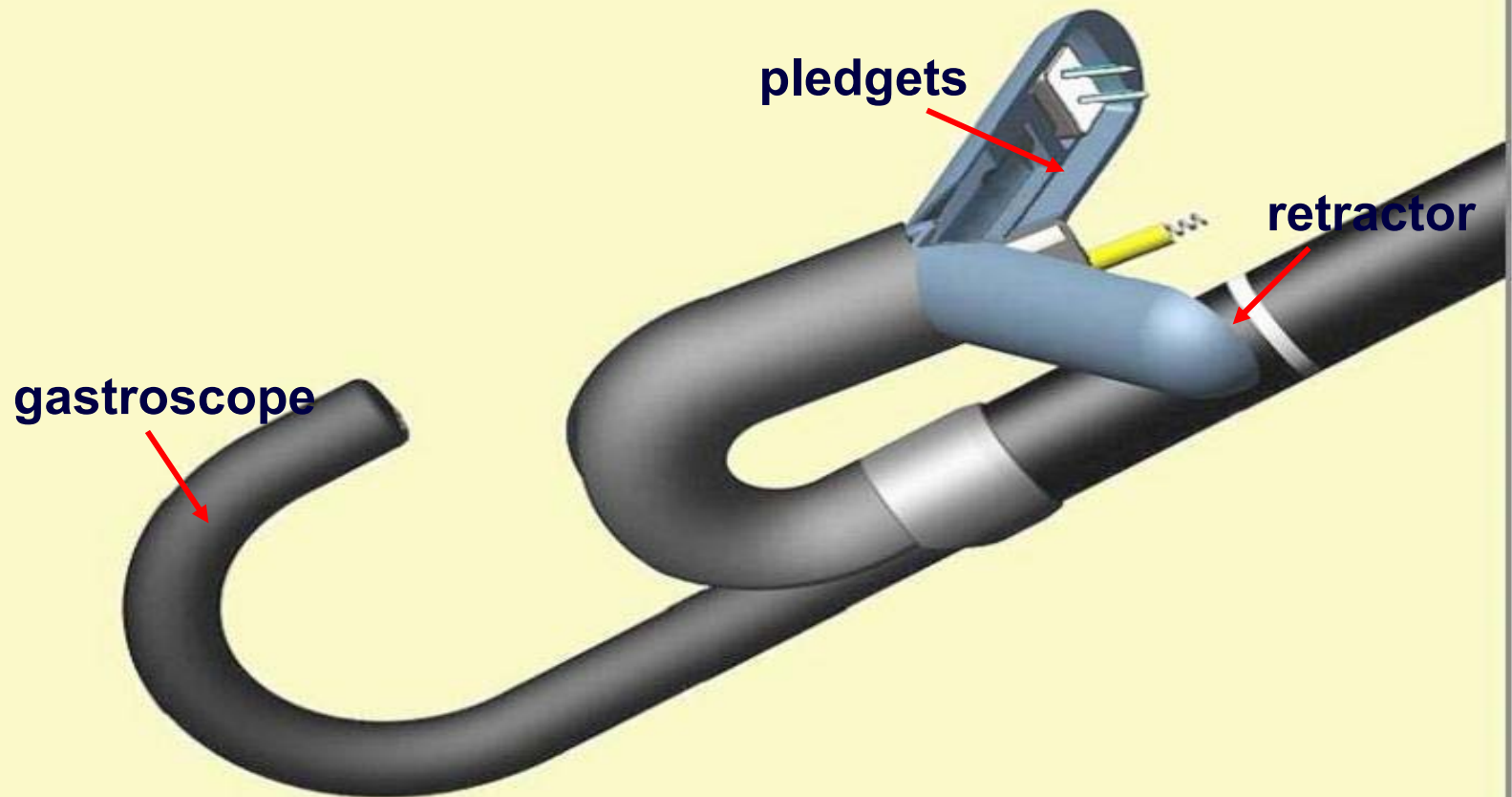
Two gastric cardia rings

- 8 lesions at each of 4 esophageal levels
 - 12 lesions at each of 2 cardia levels
- } = 56 lesions

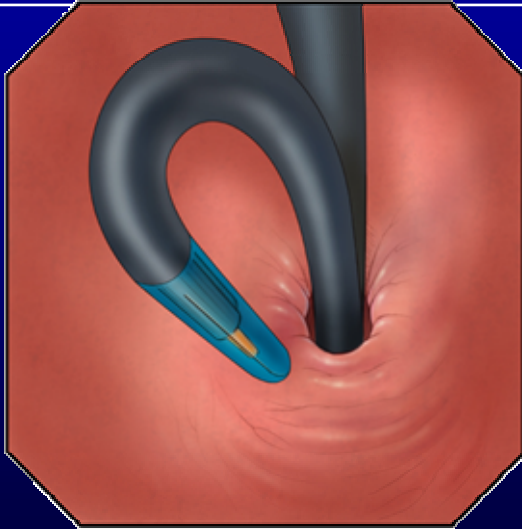
The Stretta Procedure



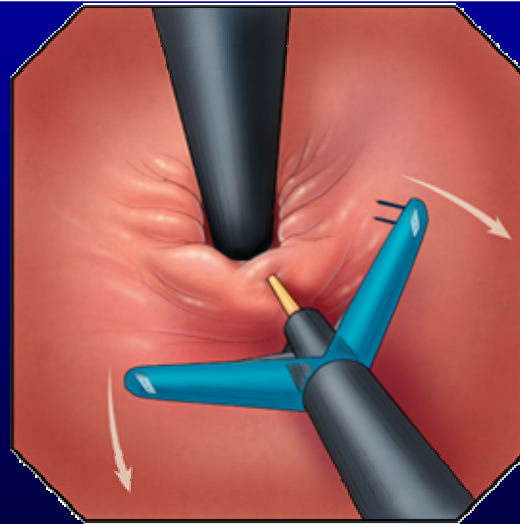
Endoscopic Plication System



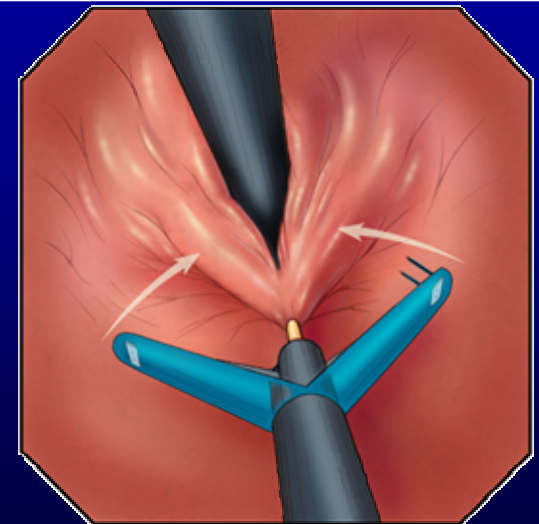
Endoscopic Full-Thickness Plication



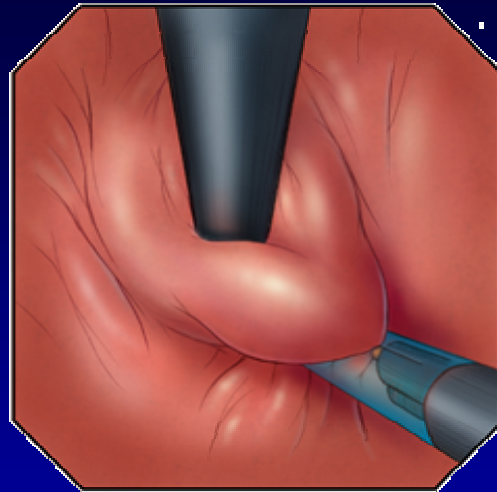
1 Plicator and gastroscope retroflexed to GEJ in anterior position.



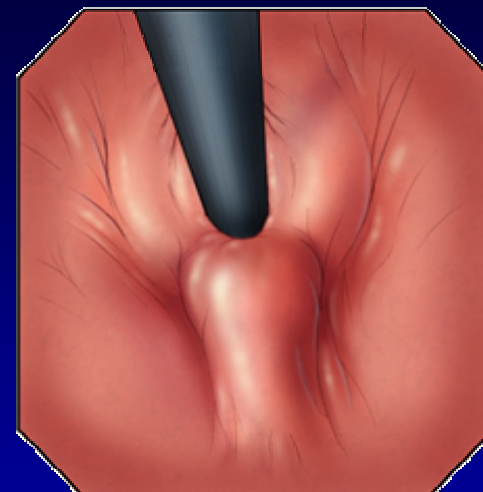
2 Arms opened, tissue retractor advanced to serosa.



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



2

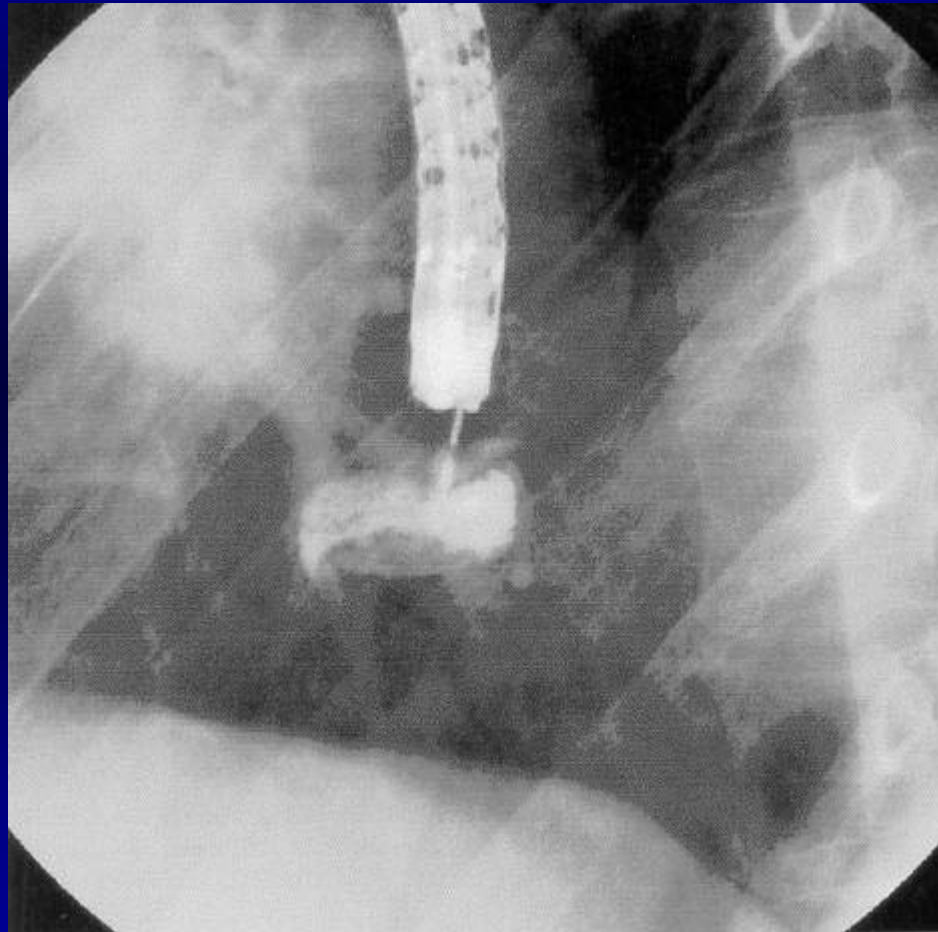


3

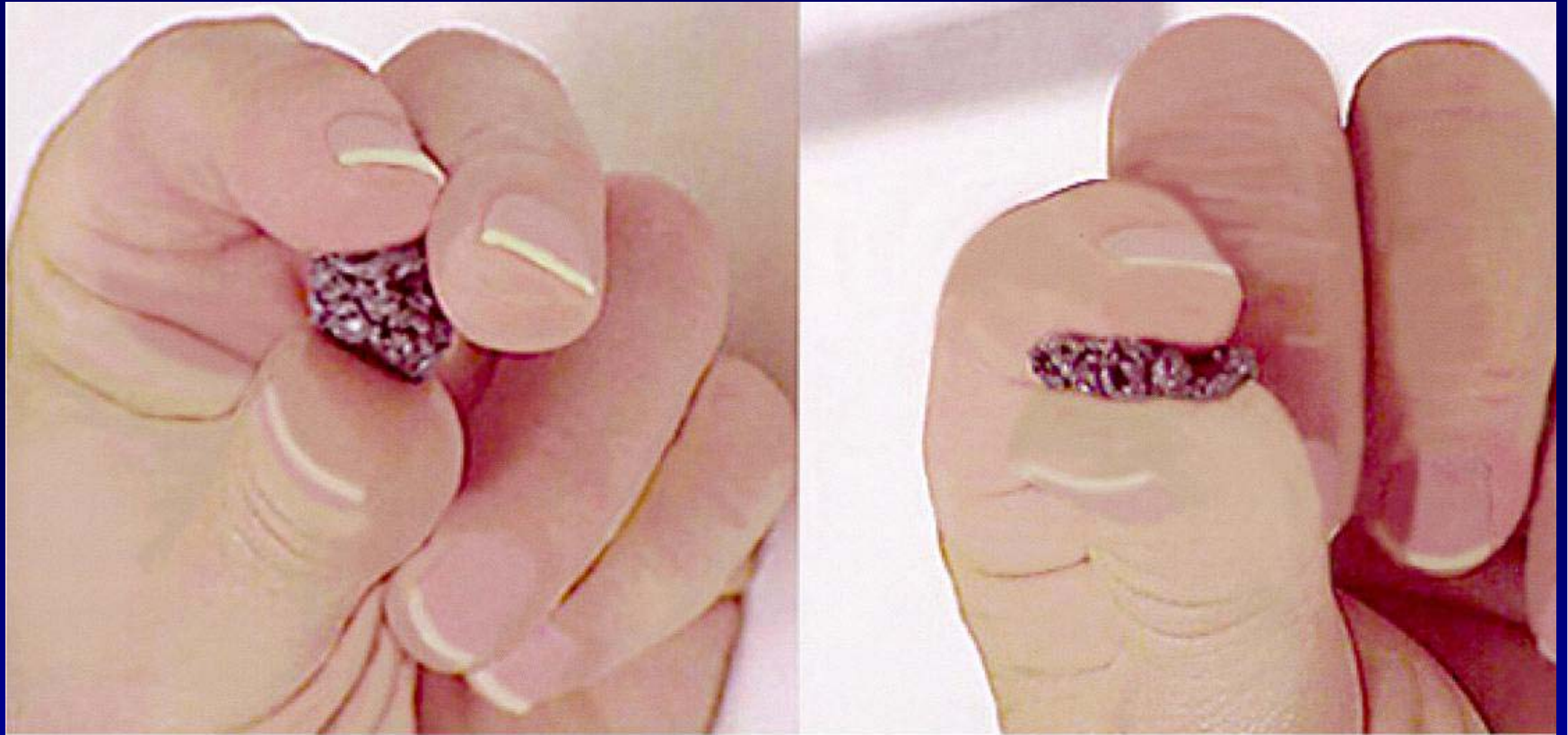


4

Enteryx™ injection into the region of the LES



Enteryx™



GERD: The role of surgery

