Evaluation and Treatment of Postfundoplication Problems

John M. Wo, M.D.

April 10, 2008

Evaluation and Treatment of Postfundoplication Problems

- Case study
- Key steps in evaluating postfundoplication problems
- Treatment and expectation

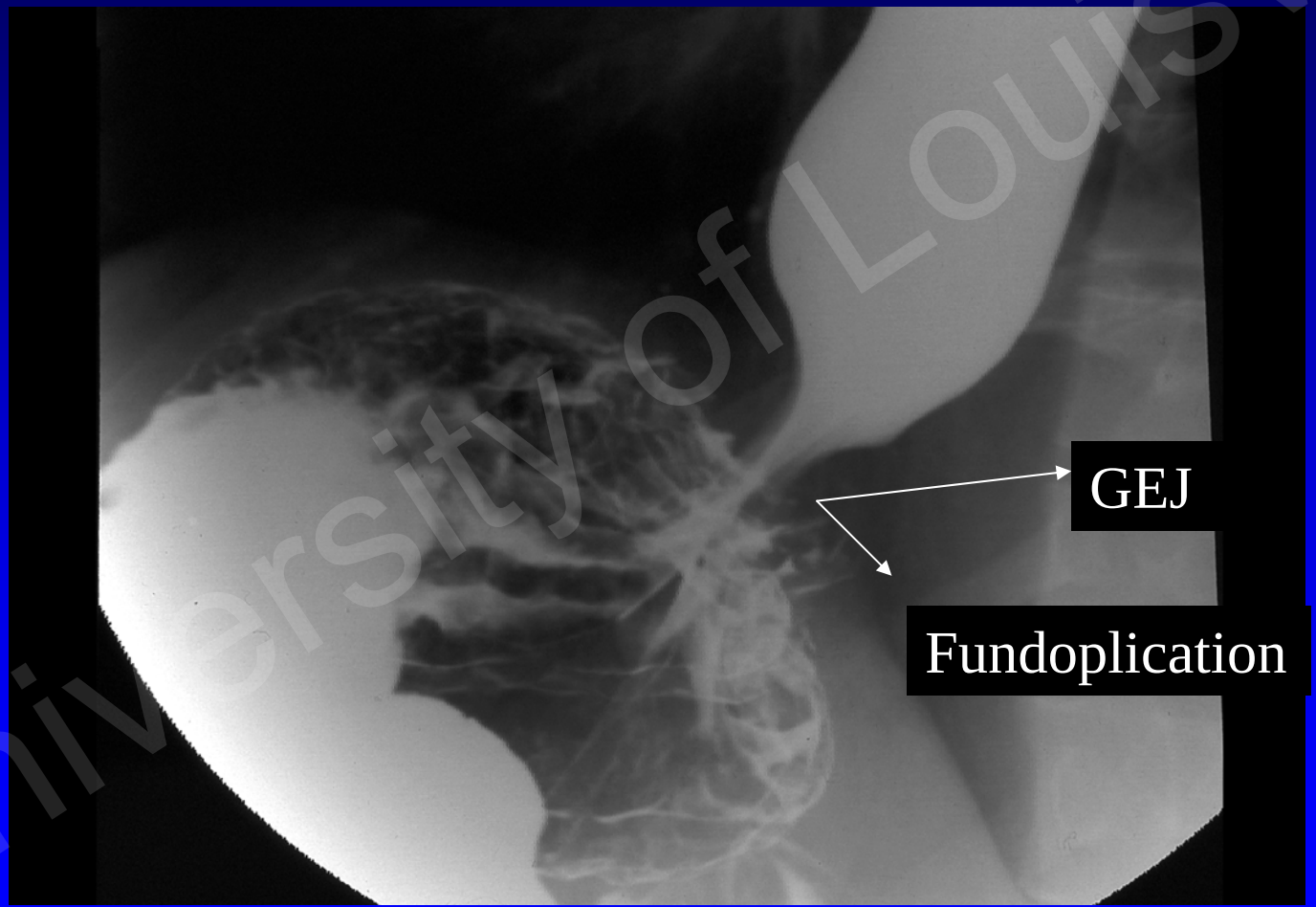
Case #1

- 34 yo female c/o debilitating bloating after antireflux surgery
- Long h/o heartburn
- S/p lap Nissen fundoplication 11 months ago
- Heartburn resolved but developed new postprandial bloating and nausea
- Report mild, infrequent dysphagia
- Normal physical exam

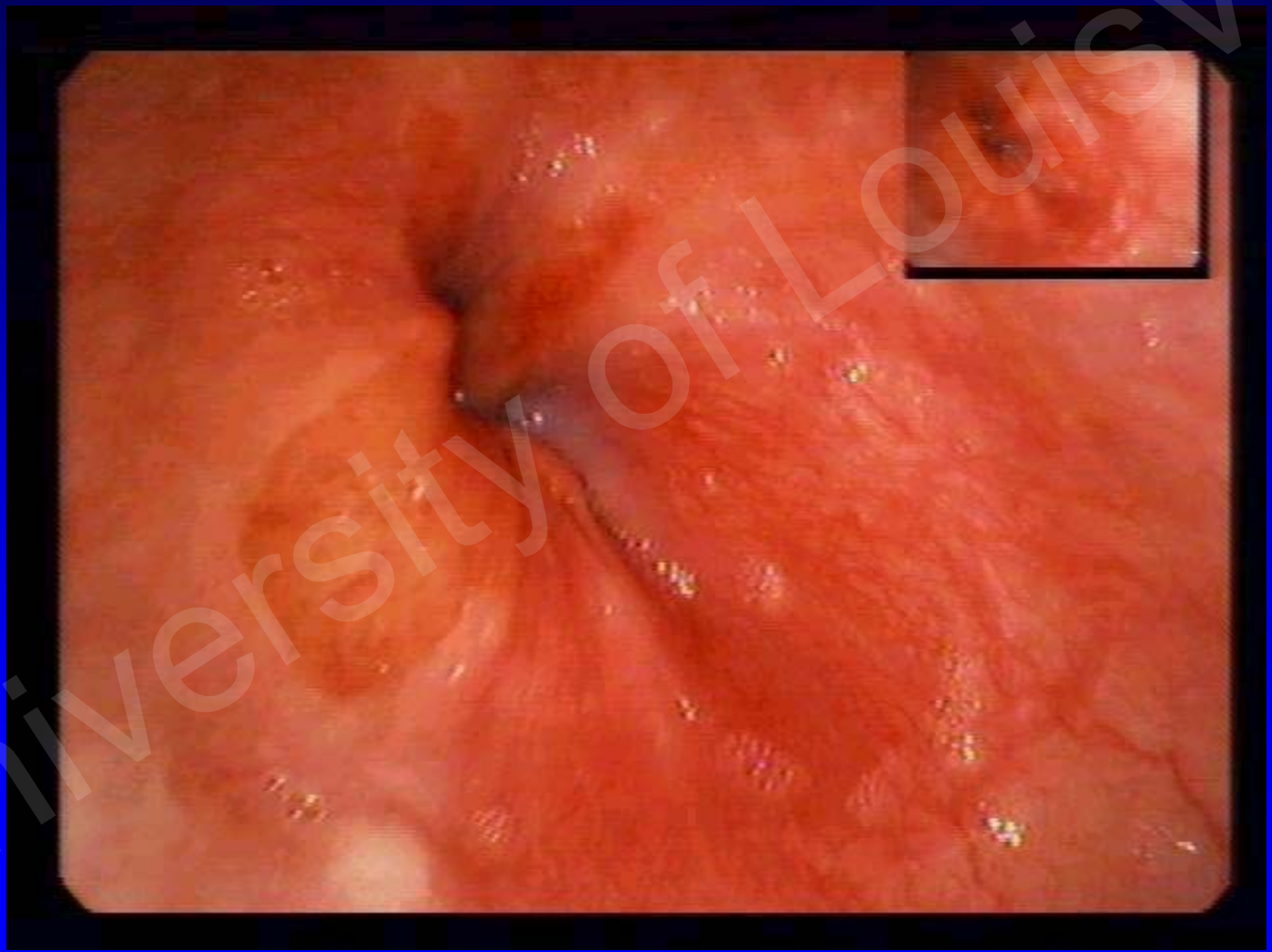
Case #1 (cont.)

- Pre-op manometry
  - LES 20 mmHg, distal esophageal P 44 mmHg,
  - 100% peristalsis
- Pre-op pH test
  - Distal esophageal acid time pH<4: 10%
  - Proximal esophageal acid time pH<4: 3.8%

Case #1 (cont.)



Case #1 (cont.)



Case #1 (cont.)

Case #1 (cont.)

- EGD
  - Slightly slipped otherwise normal
  - Dilated to 60 F
- No improvement in bloating

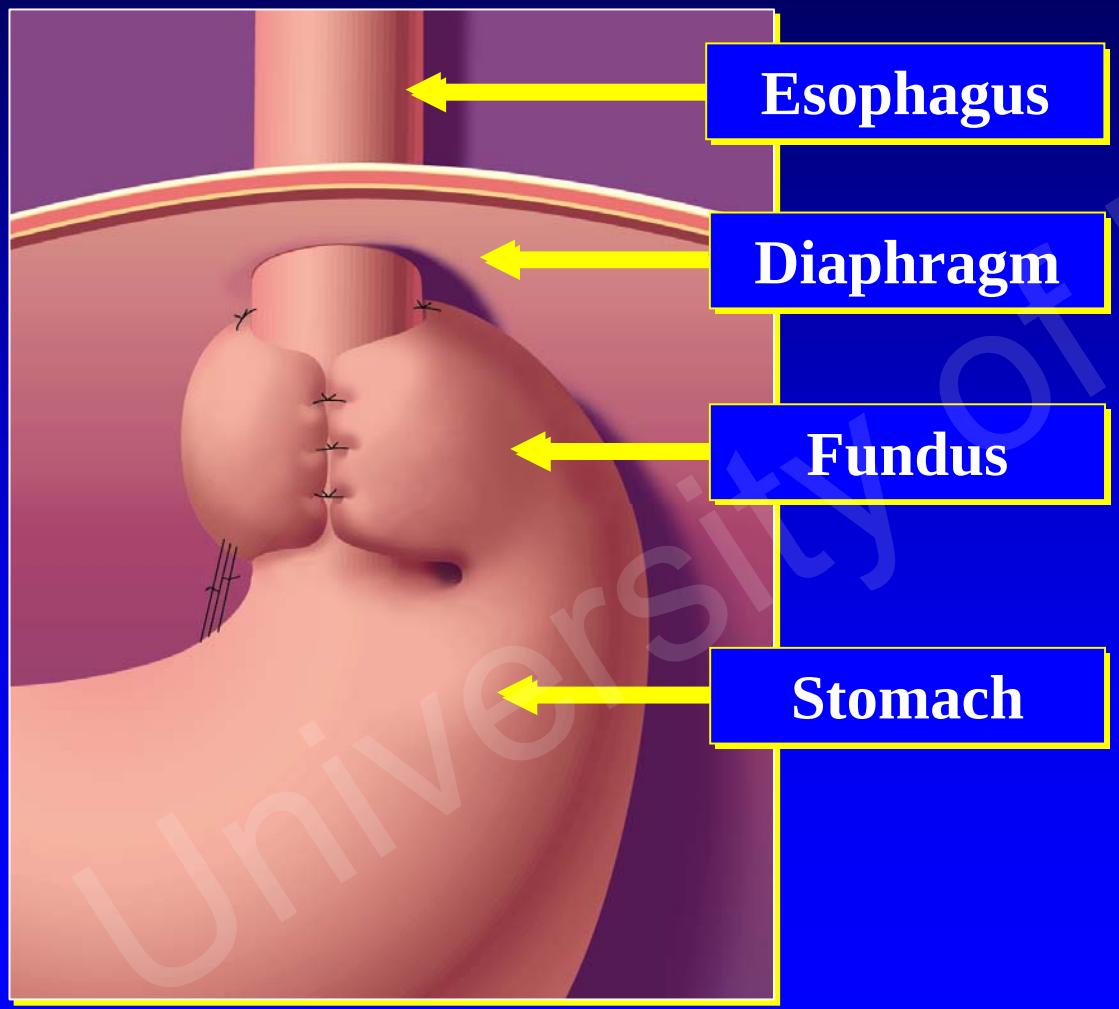
Case #1 (cont.)

- 4-hr GET
  - 10% residual at 2 hrs
  - 0% residual at 4 hrs
- Repeat esophageal manometry & pH test normal
- Dilated with 3 cm achalasia balloon did not help
- Repeat 4-hr GET normal
- Small bowel manometry normal

Case #1 (cont.)

- Diagnosis
  - "Functional" postfundoplication gas-bloat
  - Esophageal or gastric function normal
- Underwent re-do surgery
  - Conversion to Toupet (partial) fundoplication
- Symptoms improved 25%

Nissen (360º) Fundoplication



- Avoid esophageal tension
- Take down short gastric vessels to mobilize fundus
- 2 cm fundus wrap over 54-60 F dilator
- Close crura defect

Key Factors for Successful Antireflux Surgery

- Proper patient selection
- Pre-operative evaluation
- Surgical technique

Key Steps in Evaluating Postfundoplication Problems

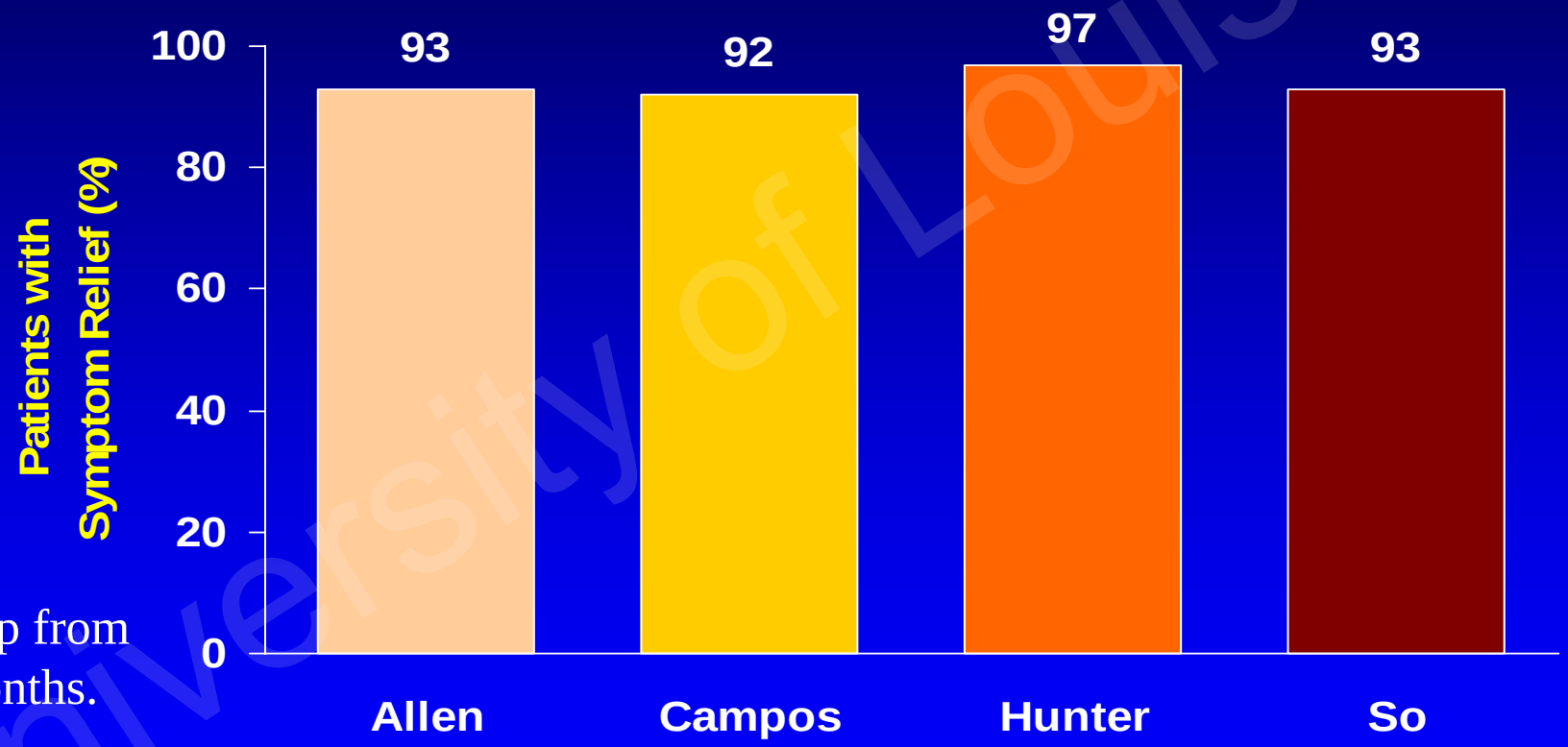
1) What are the pre-op symptoms?
2) Are the post-op symptoms new, old, or both?
3) Review pre-op testing
4) Identify post-op anatomy & physiology

Step 1:What are the Pre-op Symptoms?

Symptoms Requiring Fundoplication

- Typical heartburn and regurgitation
- Atypical GERD
  - Chest pain, asthma, epigastric burning, etc.
- Additional symptoms besides GERD
  - “Red flags?”
- Wrong diagnosis

Fundoplication: Efficacy in Relieving Typical Heartburn



*Follow-up from 6 to 15 months.

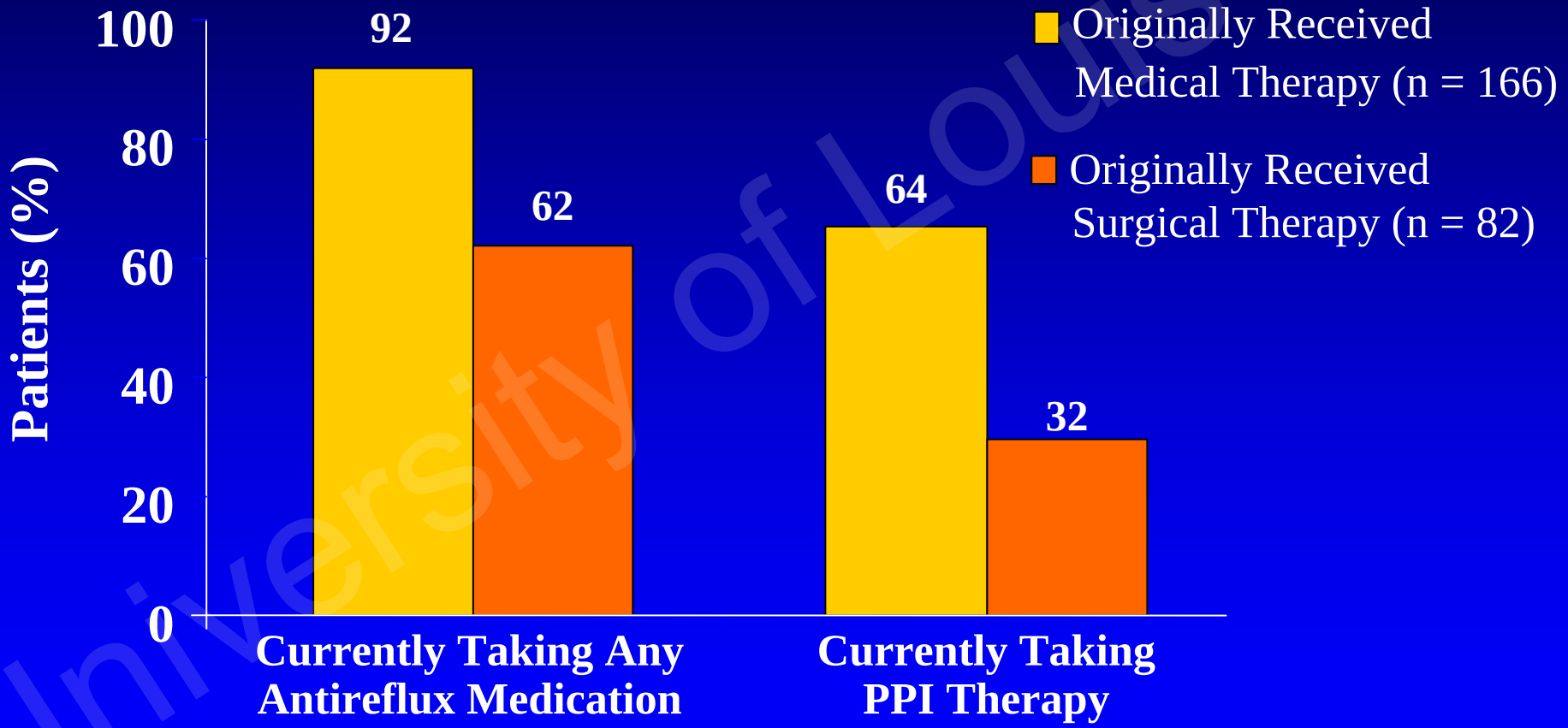
Allen et al. *Thorax.* 1998;53:963-968.

Campos et al. *J Gastrointest Surg.* 1999;3:292-300.

Hunter et al. *Ann Surg.* 1996;223:673-685.

So et al. *Surgery.* 1998;124:28-32.

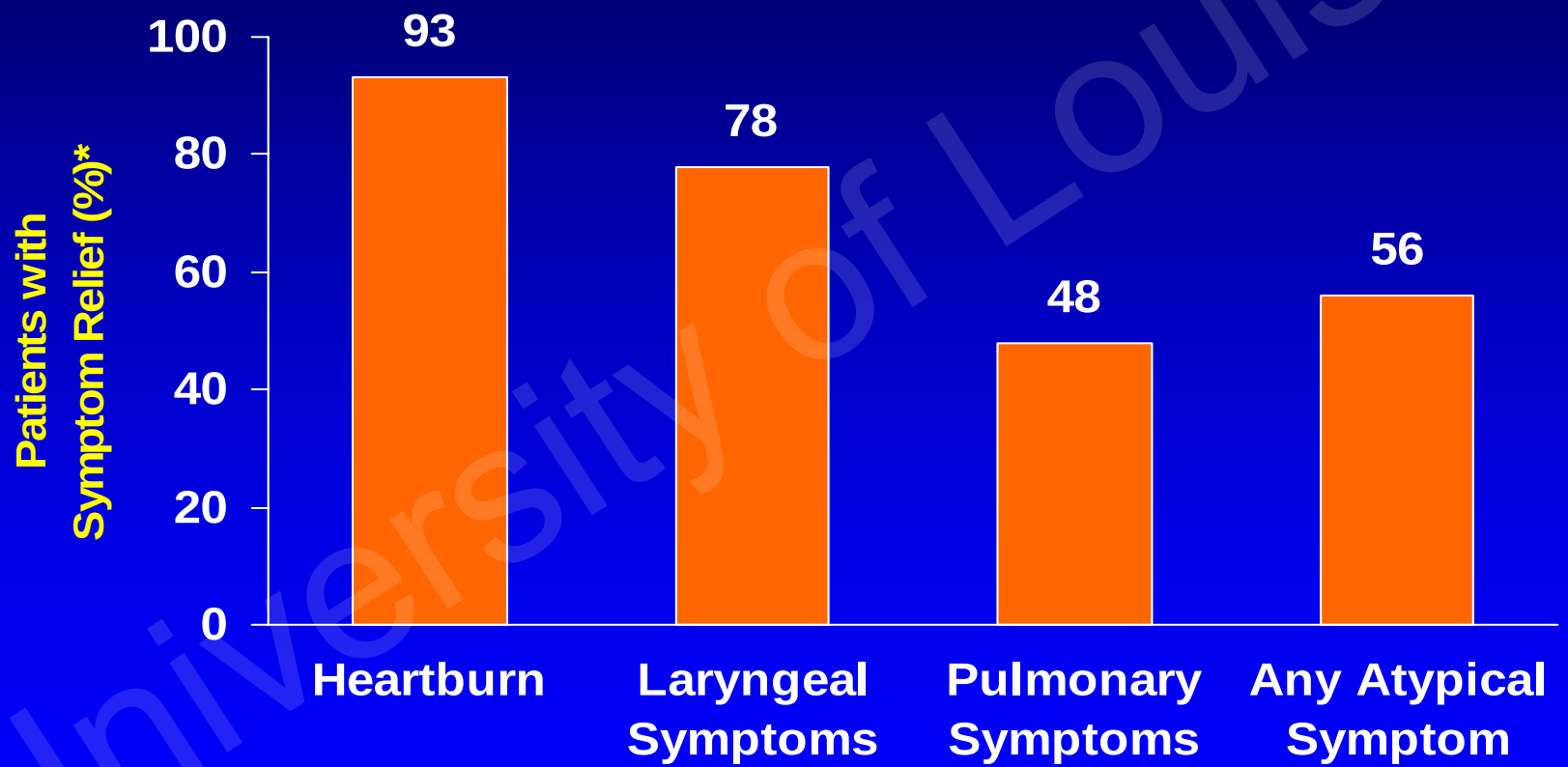
Long-Term Follow-Up of Medication Use After Fundoplication



11 to 13 years f/u.

Spechler et al. *JAMA*. 2001;285:2331-2338.

Fundoplication: Efficacy in Relief of Atypical GERD



N = 150 (35 with atypical symptoms).
So et al. *Surgery*. 1998;124:28-32.

Pre-op "Red Flags" for Fundoplication

- No response to PPI
  - Wrong diagnosis, achalasia, gastroparesis
- NERD, chest pain
  - Hypersensitive esophagus, spasm
- Large hiatal hernia, dysphagia, or multiple dilations
  - Shortened esophagus
- Nausea, vomiting & bloating
  - Gastroparesis, aerophagia
- Pre-op impaired esophageal motility
  - Increase postfundoplication dysphagia
- IBS, depression, anxiety, etc.
  - Worse post-op

Step 2: Are the Post-op Symptoms New, Old, or Both?

Postfundoplication Symptoms

- Recurrence of pre-op symptoms
- New post-op symptoms
  - Dysphagia
  - Gas-bloat
  - Chest pain
  - Epigastric/Abdominal pain
  - Diarrhea
  - Increased flatus

Causes of Postfundoplication Problems

Recurrent Symptoms

- Loosen or disrupted wrap
- Wrong diagnosis

New Symptoms

- Slipped fundoplication
- Paraesophageal hernia
- Gastroparesis & vagal neuropathy
- Functional bloating (air trapping)
- Too tight
- Esophageal spasm

Step 3: Review Pre-op Testing

Pre-op Evaluation for Antireflux Surgery

- EGD
- Esophageal manometry
- pH test in patients without esophagitis
- Gastric emptying in selected patients

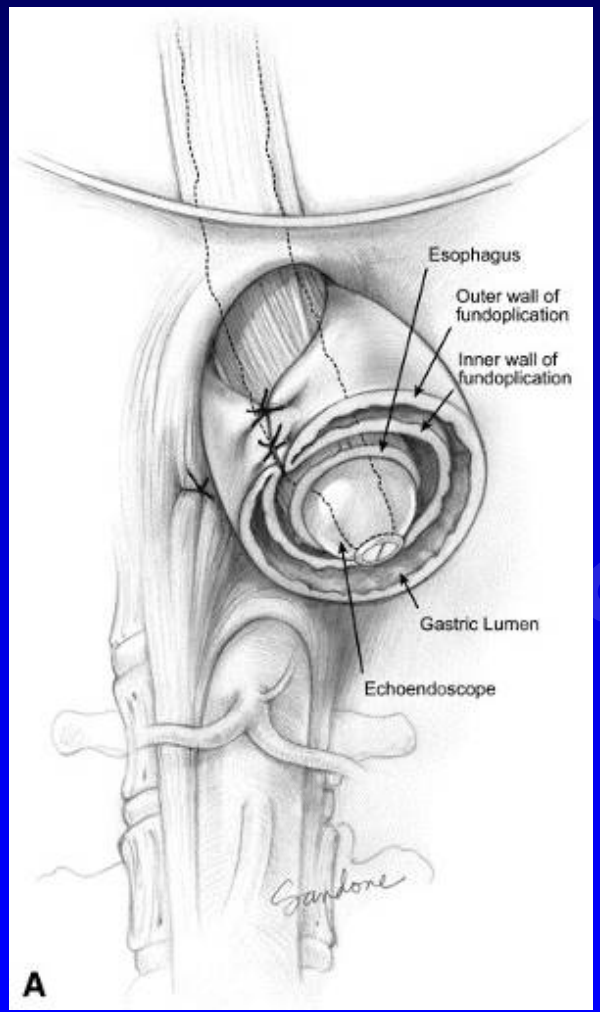
Waring JP, Hunter JG, Oddsdottir M, et al.. *Am J Gastroenterol* 1995;90:35-38.

Step 4: Identify Post-op Anatomy & Physiology

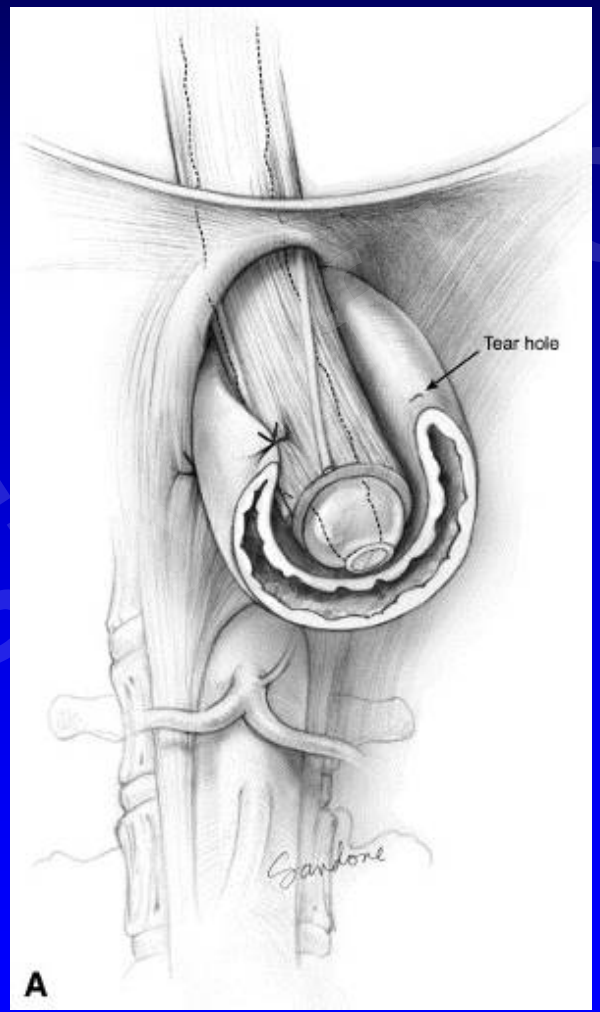
Anatomic Consideration

- Wrap integrity
  - 1) Normal (intact)
  - 2) Loosen (disrupted)
  - 3) Too tight (too long)
  - 4) Slipped wrap
  - 5) Paraesophageal herniation

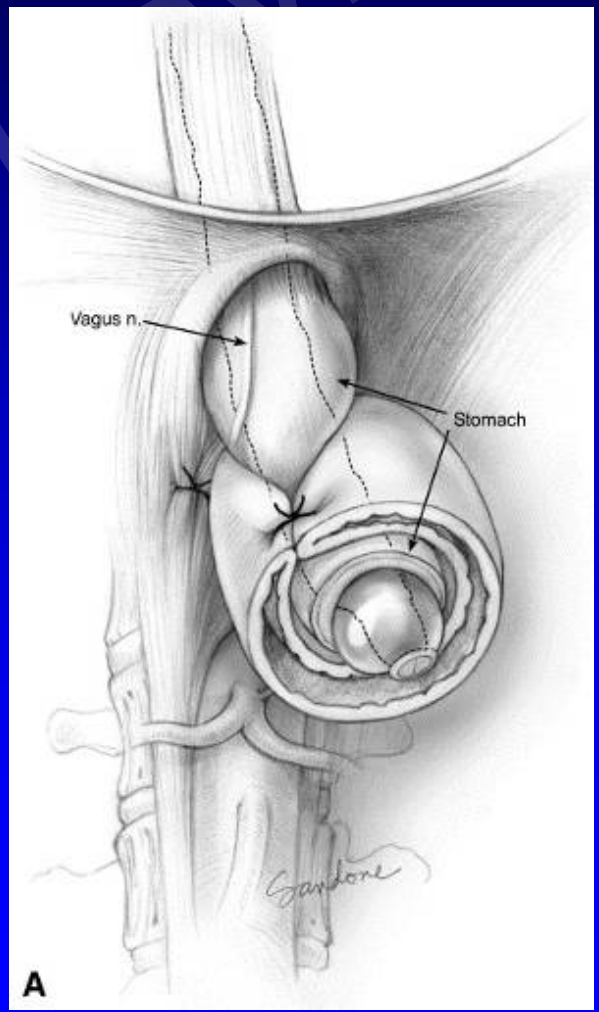
Normal Wrap

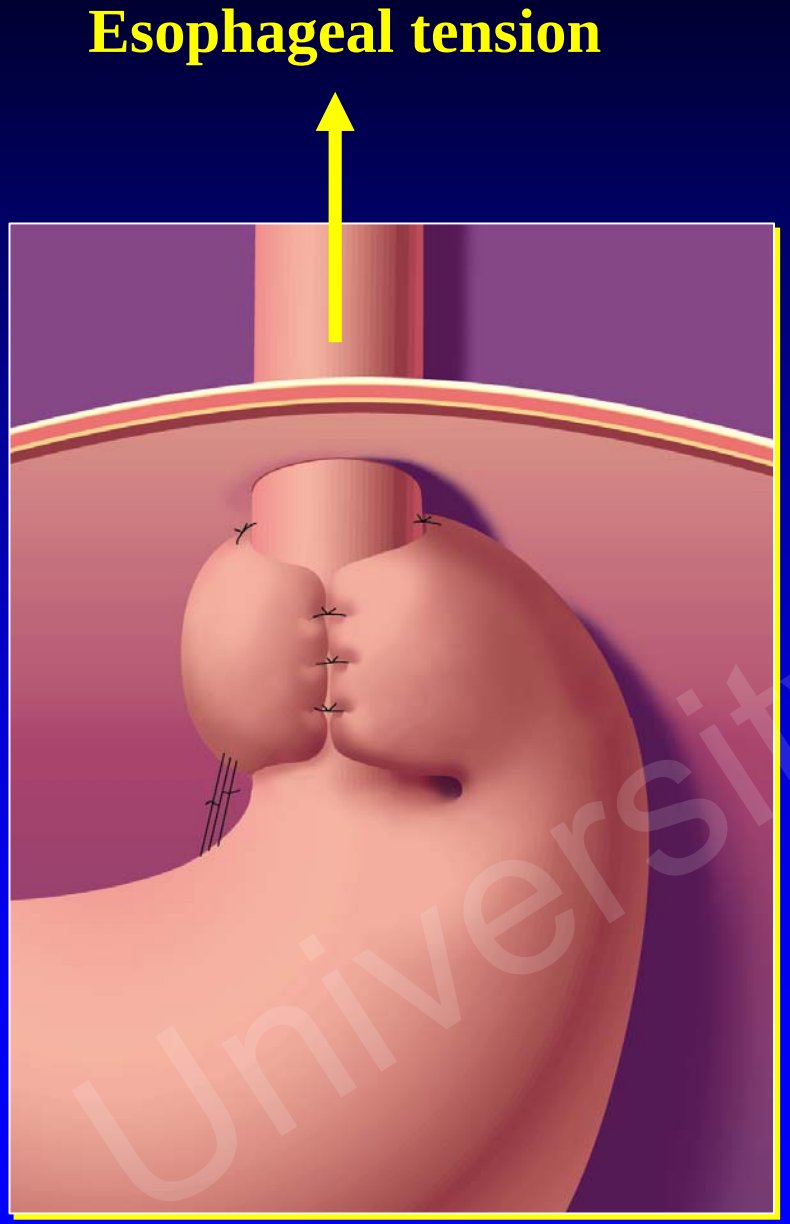


Loosen Wrap



Slipped Wrap





Slipped Wrap

Potential Risk Factors

- Large hiatal and paraesophageal hernia
- Scarred esophagus
- Barrett's esophagus
- Inadequate surgical exposure
- Retching and vomiting

Type 1
Sliding hernia

Type 2
True Paraesophageal hernia

Type 3
Mixed Paraesophageal hernia

Wo JM et al. Am J Gastroenterol 1996;91:914-916.

Physiologic Consideration

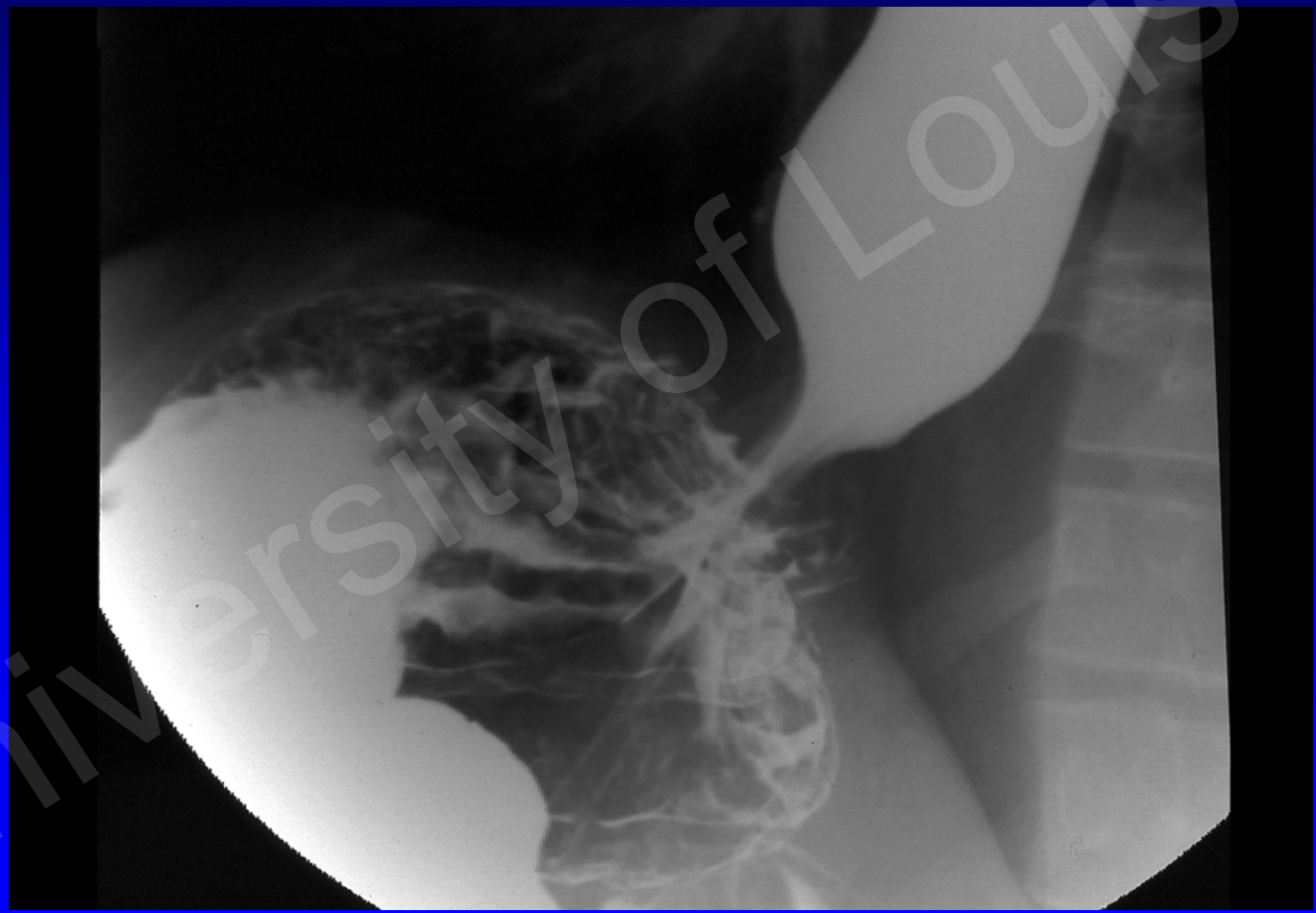
- Esophageal peristalsis
  - Manometry
    - Impaired or Absent (achalasia or secondary from GERD or wrap)
- Esophageal transit
  - Timed barium swallow (Achalasia protocol)
- Gastroparesis
  - Gastric scintigraphy
- Vagal neuropathy
  - Antroduodenal manometry

Postfundoplication Testing Protocol

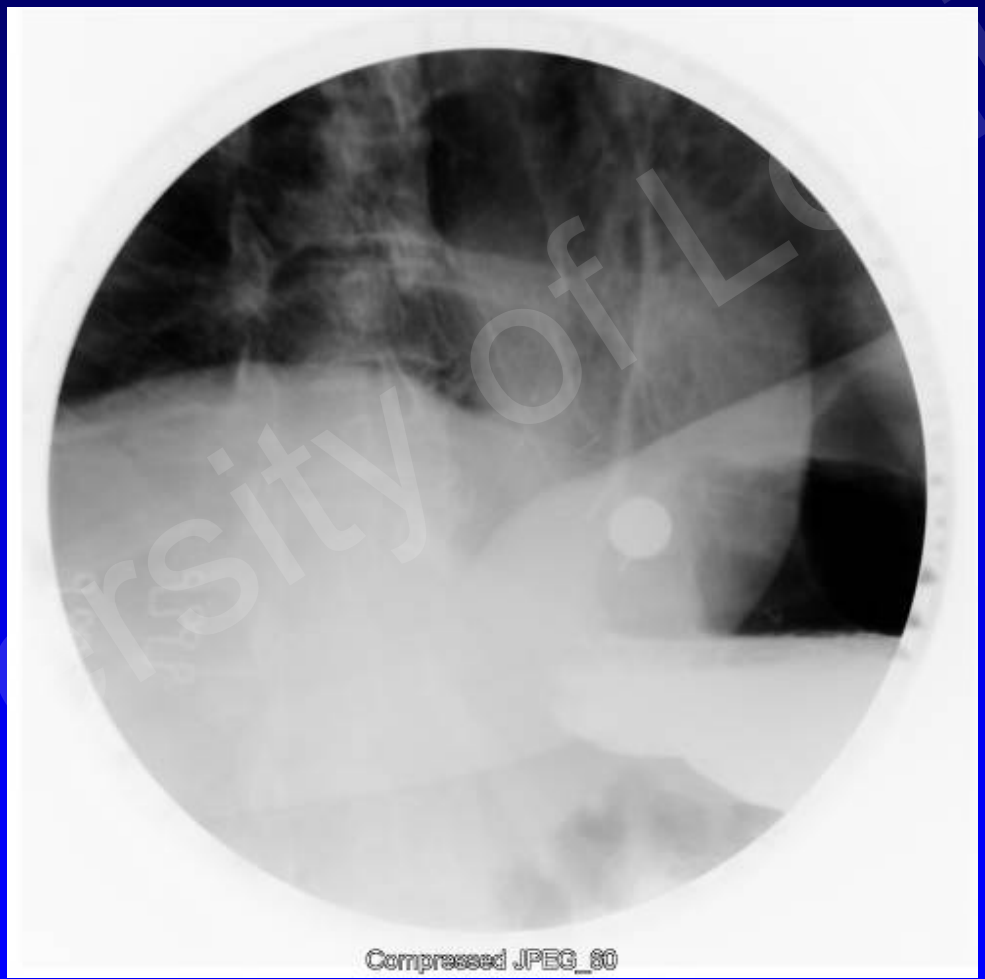
1. Esophageal manometry
2. **EGD**
3. 4-hr GET

- Others, depending on clinical scenario
  - **Barium swallow**
  - Timed barium swallow
  - Bravo pH
  - Small bowel manometry

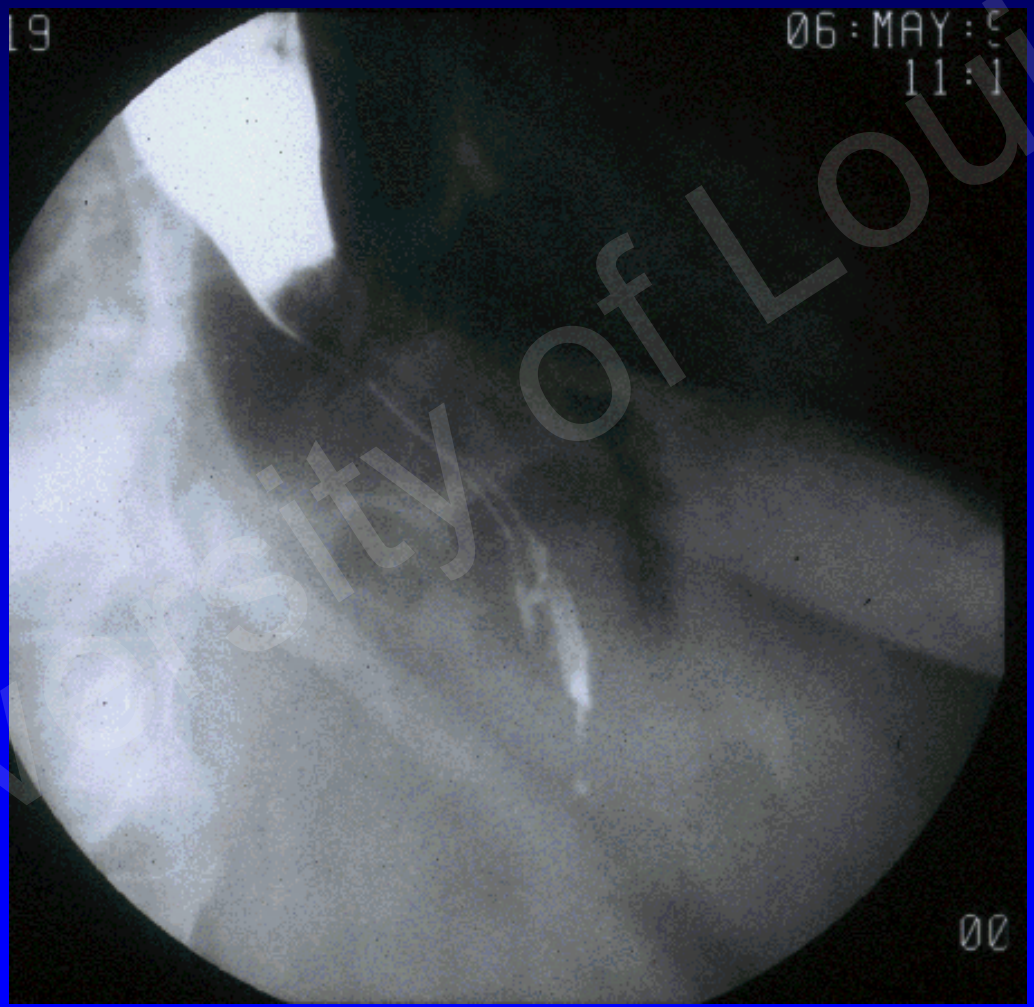
Normal Wrap



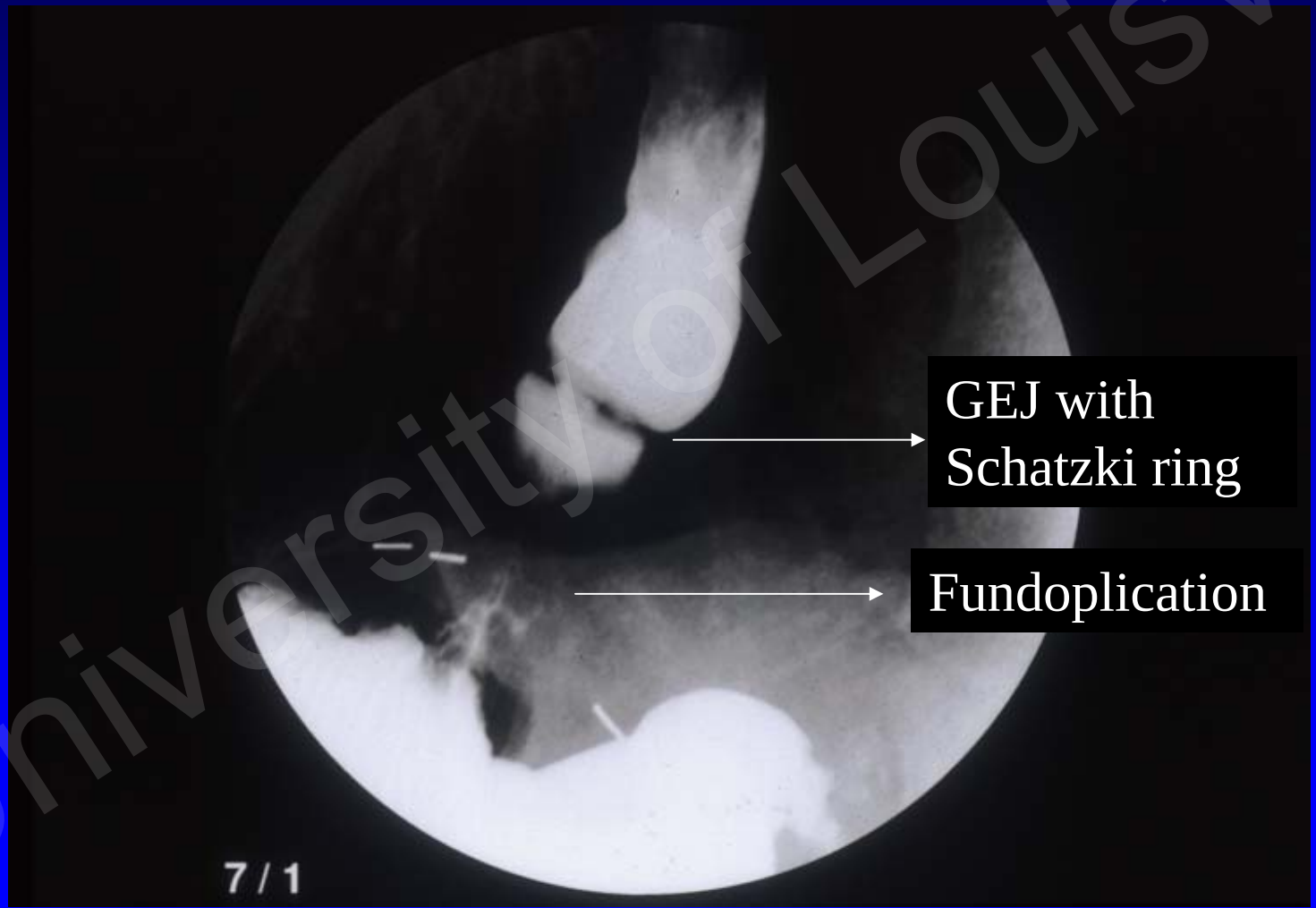
Barium Tablet Impaction is Common After Antireflux Surgery



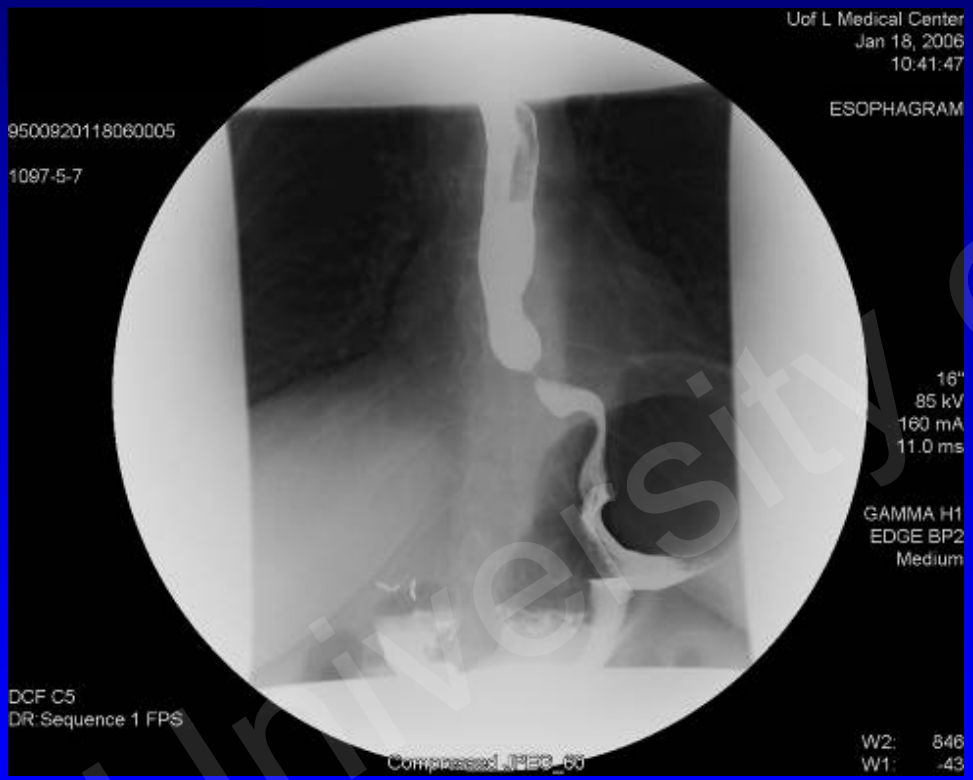
Tight or Long Wrap

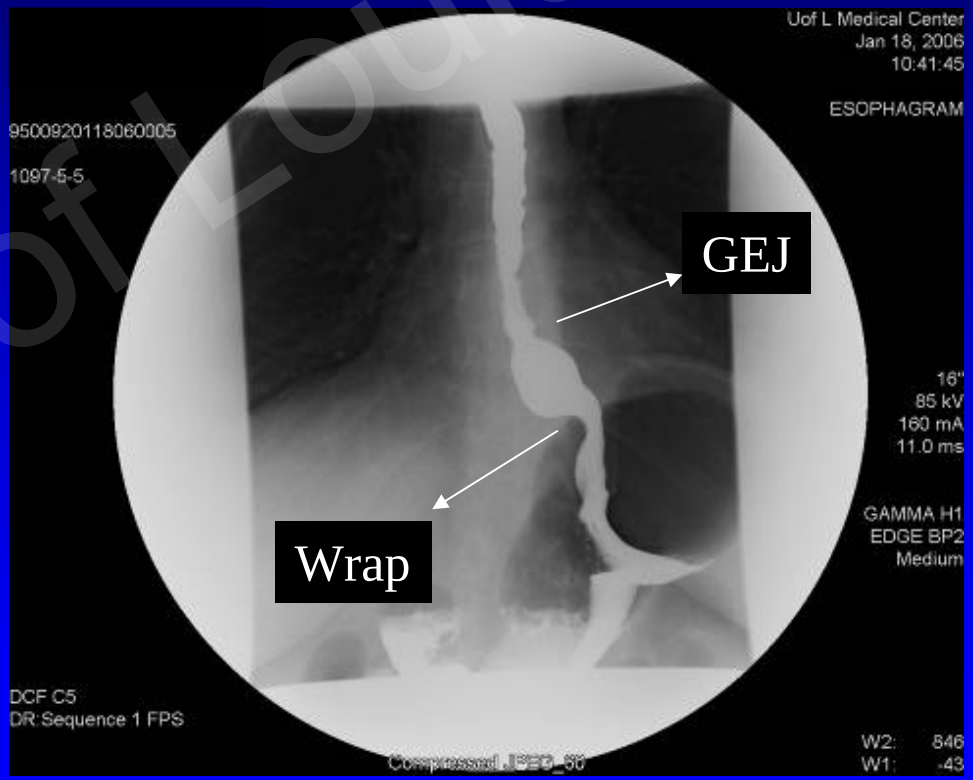


Slipped Wrap & GEJ Stricture

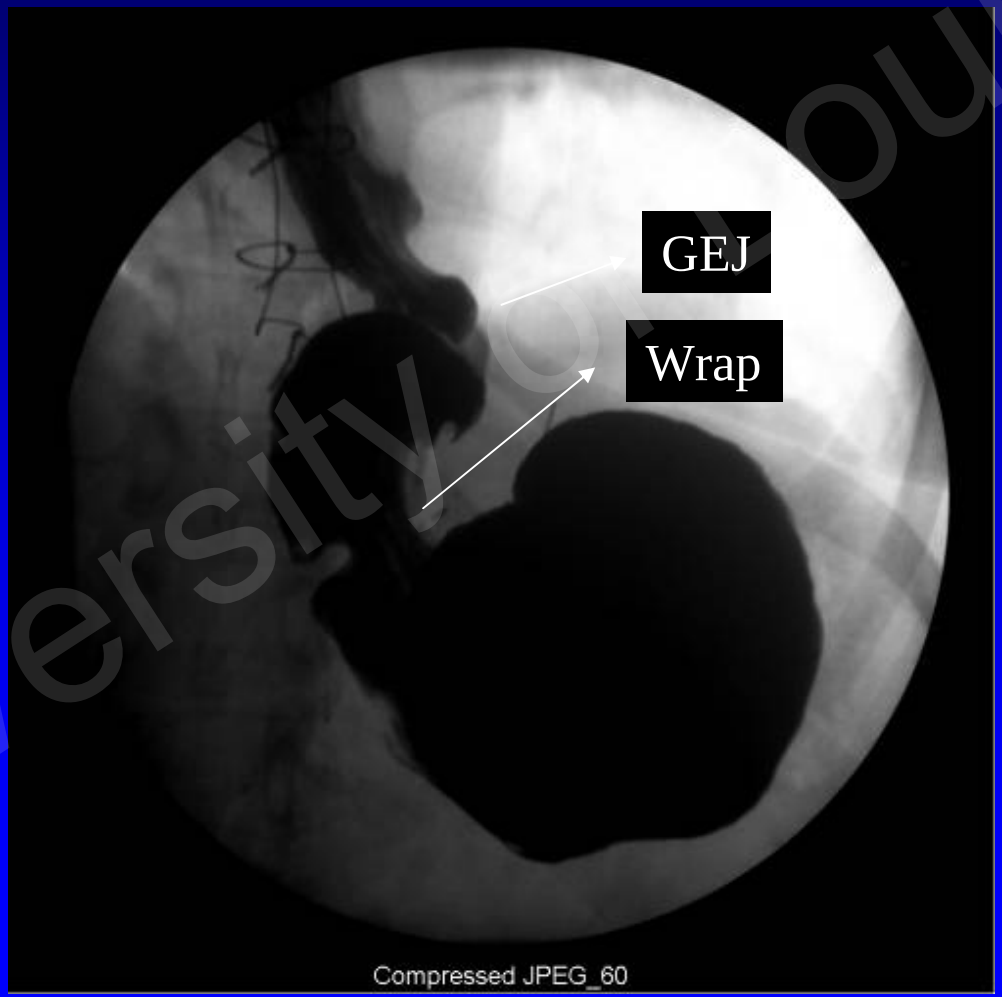


Slipped Fundoplication

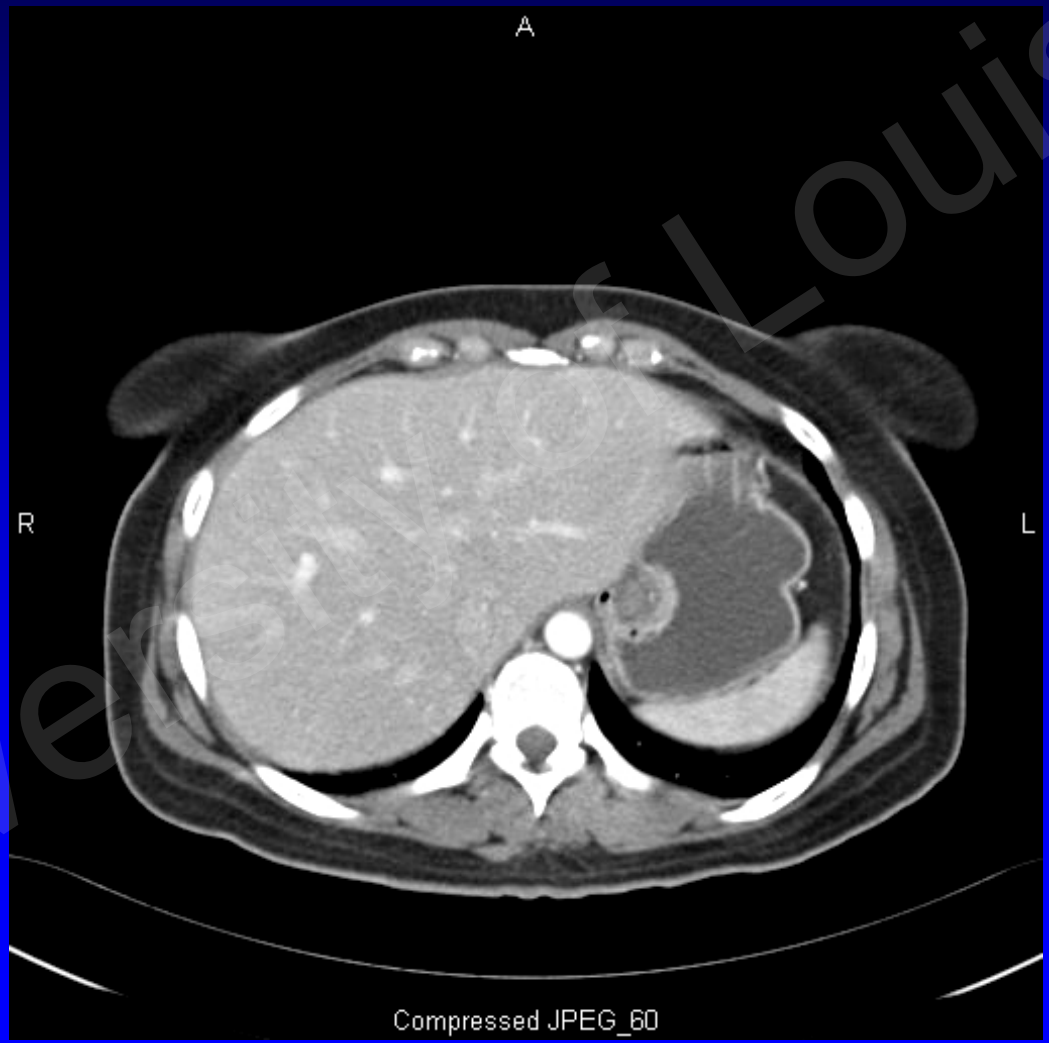




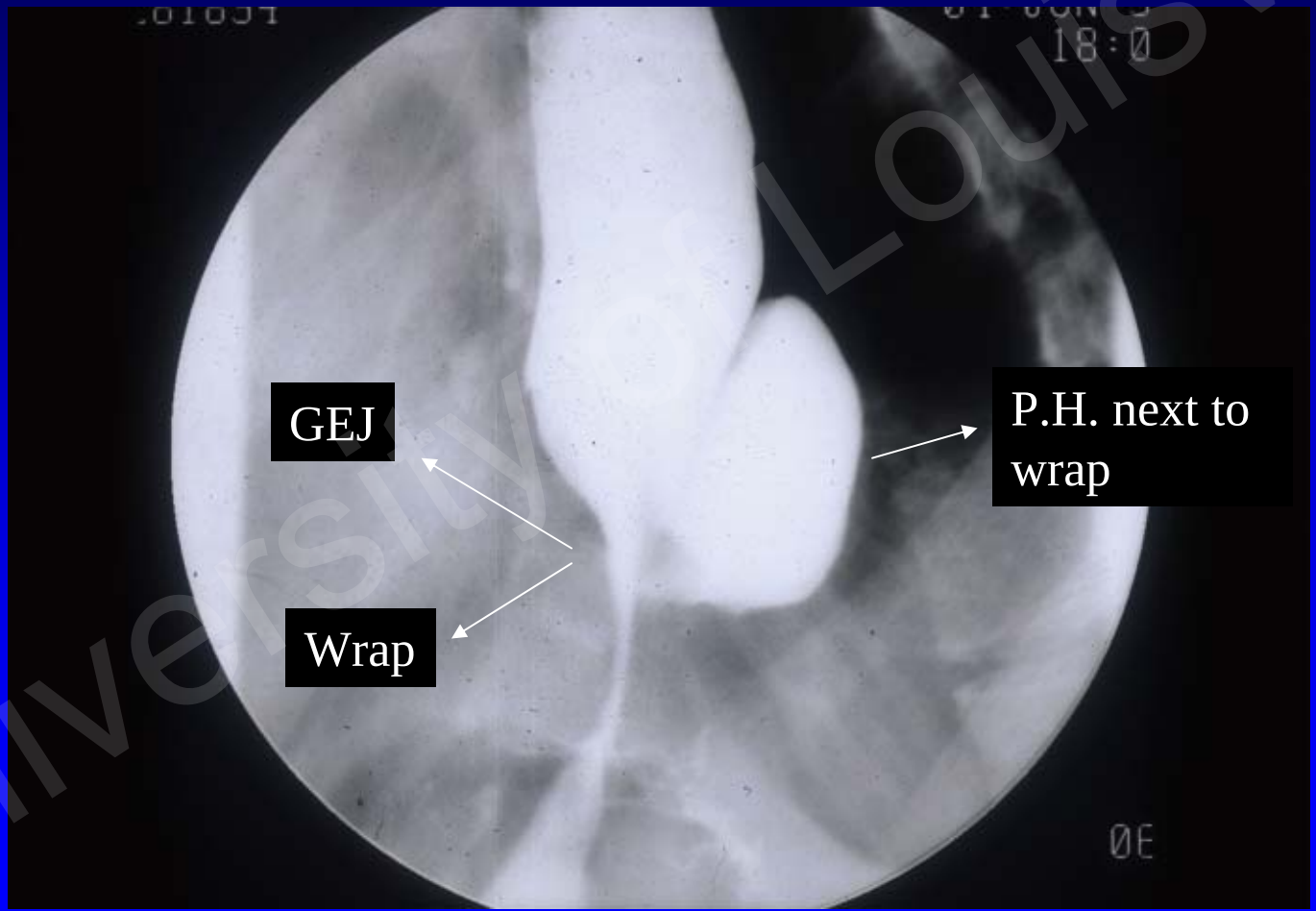
Very Slipped Wrap



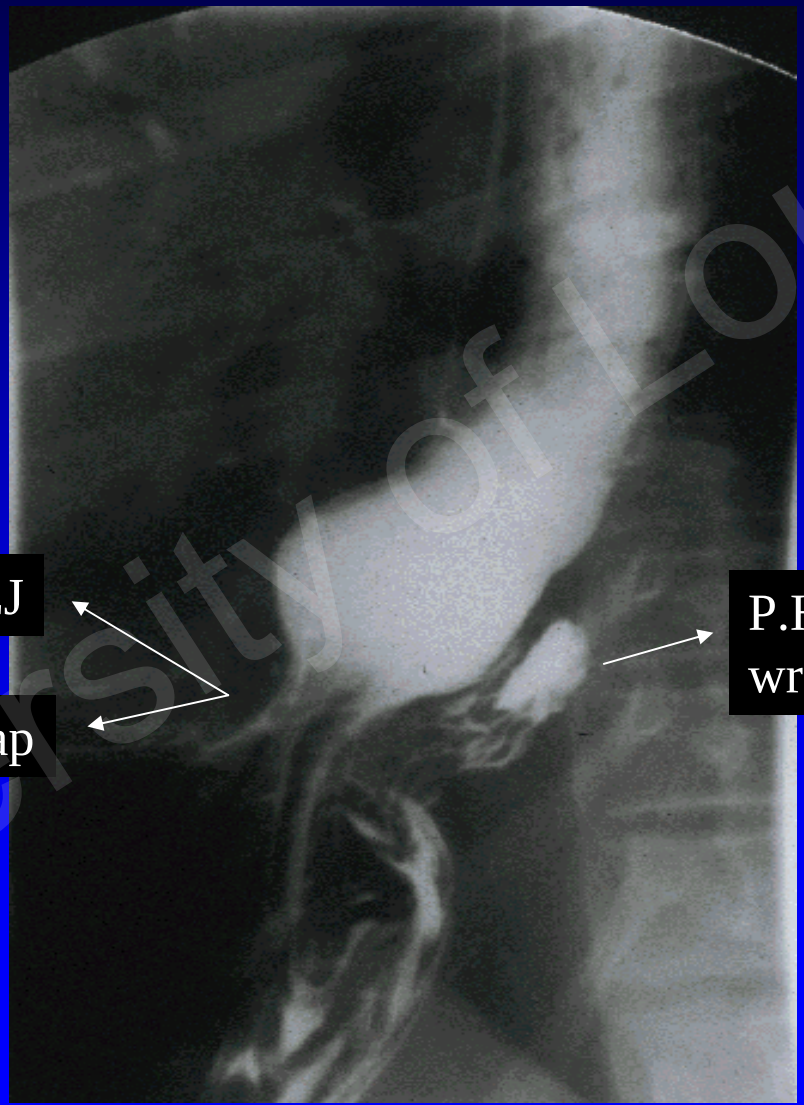
Slipped Wrap



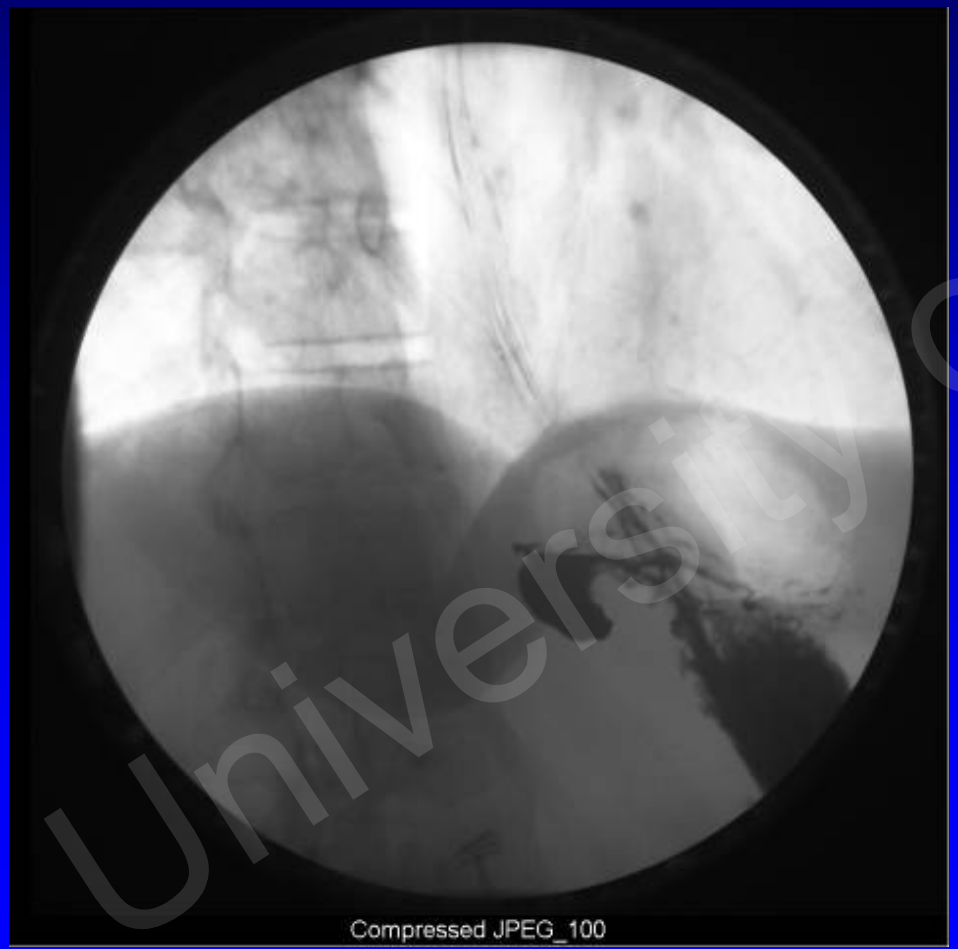
Paraesophageal Hernia

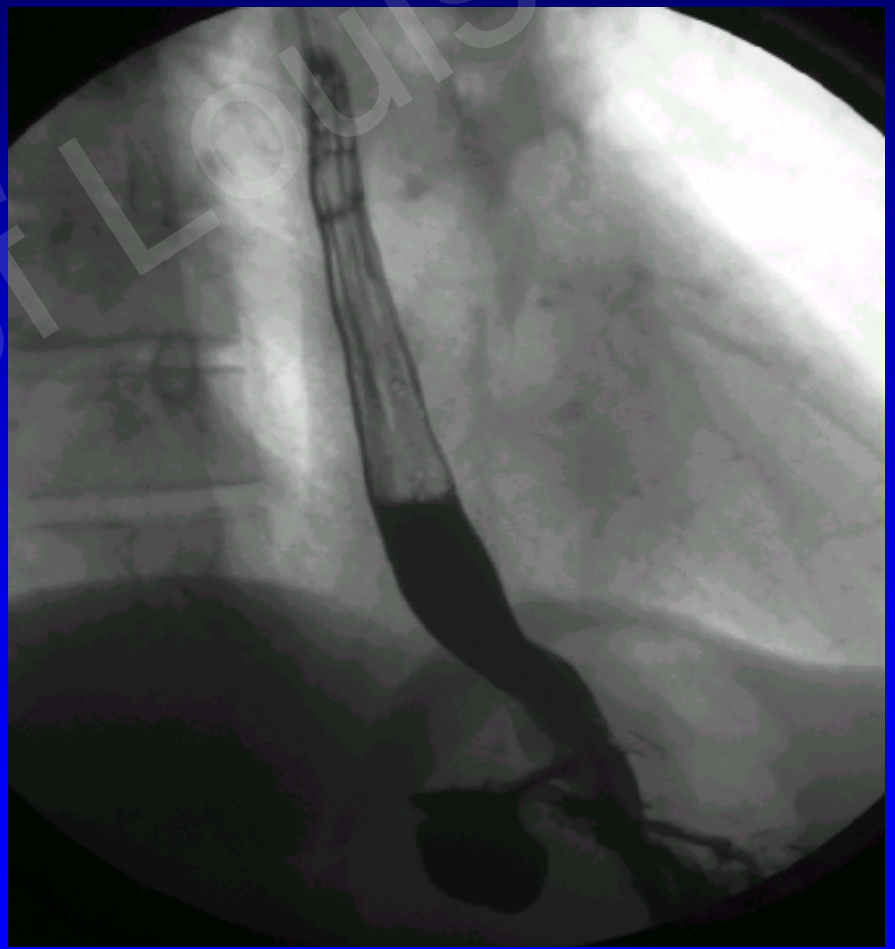


Paraesophageal Hernia

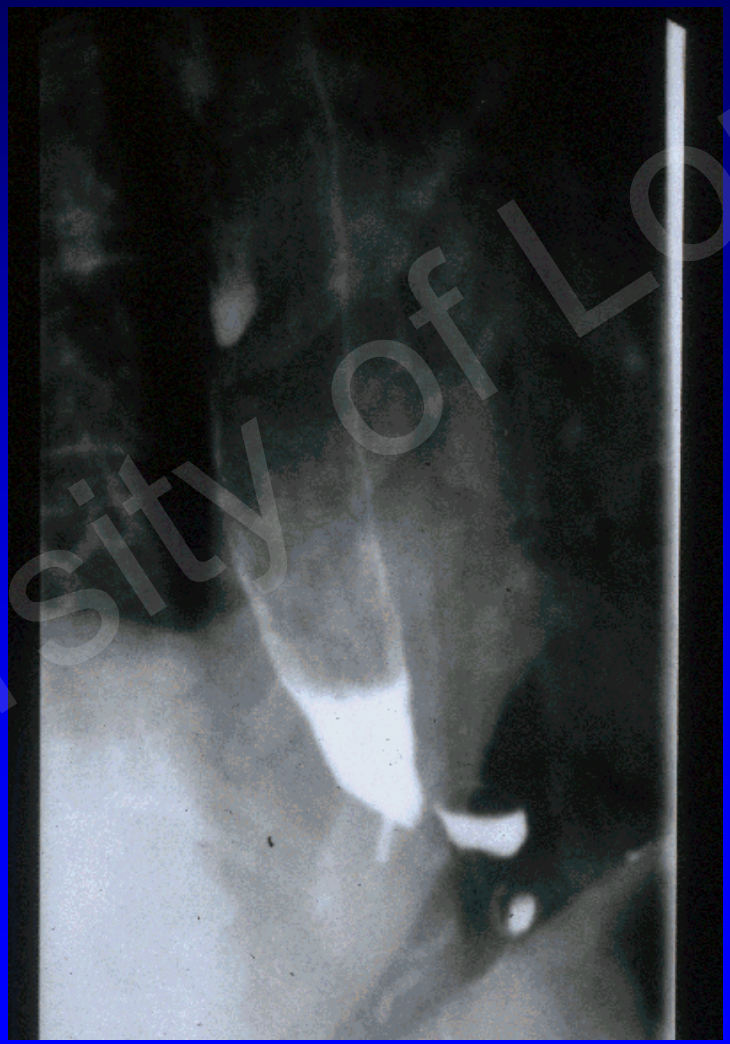


Paraesophageal Hernia





Gastric Mucosa Adjacent to Wrap

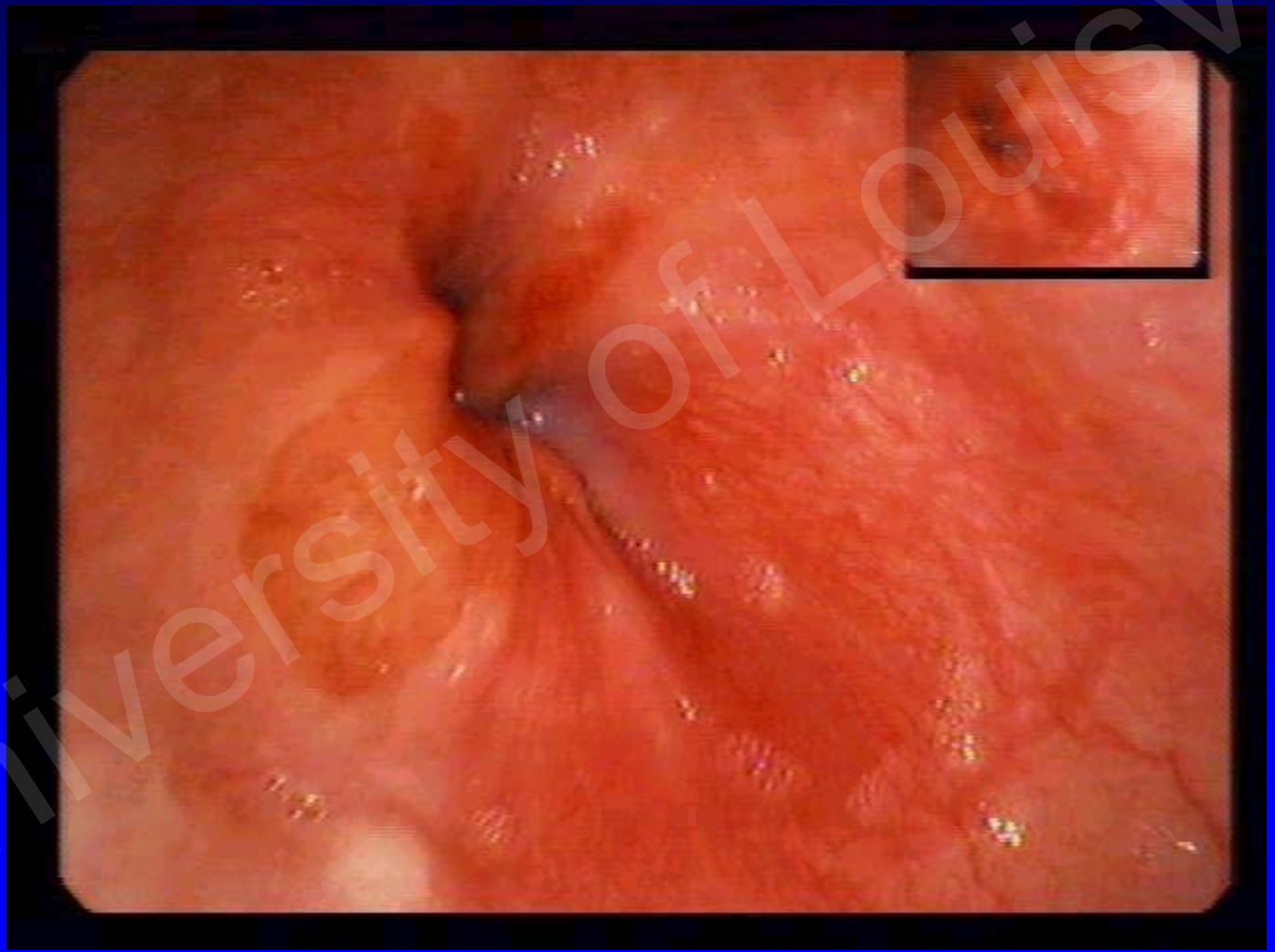


EGD for Postfundoplication Evaluation

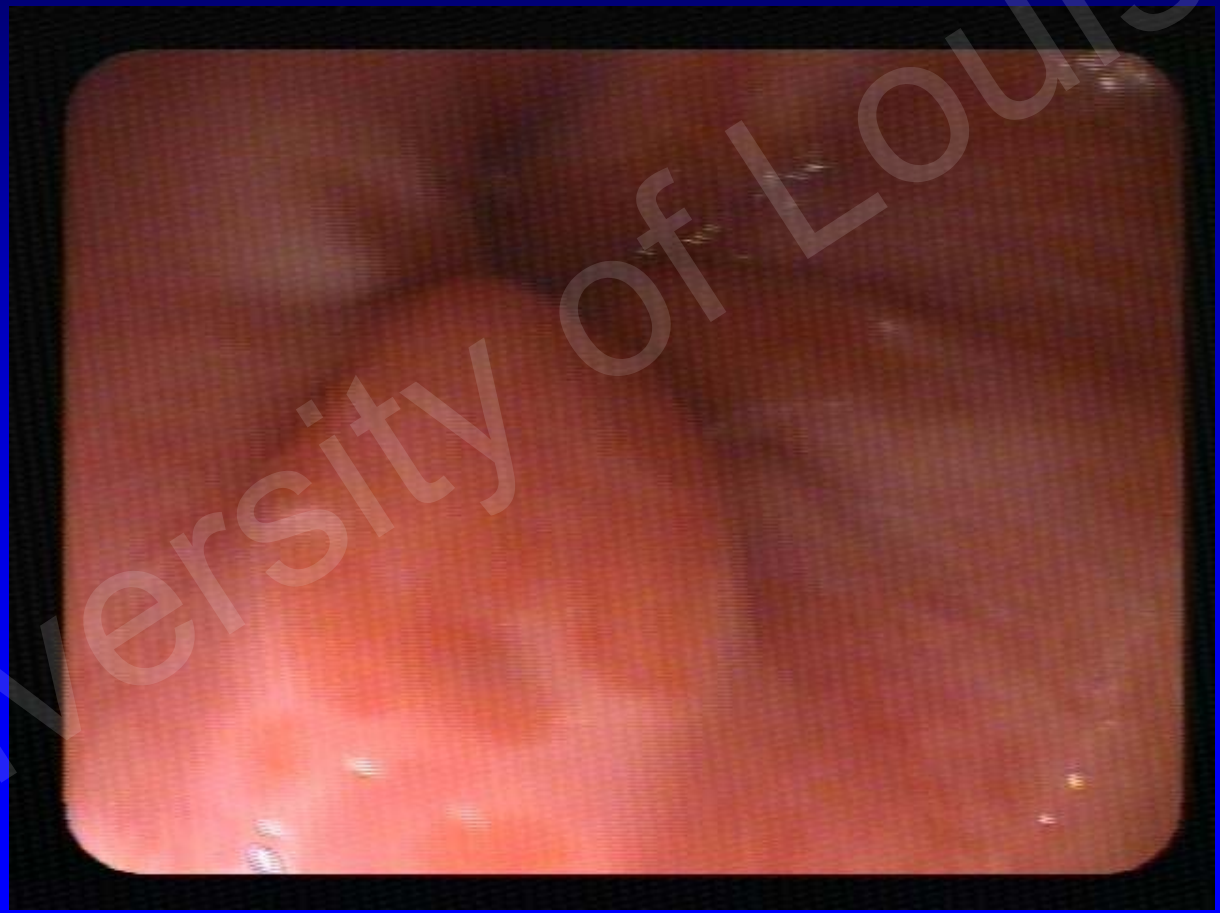
- Antegrade
- Retrograde

EGD:
Antegrade View

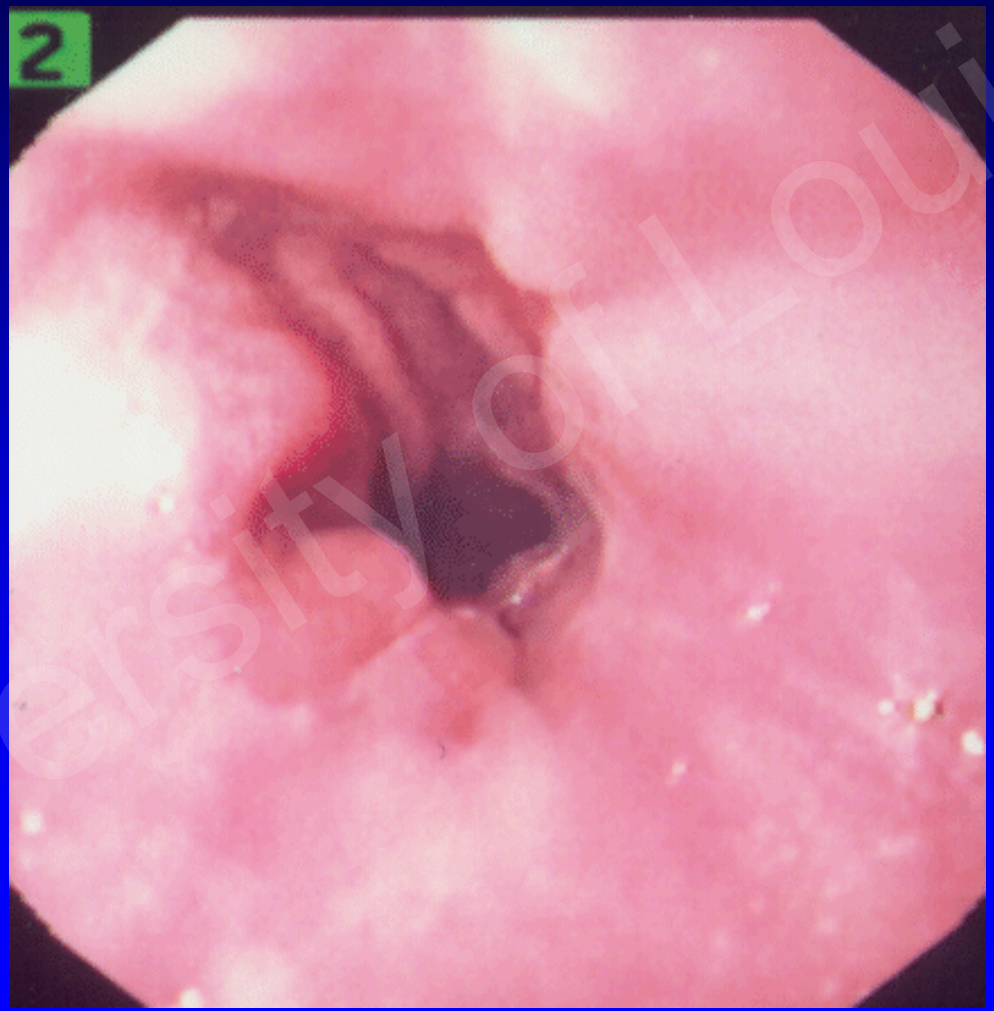
Slightly Slipped Wrap



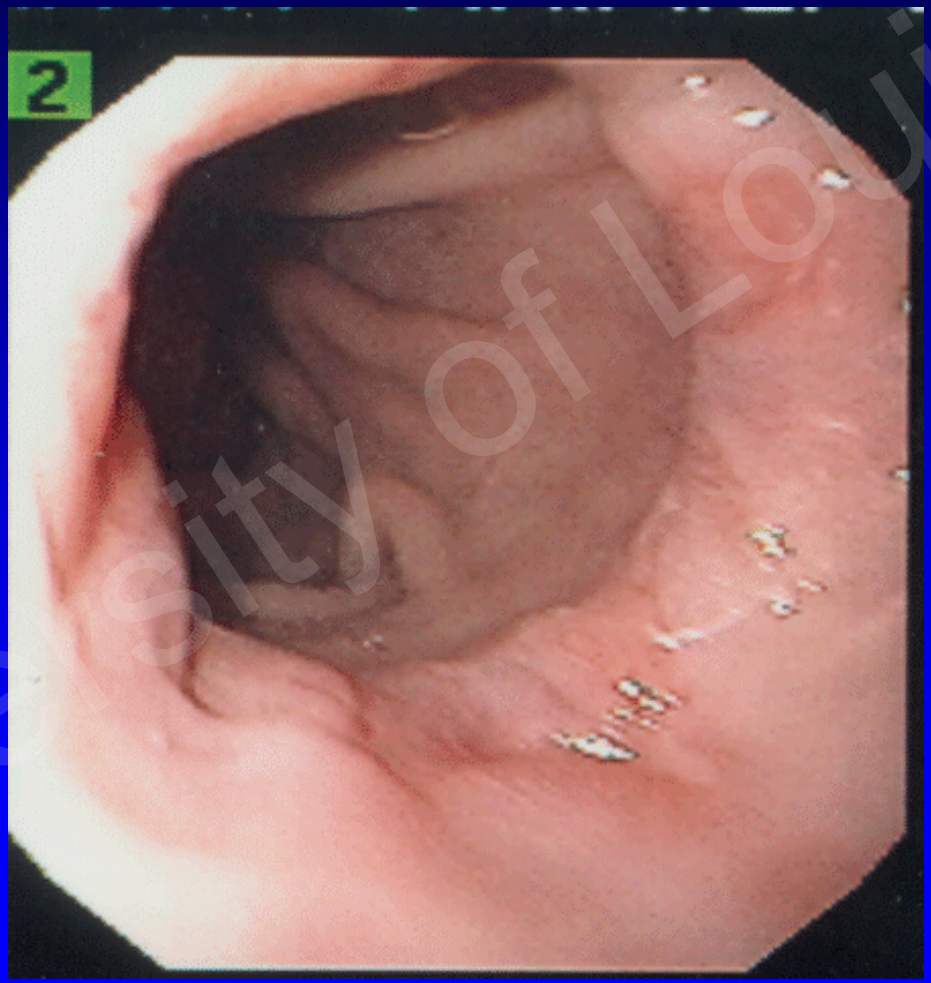
Slightly Slipped Wrap



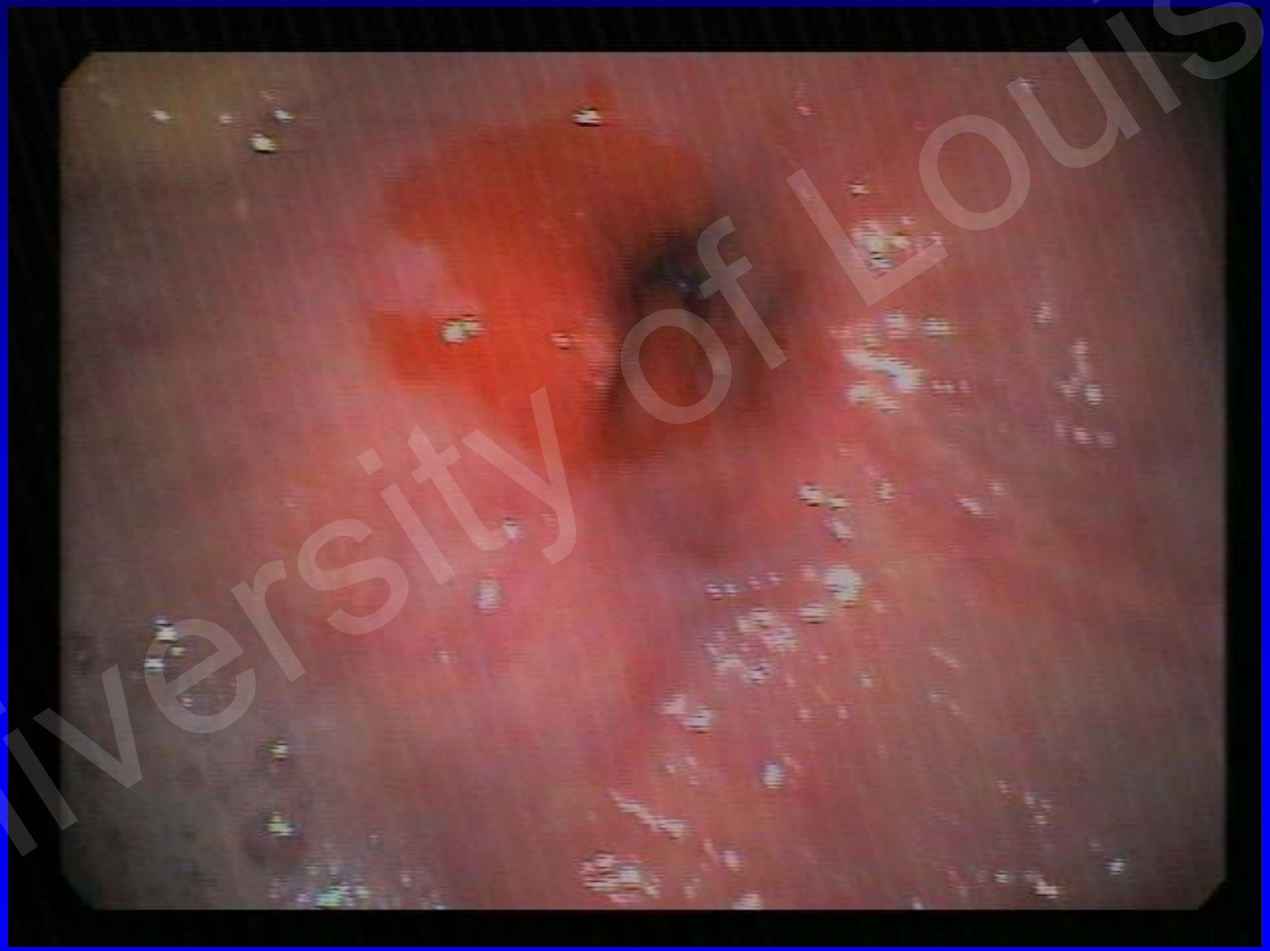
OK but Slightly Slipped Wrap



Slipped Wrap

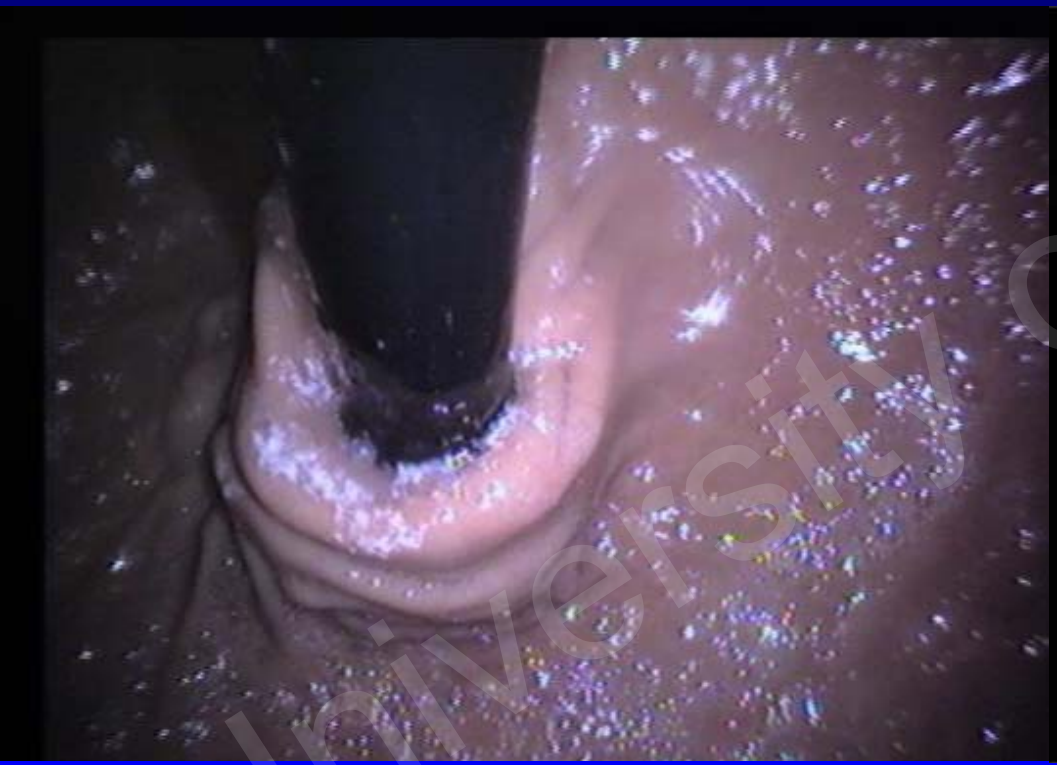


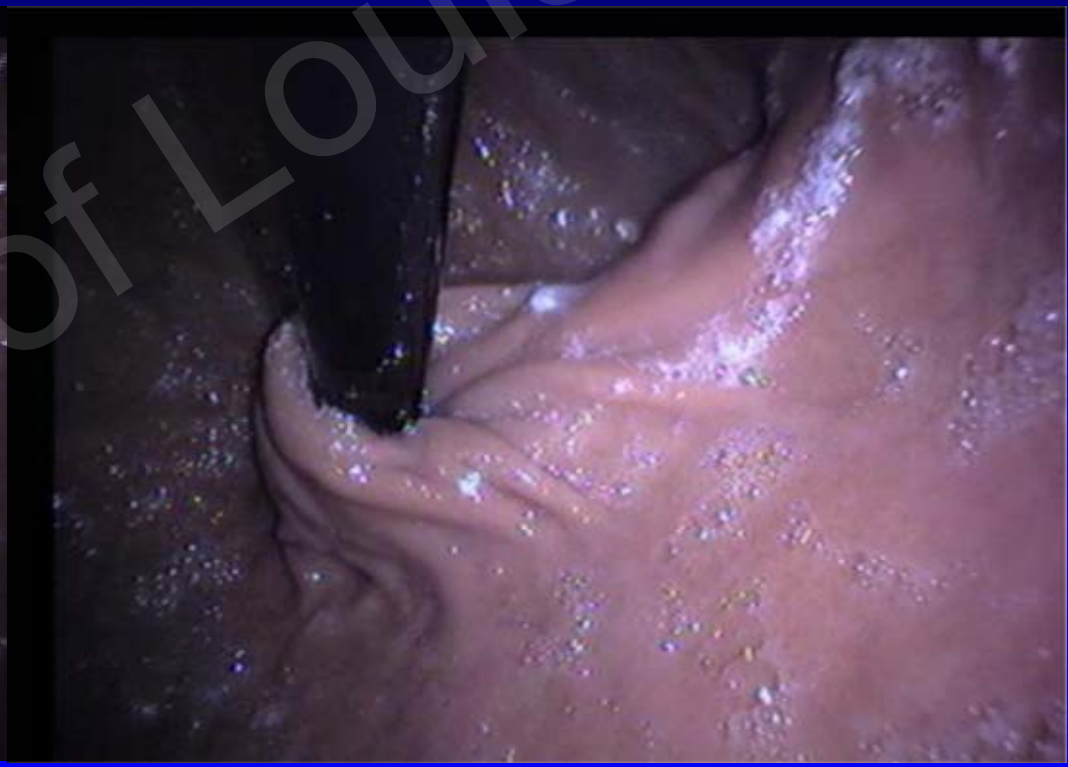
Postfundo Reflux Stricture



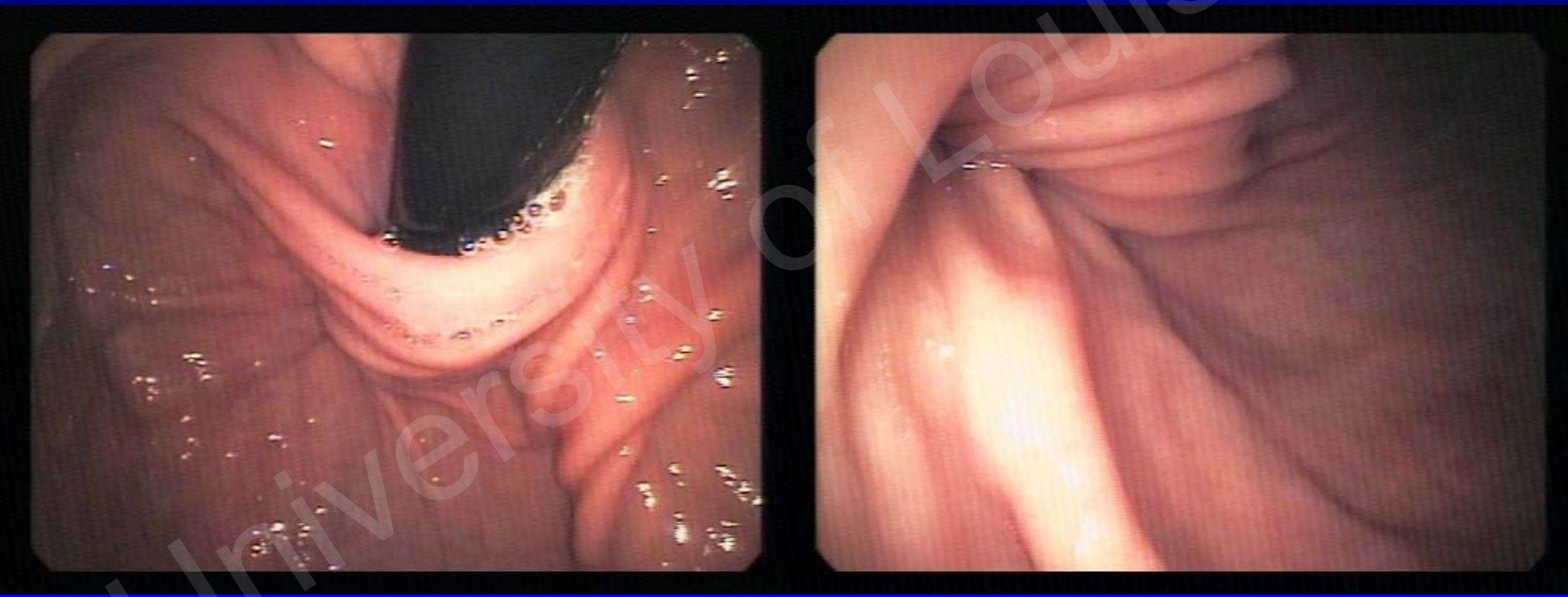
EGD:
Retrograde View

Retrograde View:
Normal Wrap

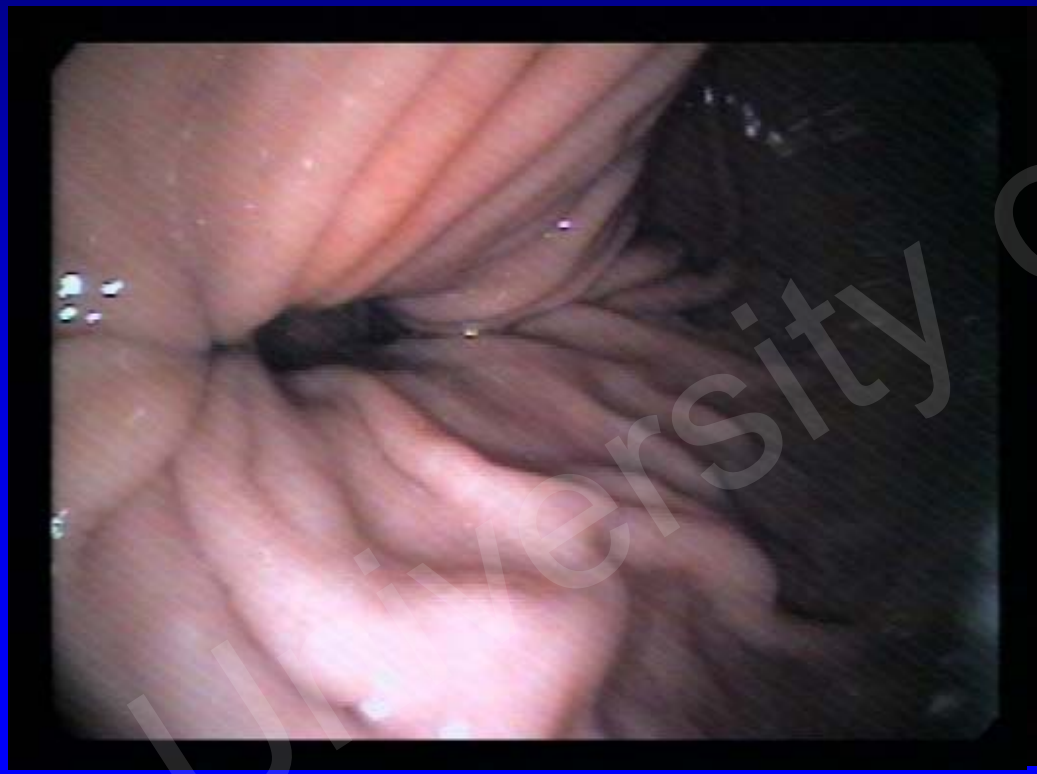


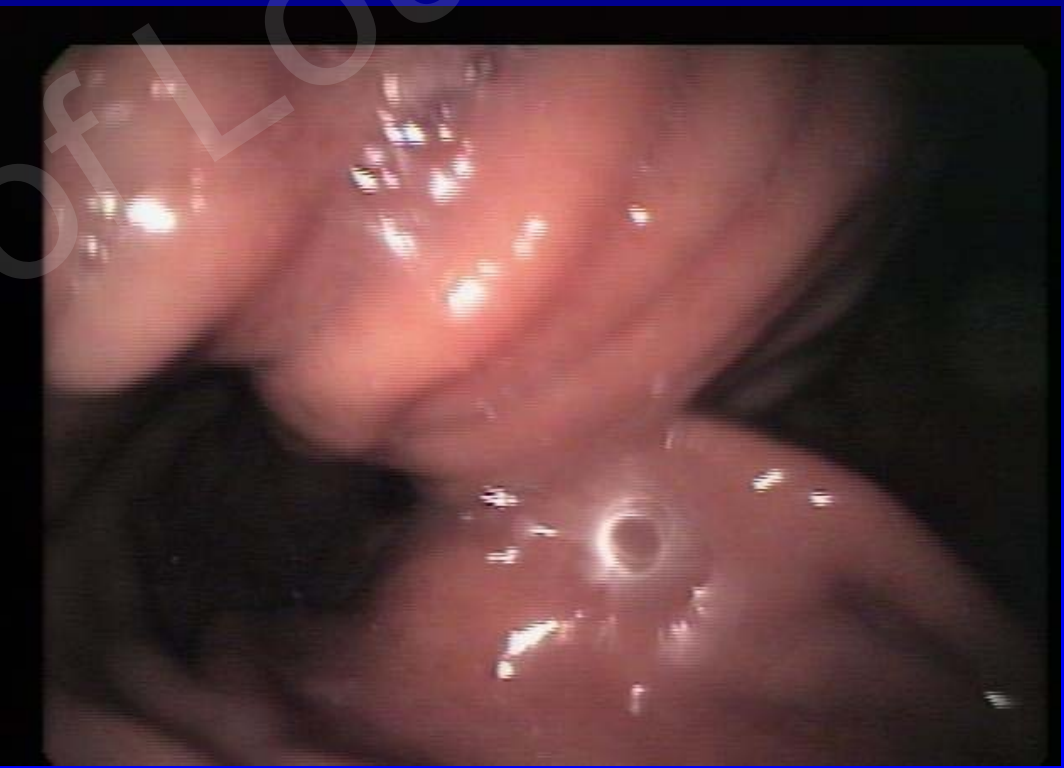


Retrograde View:
Small Opening Adjacent to Wrap

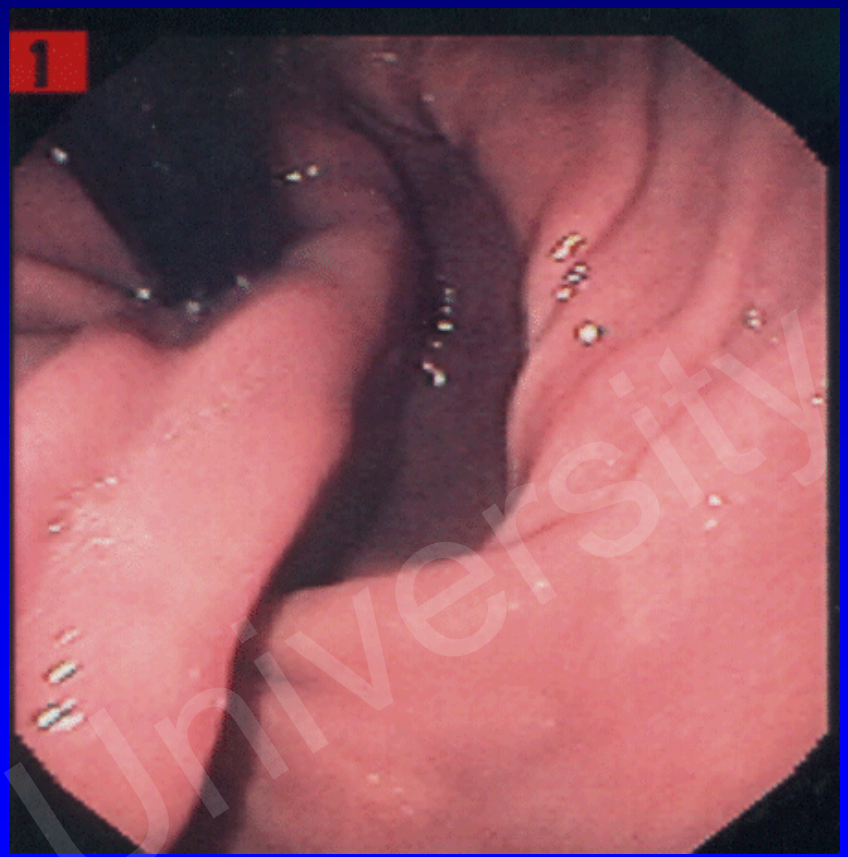


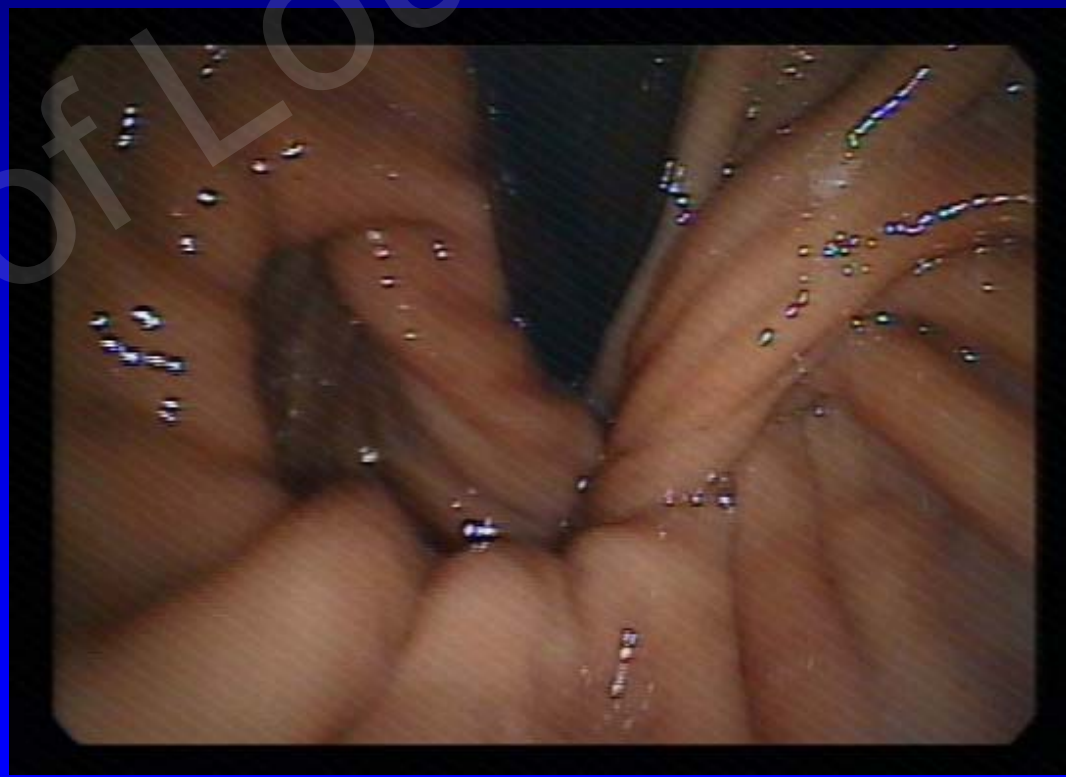
Retrograde View:
Medium Opening Adjacent to Wrap



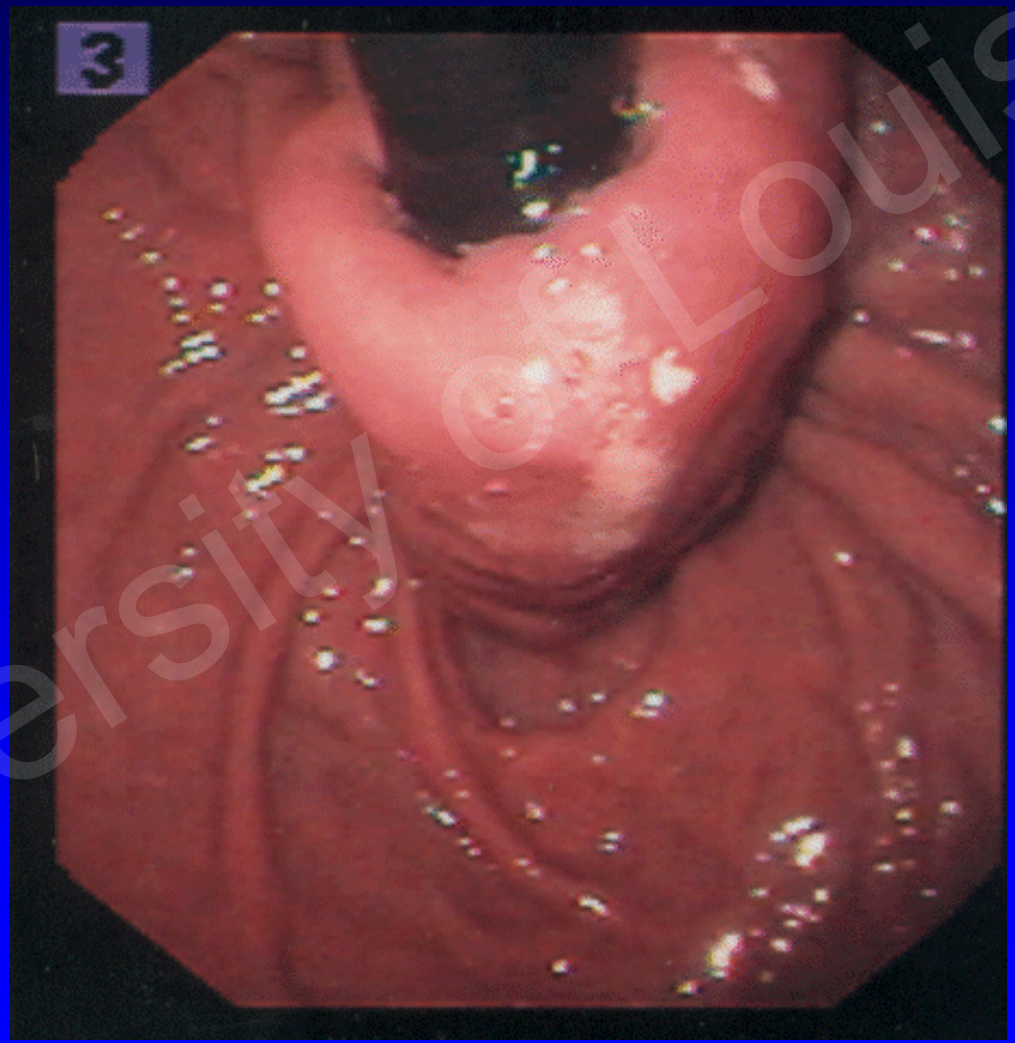


Retrograde View:
Large Opening Adjacent to Wrap

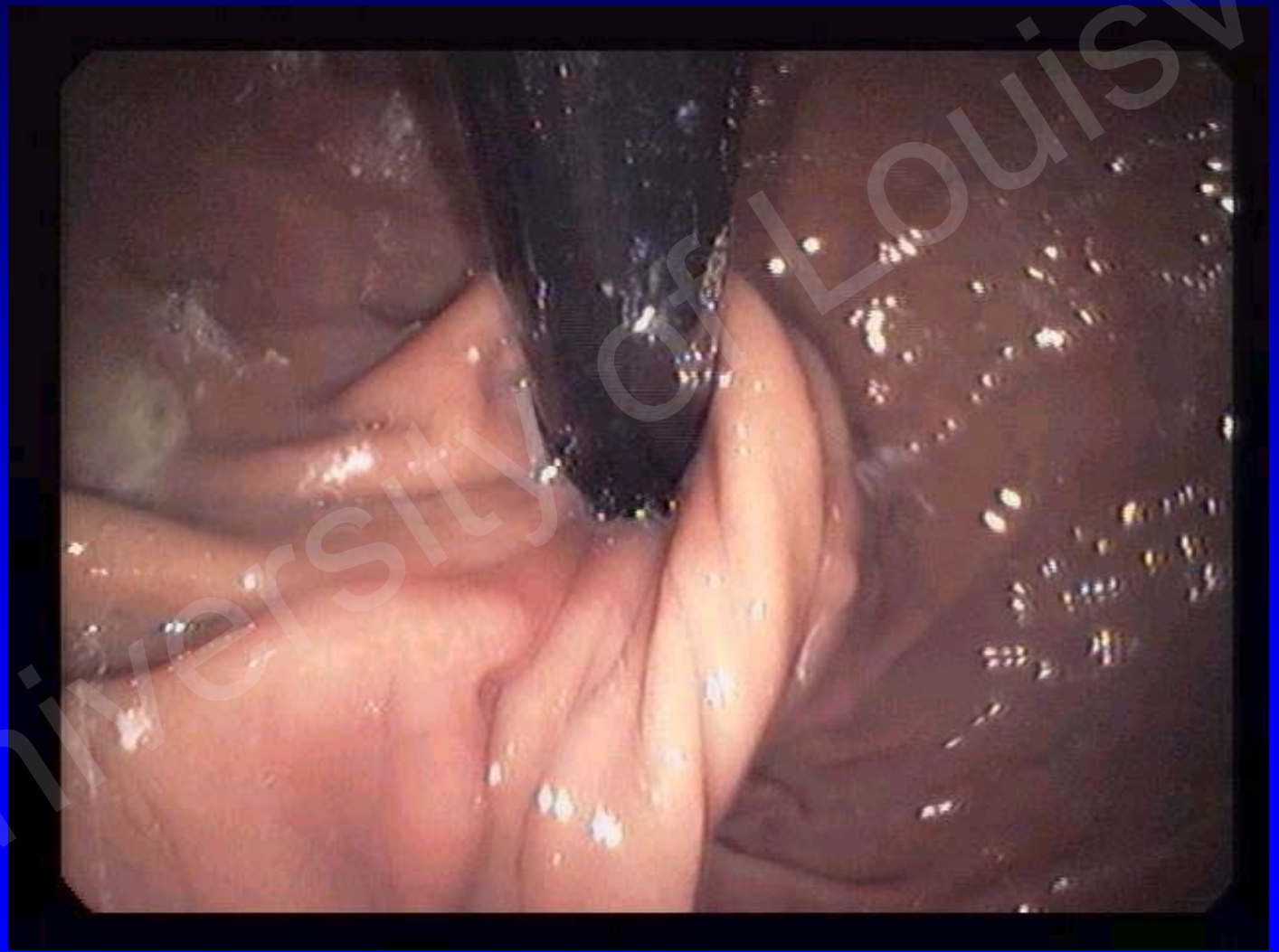




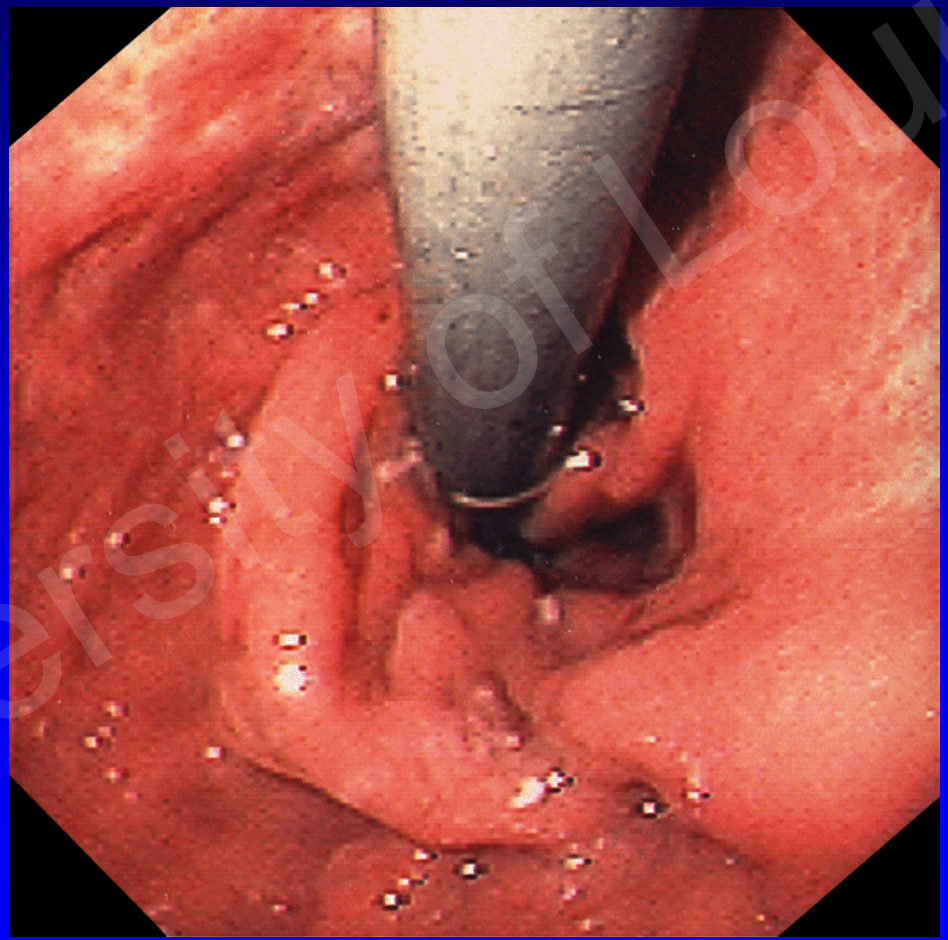
Wrap Too Long



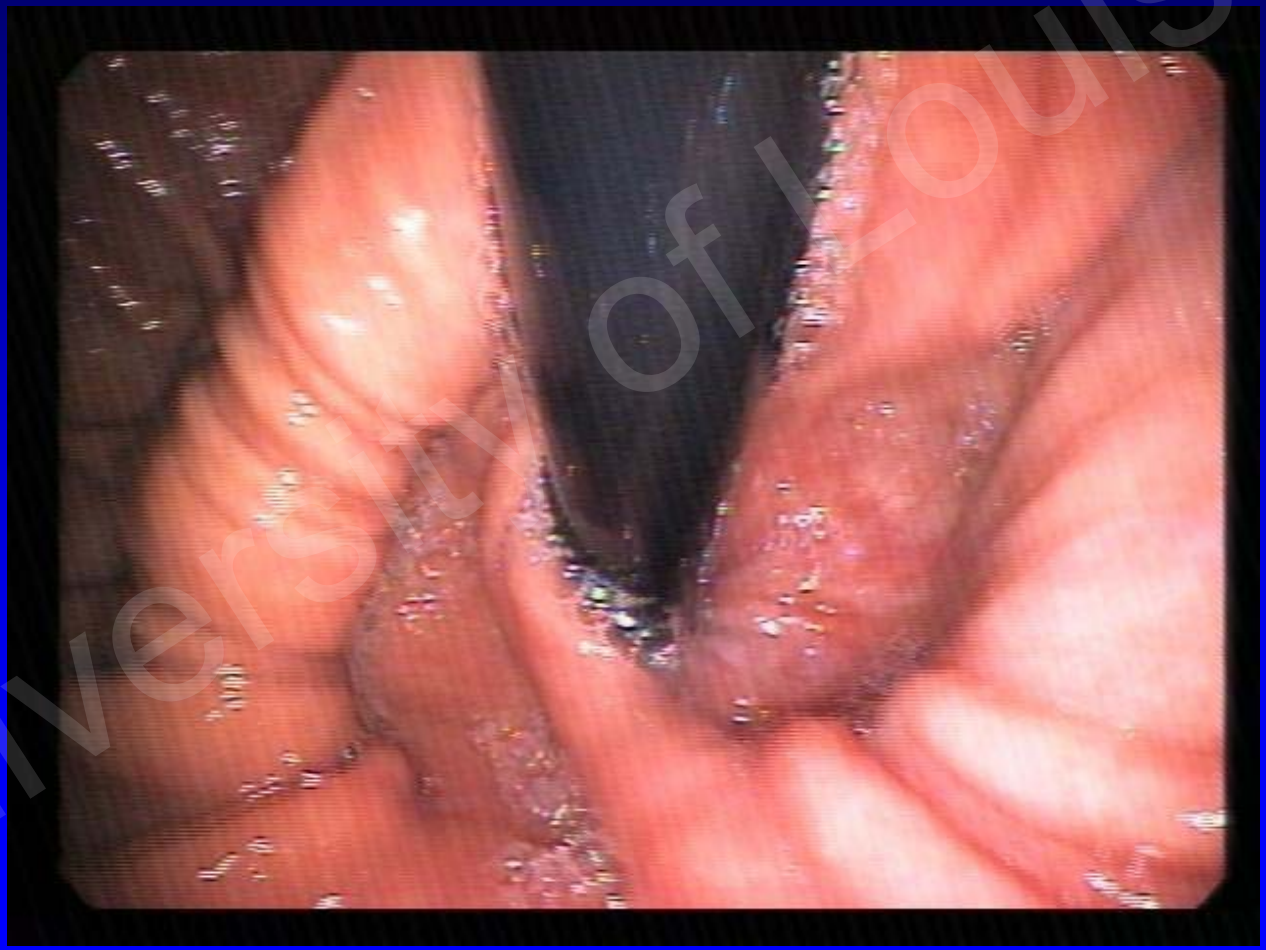
Loose Wrap



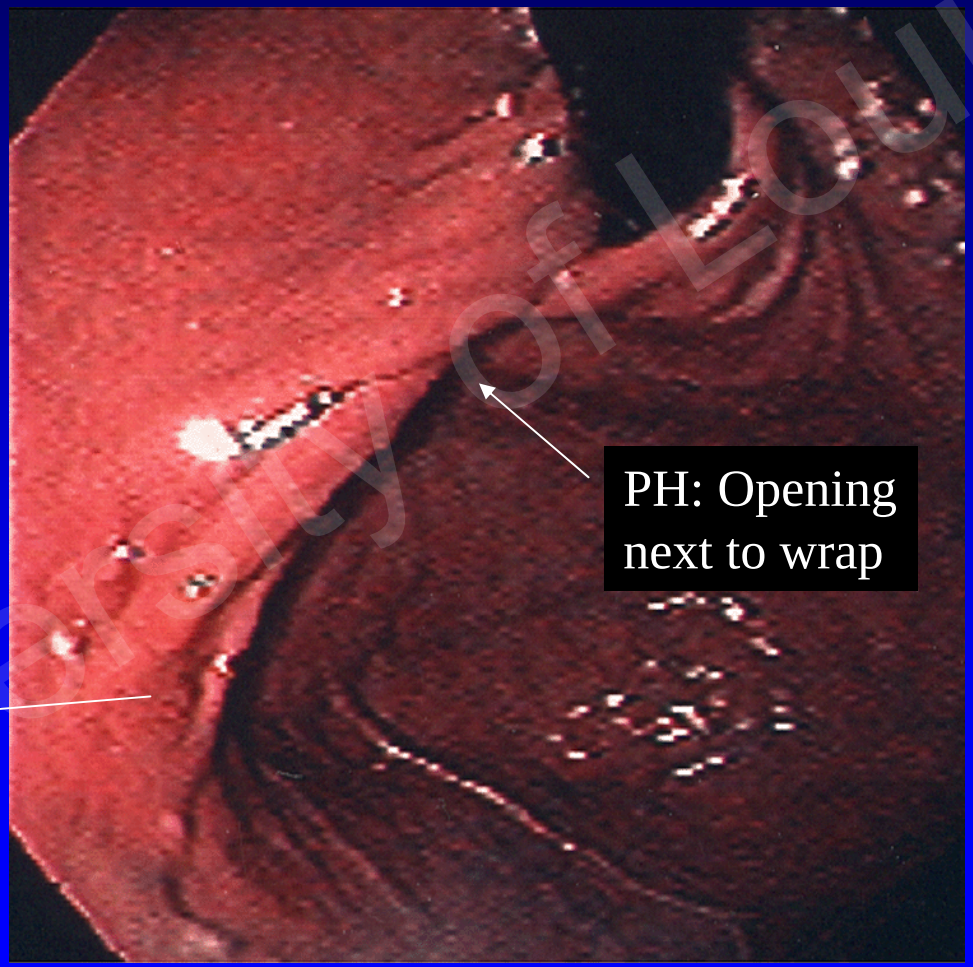
Loose Wrap



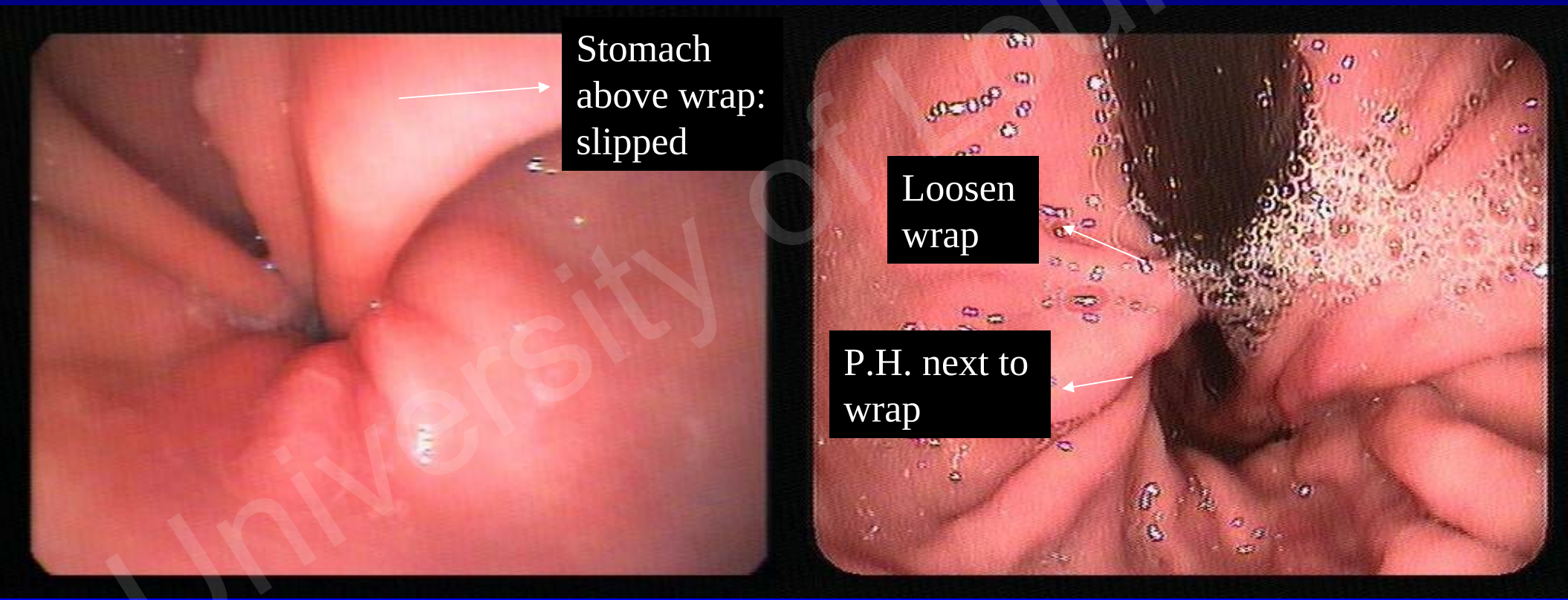
Total Disrupted Wrap



“Double Whammy” : Slipped Wrap + Paraesophageal Hernia



“Triple Whammy” : Slipped + Paraesophageal Hernia + Loose



Postfundoplication Syndromes

Postfundoplication Dysphagia

- Transient dysphagia: 60%
- Dysphagia requiring dilation: 6-13%

Hunter et al. *Ann Surg.* 1996;223:673-685.
Malhi-Chowla et al. *Gastrointest Endosc.* 2002;55:219-223

Causes of Postfundoplication Dysphagia

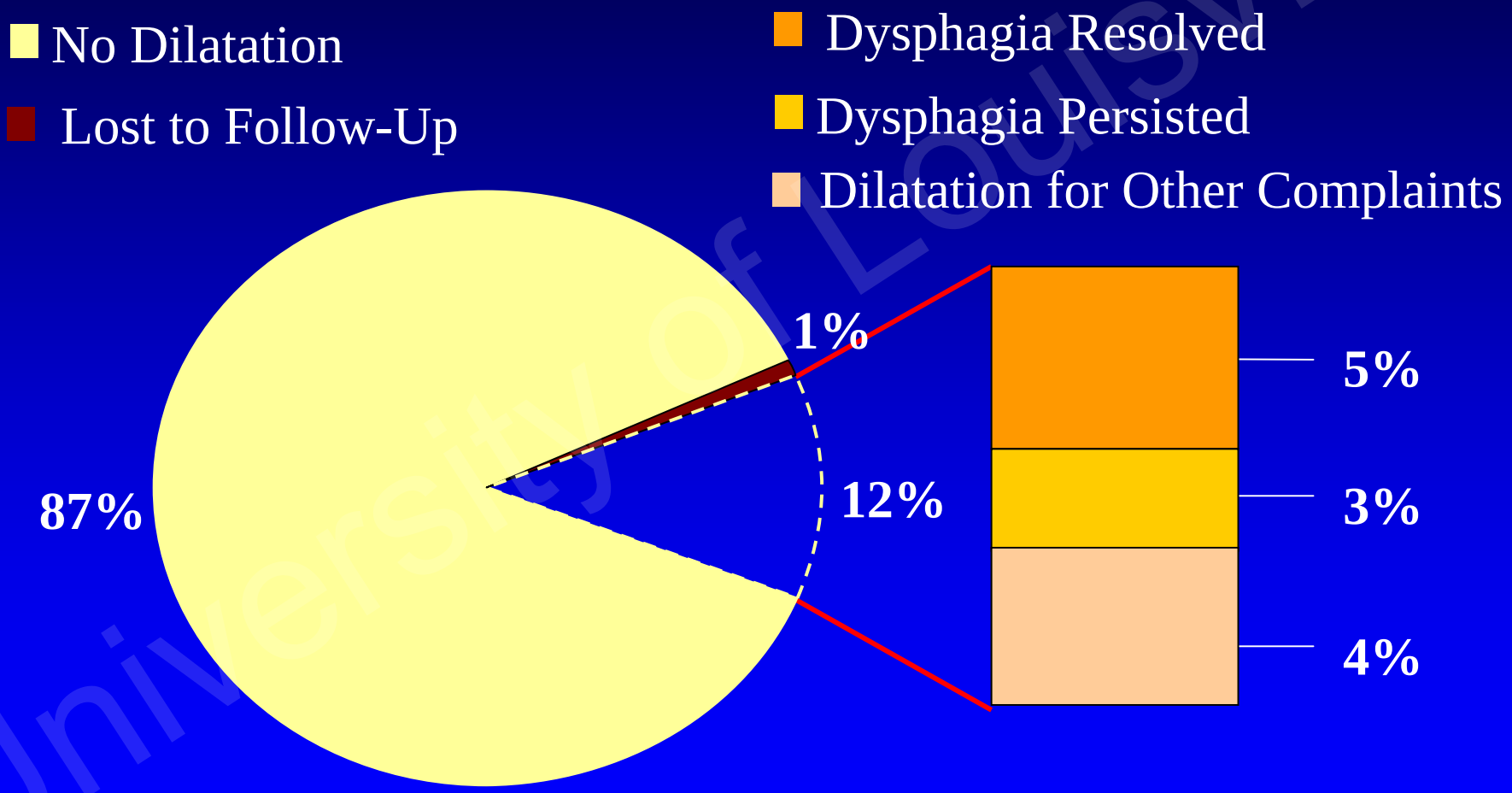
Early post-op

- Edema
- Wrap too tight
- Esophageal stricture
- Unrecognized achalasia
- Esophageal spasm

Late post-op

- Slipped wrap
- Paraesophageal hernia
- Esophageal stricture

Postfundoplication Dysphagia and Esophageal Dilatation



N = 233. Malhi-Chowla et al. *Gastrointest Endosc*. 2002;55:219-223.

Endoscopic Management of Postfundoplication Dysphagia

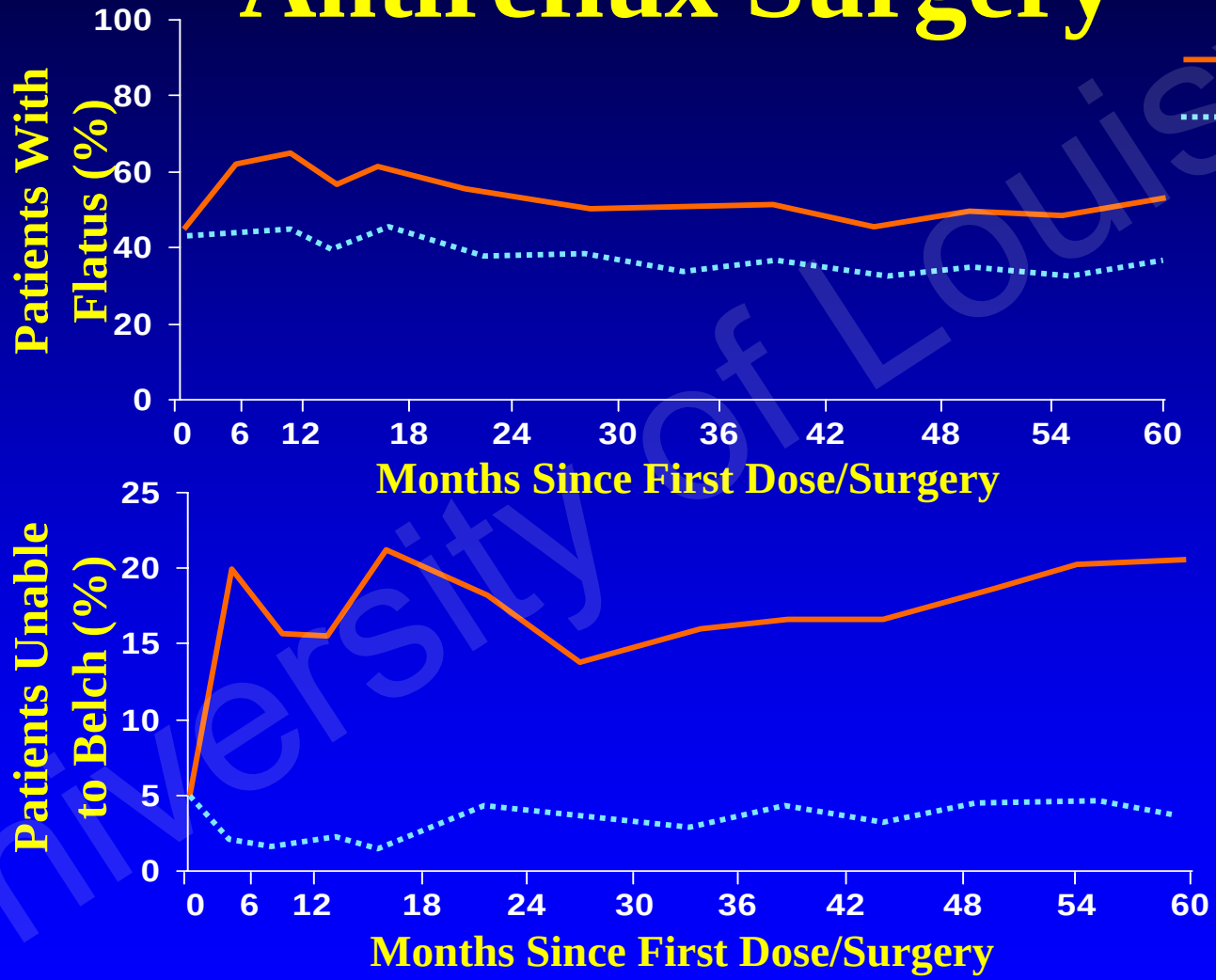
- Dilation is safe but effective in only 50% of patients
- Predictors of poor outcome
  - Slipped wrap
  - No response to dilation
  - Multiple fundoplications

Postfundoplication Gas Bloat

- Approx. 20% unable to belching
- 5 to 20% gas-bloat syndrome
- May require re-operation

Hunter et al. *Ann Surg.* 1996;223:673-685.
Lundell et a. *J Am Col Surg* 2001;192:172-179.

Flatus and Inability to Belch After Antireflux Surgery



Lundell et al. *J Am Coll Surg.* 2001;192:172-179.

Causes of Postfundoplication Gas-Bloat

- Aerophagia
- Slipped fundoplication
- Gastroparesis
  - Pre-op condition
  - Post-surgical vagal neuropathy
- “Functional”

Conclusions

- Key steps in evaluating postfundoplication problems
  1) What are the pre-op symptoms?
  2) Are the post-op complaints new, old, or both?
  3) Review pre-op testing
  4) Identify post-op anatomy & physiology
- Abnormal anatomy may not be causing symptoms
- Treatment is suboptimal