

# Gastroesophageal Reflux Disease (GERD)

Firas Obeidat

# Introduction

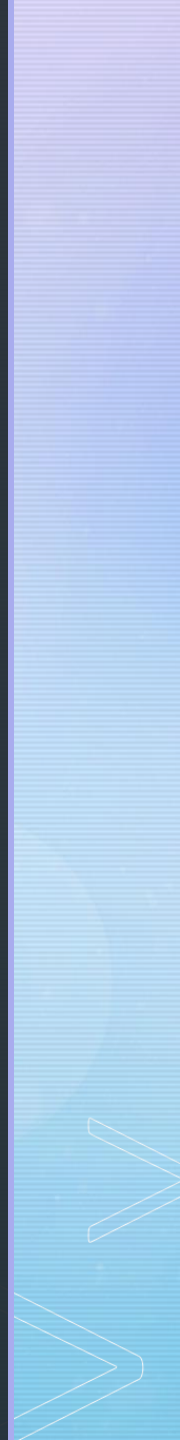
- It accounts for a majority of esophageal pathology.
- It is a chronic disease , and when medical therapy is required , it is often lifelong treatment.
- Antireflux surgery is an effective and long-term therapy and is the only treatment that is able to restore the gastroesophageal barrier.
- The most common and typical symptoms of the disease are heartburn and regurgitation.

# Introduction

- These symptoms are very common in general population and many consider them to be normal and do not seek medical attention.
- Even when excessive , these symptoms are not specific for GERD as it may occur in other gastroesophageal pathologies.
- That is why objective evaluation of patients is mandatory before planning surgery.



## Definition

- GERD is defined as a condition which develops when the retrograde flow (reflux) of gastric content into the esophagus causes troublesome symptoms and/or complications.
- 

## Mechanisms of GERD

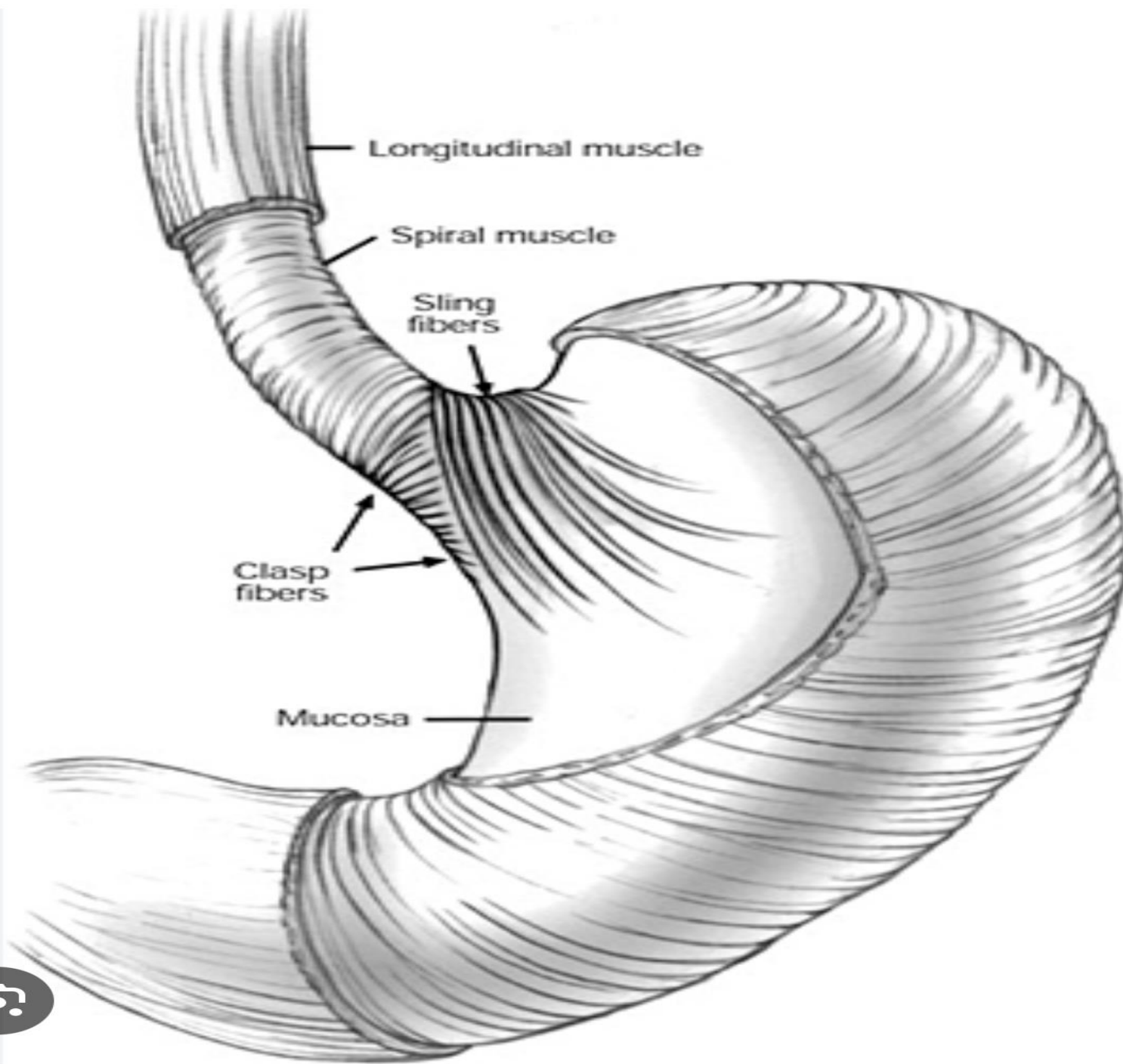
- GERD is an imbalance between the injurious refluxed material and defensive mechanisms.
- The severity of symptoms and complications is proportional to the frequency and duration of mucosal acid exposure.

# Mechanisms of GERD

## Normal defensive mechanisms for GERD:

1. Lower esophageal sphincter is a high pressure zone created by the following components:

- Angle of His.
- Crus of diaphragm.
- Intraabdominal esophagus.
- Tonic contractions of lower esophageal muscles.



## Mechanisms of GERD

2. Fundic compliance.
3. Esophageal peristalsis and gravity.
4. Salivary production and buffering the acid.
4. Epithelial barrier function (tight junction and lipid rich matrix which prevent acid penetration).
5. Proper gastric emptying function.



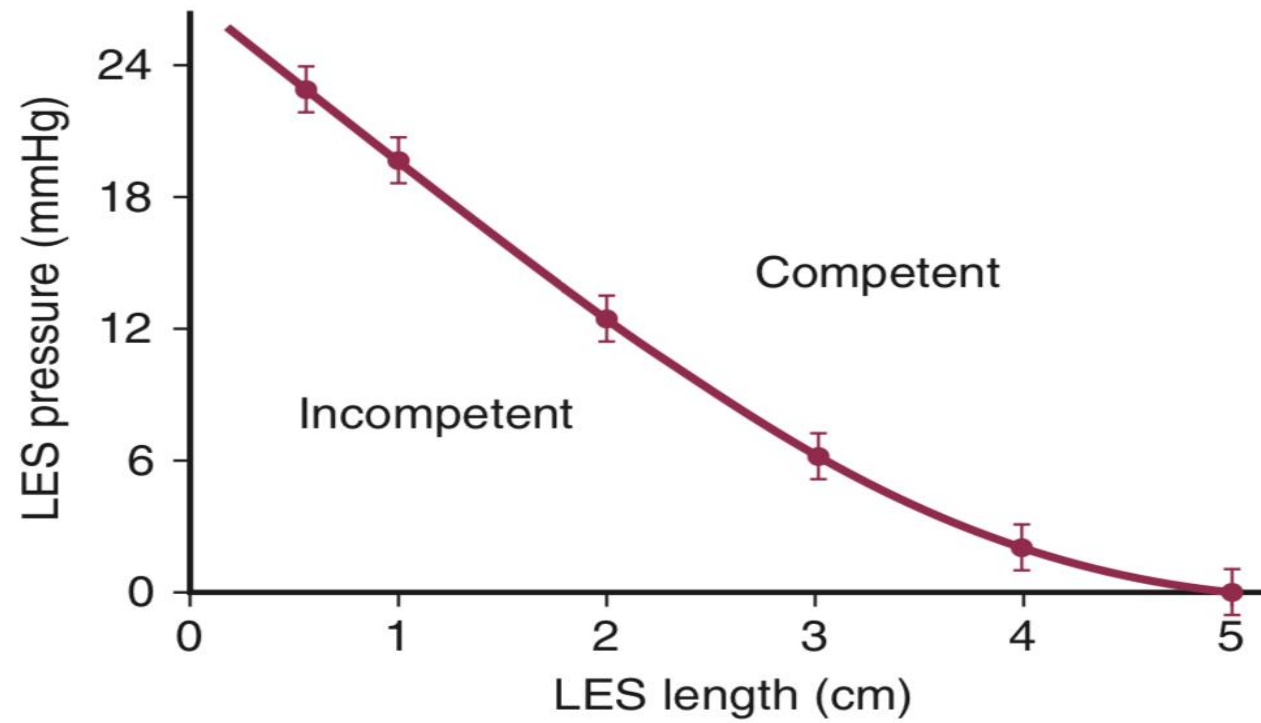
# Mechanisms of GERD

## Mechanically defective LES:

Normal manometric values of the distal esophageal sphincter, n = 50

PARAMETER	MEDIAN VALUE	2.5TH PERCENTILE	97.5TH PERCENTILE
Pressure (mmHg)	13	5.8	27.7
Overall length (cm)	3.6	2.1	5.6
Abdominal length (cm)	2	0.9	4.7

# Mechanisms of GERD



# Mechanisms of GERD

## Impaired esophageal clearance:

- Esophageal dysmotility.
- Reduced salivation.

## Impaired defence against epithelial injury:

- Impaired mucosal integrity.

## Impaired gastric (reservoir) function:

- Decreased gastric compliance and increase in intragastric pressure, delayed gastric emptying.

## Risk factors for GERD

- Presence of hiatus hernia.
- Obesity.
- Smoking and alcohol.
- Pregnancy.
- High fat and carb. Diet.

## Prevalence of GERD

- The prevalence in US is around 20%.
- More common in men.
- Most common cause for GI clinic visits.
- Phenotypes of GERD: ( nonerosive reflux disease (NERD), erosive esophagitis (EE) and Barrett's esophagus (BE)).
- NERD is most common type (60-70%), EE (30%), BE (6-15%).

# Symptoms of GERD

## Typical symptoms:

- Heartburn
- Regurgitation
- Dysphagia
- Odynophagia
- Hypersalivation/Water brash

# Symptoms of GERD

## Atypical symptoms:

- Chest pain
- Cough
- Adult onset asthma ( 50% of patients with asthma have esophagitis or abnormal distal esophageal acid exposure)
- Chest infection and lung fibrosis
- Otitis
- Laryngitis
- Dental erosion
- sinusitis

## Complications of GERD

- Erosive esophagitis.
- Esophageal stricture.
- BE is a replacement of squamous epithelium by columnar epithelium. ( premalignant condtion, regular follow up is required).



## Complications of GERD

- Complications of GERD occur in the presence of two predisposing factors:
  1. Mechanically defective LES.
  2. Increased esophageal exposure to fluid containing duodenal juice ( alkaline reflux )

## Complications of GERD

### Barrett's esophagus (BE):

Risk of dysplasia and cancer in BE is 0.2%-0.5% per year.

Risk is 40 times higher than general population.

Occurs in 10%-15% of patients with GERD.

Most if not all adenocarcinoma of the esophagus arise in BE.

One third of patients with BE present with malignancy.

## Diagnostic tools

- Trial of medical treatment using PPI
- Tests to detect structural abnormalities:
  1. Endoscopy with biopsy.
  2. Radiographic evaluation ( Barium swallow ).

# Diagnostic tools

## ➤ Tests to detect functional abnormalities:

1. Esophageal manometry study.
2. 24 h-pH ambulatory impedance study.
3. Gastric emptying study.

# Diagnostic tools

## Indications for investigations:

- Persistent symptoms.
- Presence of alarming signs and symptoms.
- Uncertain diagnosis.
- Before surgery.



# Diagnostic tools

## Endoscopy:

- It is the initial diagnostic evaluation tool.
- Mandatory before surgery.

# Diagnostic tools

## Benefits of endoscopy:

- Grading of esophagitis and Barrett's columnar-lined esophagus ( Los angeles grading system).
- Presence of HH, ( Hill grading system).
- Detection of other pathologies.



### LA-A

≥1 mucosal break,  
≤5 mm, does not  
extend between  
mucosal folds



### LA-B

≥1 mucosal break,  
>5 mm, does not  
extend between  
mucosal folds



### LA-C

≥1 mucosal break,  
extends between  
mucosal folds, involves  
<75% of circumference



### LA-D

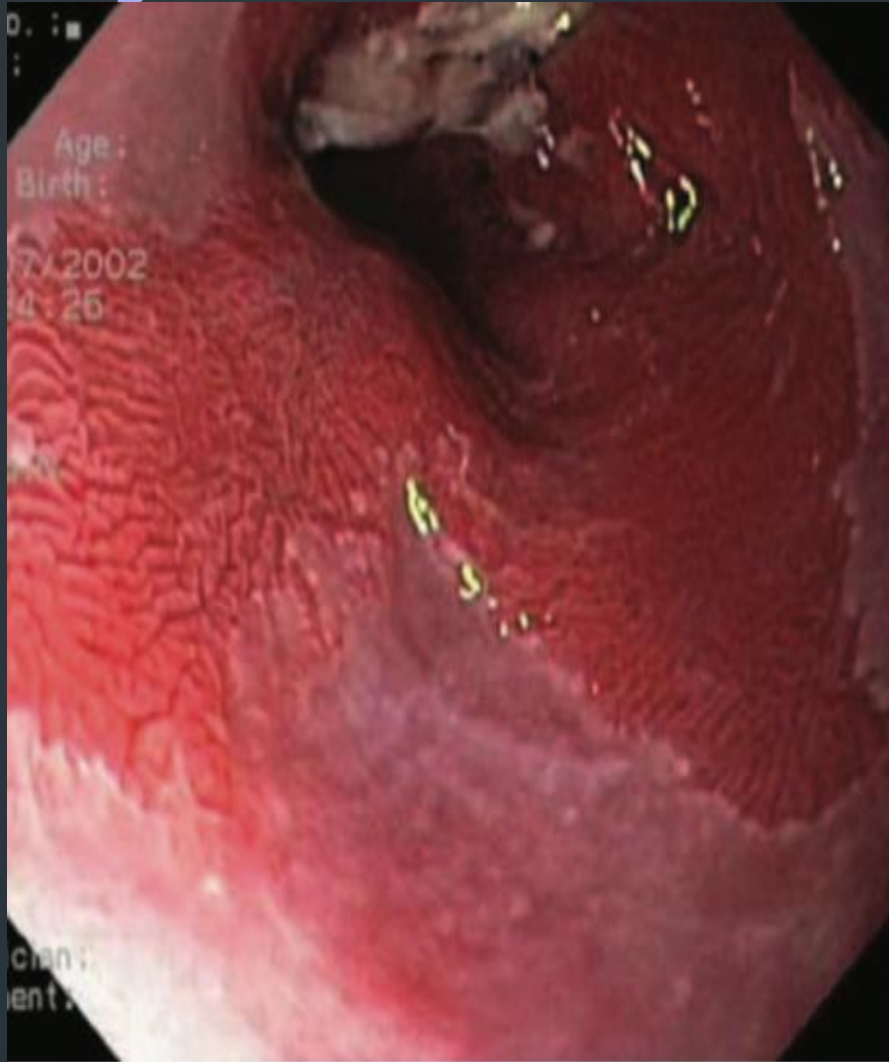
≥1 mucosal break,  
involves >75% of  
circumference





[Open in a new tab](#)

Endoscopic images of Hill grade I (A), Hill grade II (B), Hill grade III (C), and Hill grade IV (D).



C



D

# Diagnostic tools

## Barium swallow:

- To assess the size and type of associated hiatus hernia.
- Types of HH.
- To assess the peristalsis of the esophagus.
- Demonstration of reflux ( in only 40% of patients with classic reflux symptoms, so failure to demonstrate reflux doesn't exclude it).
- The study should include evaluation of the stomach and duodenum.







# Diagnostic tools

## 24-h pH impedance study:

- Informative but not mandatory in patients with typical reflux symptoms and esophagitis.
- Based on the electrical conductivity between multiple electrodes positioned along the axial length of a thin intraluminal probe.
- Indications:

Atypical symptoms

Absence of esophagitis

Atypical response to medical treatment

## Diagnostic tools

- Should stop H2 blockers 3 days and PPI 14 days before the test.
- Non acidic reflux.
- Detection of retrograde movement of bolus (gas or liquids).



## COMPONENT

Total time

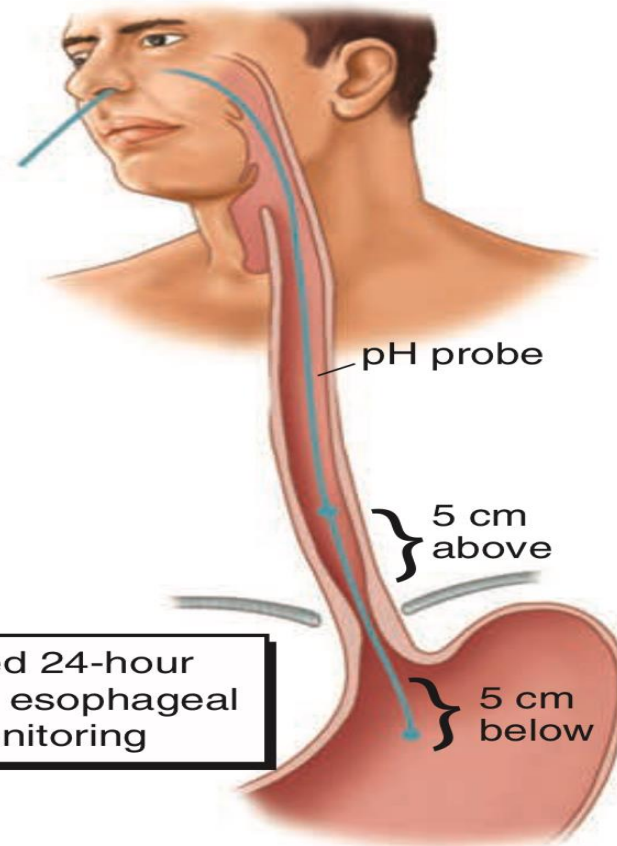
Upright time

Supine time

No. of episodes

No. >5 min

Longest episode



Combined 24-hour  
gastric and esophageal  
pH monitoring

# Diagnostic tools

## Esophageal manometry:

- Mandatory preoperatively.
- Assessment of sphincter status and esophageal peristalsis.
- Tailoring of the procedure according to the pump function (esophagus).

## Diagnostic tools

- A mechanically defective sphincter is identified by having one or more of the following characteristics:

LES pressure of  $< 6$  mm Hg

Intraabdominal esophageal length  $< 1$ cm

Overall sphincter length  $< 2$  cm

# Diagnostic tools

## Tests of duodenogastric function:

- In severe diabetes.
- In patients with nausea and vomiting.
- Reflux of alkaline duodenal juice, including bile salts, pancreatic enzymes, and bicarbonate is thought to have more harmful effect on the esophagus than pure acid reflux.
- Gastric emptying study using radiolabeled meal ( normal subject will empty 59% of a meal within 90 minutes).

## Treatment options

- Recent development of MIS has lowered the threshold for surgical treatment.
- In 1991 Dallemagne did the first laparoscopic Nissen fundoplication.
- All patients should receive intensive medical therapy ( 2-3 months) before considering surgery ( response in erosive reflux is more).
- Life style modification.

## Treatment options

- Alarming signs and symptoms:

Anemia.

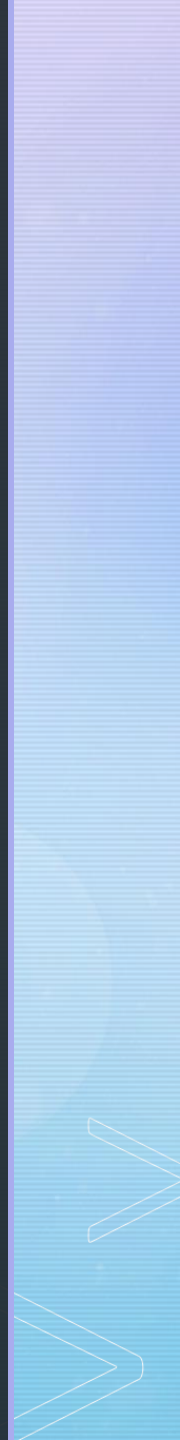
Weight loss.

Dysphagia/odynophagia.

- In the absence of these signs and symptoms give 6 weeks trial of PPI with life style modification, if no improvement endoscopy is indicated.
- In the presence of these features then endoscopy is indicated.



## Treatment options

- Treatment option should be tailored for each patient.
  - Life style modification.
  - Medical therapy.
  - Endoscopic therapy.
  - Surgical therapy.
- 

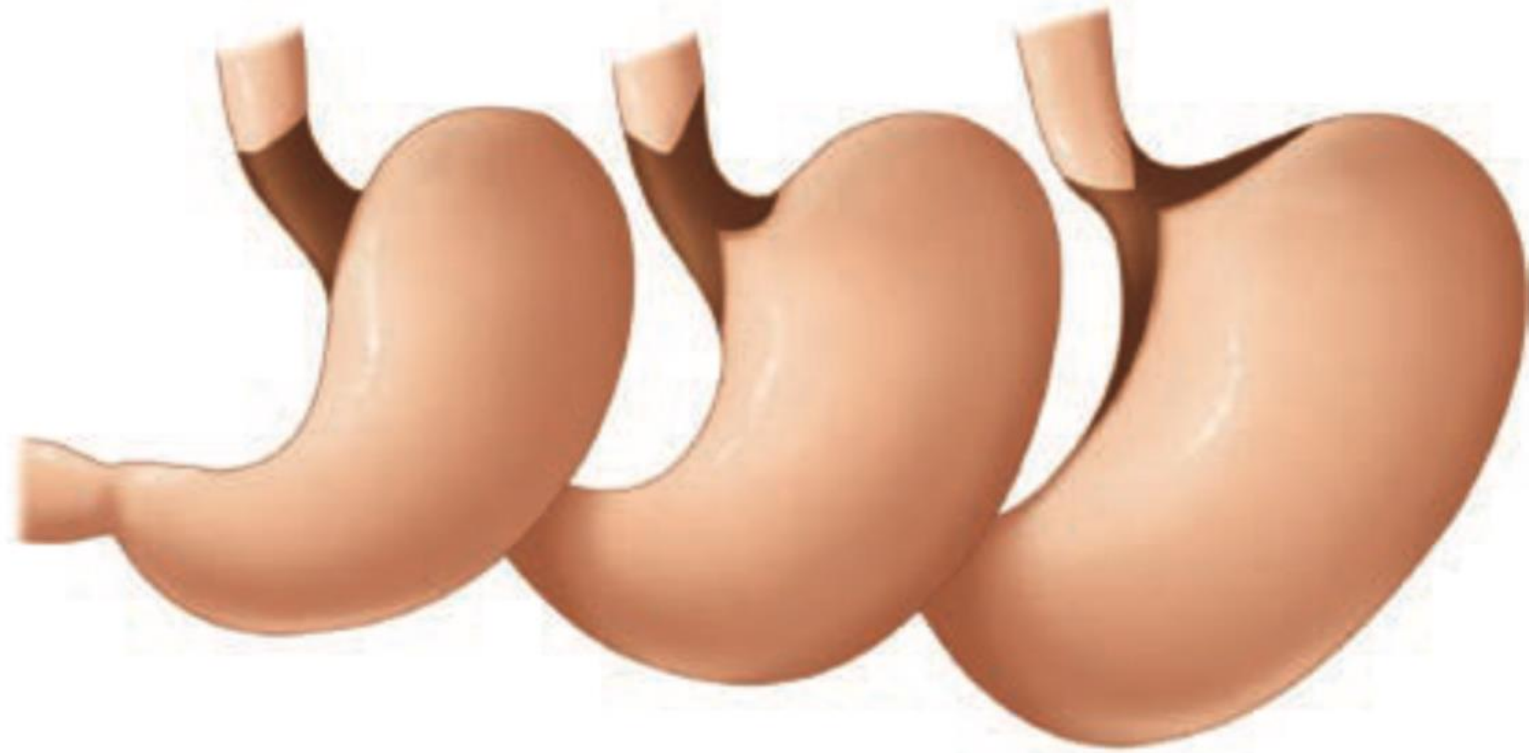
## Medical therapy

- PPI can reduce gastric acidity by 80%-90%.
- It heals most of mild esophagitis, and half of severe esophagitis.
- In mixed reflux it gives relief of symptoms with persisting mucosal damage.
- 80% of patient after 6 months of treatment have recurrent symptoms.



## Surgical therapy

- Success rate in good patient selection > 90%.
- Poor responder to medical treatment have poor response to surgery.
- Outcome is disappointing in patient with delayed gastric emptying.



**Distention**



# Surgical option

## Indications for surgery:

- Complications of reflux not responding to medical treatment.
- Symptoms interfering with life style despite of medical therapy.
- Presense of hiatus hernia.
- Chronic reflux requiring continuous medical therapy ( young age, patient's desire).
- Markedly hypotensive LES.

## Surgical option

### ➤ Principles of surgical therapy:

The primary goal is to preserve antireflux valve, while preserving the patient's ability to swallow normally and to belch to relieve gaseous distension.

The operation should place adequate length of the distal esophageal sphincter in the positive-pressure of the abdomen.

## Surgical option

### ➤ Principles of surgical therapy:

In normal swallowing vagally mediated relaxation of LES and the gastric fundus occurs. To ensure relaxation of the sphincter after surgery (only fundus should be used for wrap).

wrap should be over the sphincter not the gastric body.

avoid vagal nerves injury because it may result in failure of the sphincter to relax.

Tension free repair.

## Surgical option

### Basic surgical steps:

- Restoration of an effective LES.
- Restoration of enough intraabdominal esophagus length.
- Excision of hernial sac.
- Wrapping of the intraabdominal esophagus with the fundus.

# Surgical option

## Choice of approach:

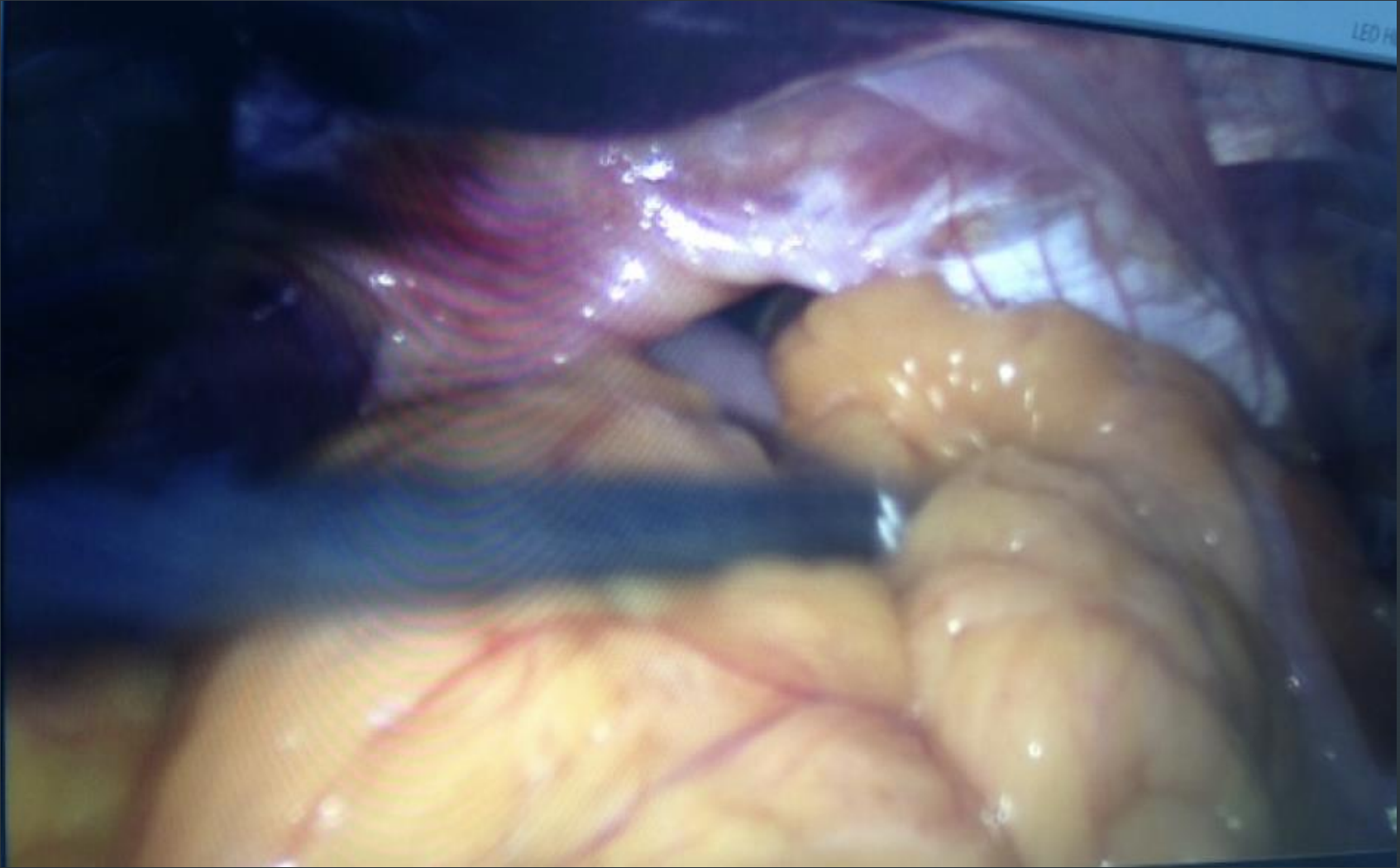
- Transabdominal versus transthoracic.
- Complete versus partial wrap ( 90% success rate in long term follow up ).
- With or without mesh.
- Short esophagus (lengthening procedure: Collis-Nissen).
- Resection ( BE with dysplasia, stricture).

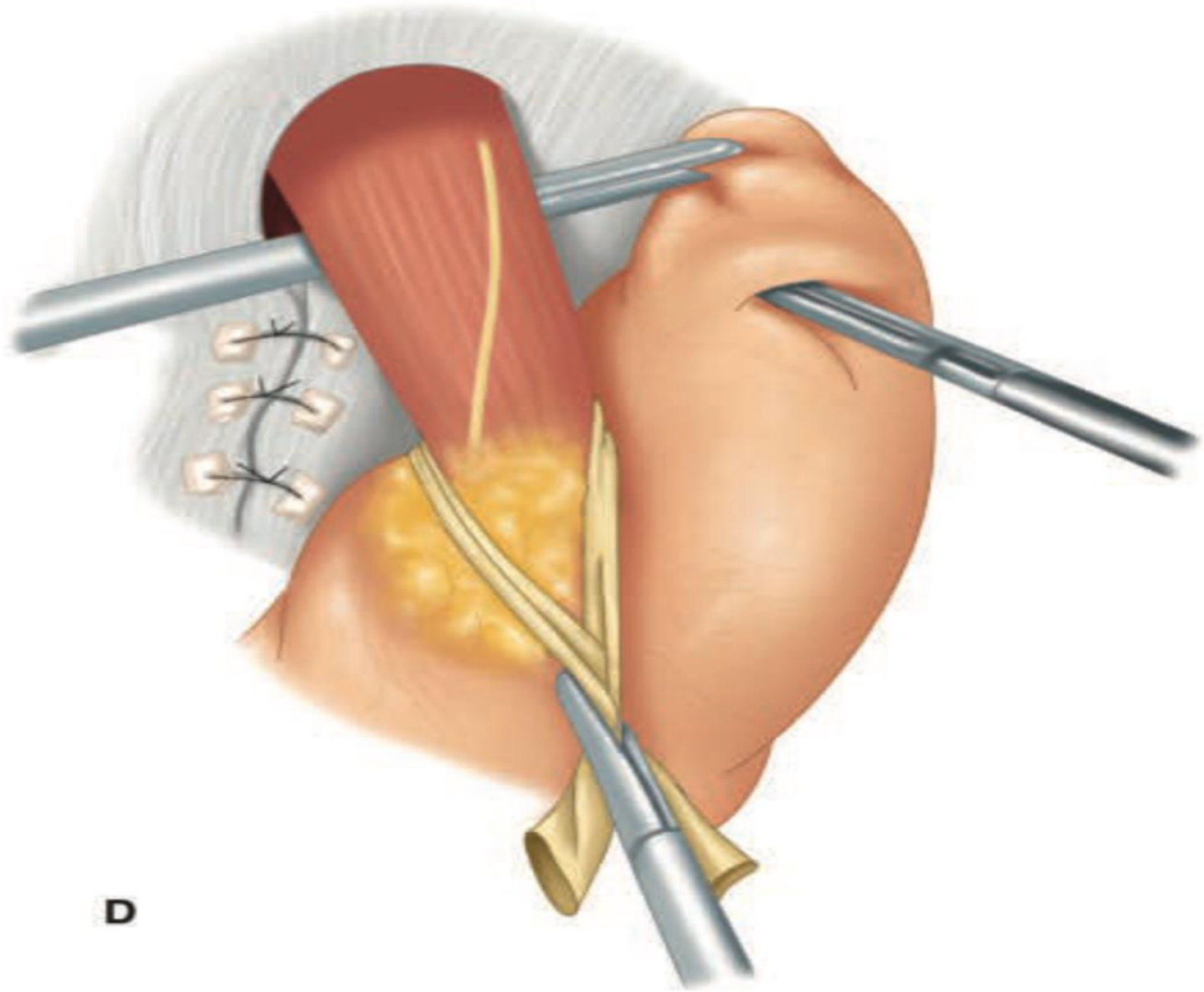
## Surgical option

### Complications:

- Dysphagia (early 19-90%, late 5-10%)
- Gas bloating syndrome
- Inability to belch
- Failure 5-10%
- Intrathoracic migration of the wrapp







**D**

