



# GERD

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## Lecture 1

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Gastroesophageal reflux: is a normal physiologic phenomenon experienced intermittently by most people, particularly after a meal or with coffee. This type is short lived and does not cause any symptoms after the reflux, as retrosternal pain or burning. When endoscopy is performed, blood is not found in the esophagus.

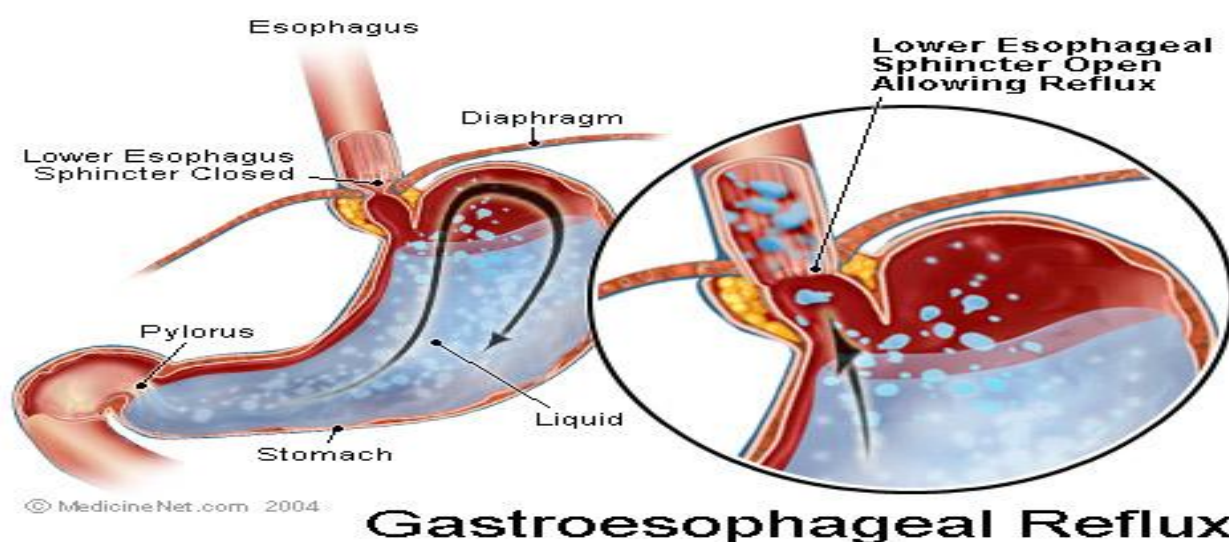
Gastroesophageal reflux disease (GERD): occurs when the amount of gastric juice that refluxes into the esophagus exceeds the normal limit, causing symptoms with or without associated esophageal mucosal injury. When endoscopy is performed erythema, blood, and a case of esophagitis is seen.

### Definition:

According to the American College of Gastroenterology (ACG):

- Symptoms OR mucosal damage produced by the abnormal reflux of gastric contents into the esophagus
- Often chronic and relapsing
- May see complications of GERD in patients who lack typical symptoms

### Anatomic radiographic landmarks of the lower esophageal sphincter (LES):



### Physiologic vs Pathologic reflux:

Physiologic GERD	Pathologic GERD
<ul style="list-style-type: none"> <li>- Postprandial (after food)</li> <li>- Short lived</li> <li>- Asymptomatic</li> <li>- No nocturnal symptoms (no symptoms at night)</li> </ul>	<ul style="list-style-type: none"> <li>- Symptoms</li> <li>- Mucosal injury</li> <li>- Nocturnal symptoms</li> </ul>

Note: distinction between normal and GERD is blurred (unclear) because some degree of reflux is physiologic in all people

## Epidemiology:

- About 44% of the US adult population have heartburn at least once a month
- 14% of Americans have symptoms weekly
- 7% have symptoms daily

## Pathophysiology :

### Normally:

- Primary barrier to gastroesophageal reflux is the lower esophageal sphincter (LES)
- LES normally works in conjunction with the diaphragm
- If barrier disrupted, acid goes from stomach to esophagus

### A. Abnormal lower esophageal sphincter (LES):

1. Functional (frequent transient LES relaxation)

When it closes tight but it loosens up frequently

2. Mechanical (hypotensive LES) the sphincter closes, but closure is weak

3. Foods (e.g. coffee, alcohol) some types of food help relax the sphincter

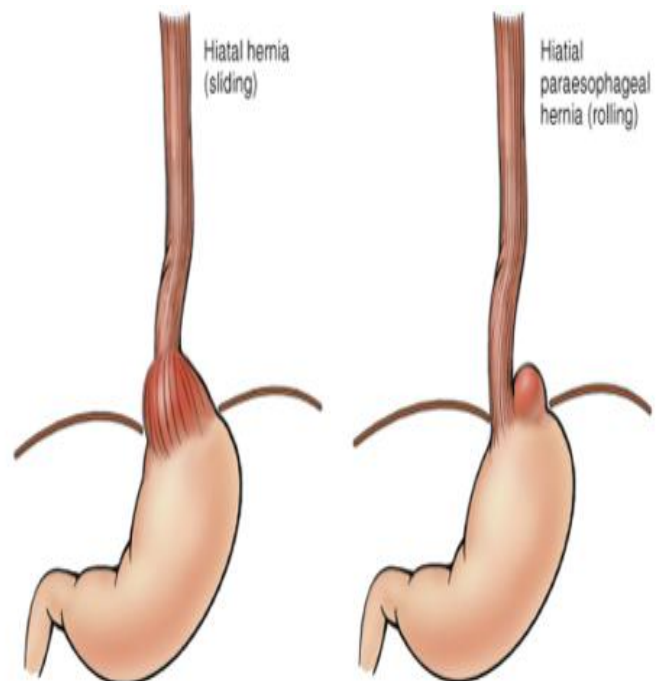
4. Medications (e. g. calcium channel blockers),

5. Location i.e. hiatal hernia the sphincter is normally at the level of the diaphragm, in this condition it's at a higher level so the stomach is pulled into the thoracic cavity and the sphincter is weaker.

The hernia causes ischemic injury to the part that goes into the thoracic cavity. There are 2 kinds of hernia, the first is called a sliding hernia and the other one is called paraesophageal (rolling) hernia. About 99% of cases are sliding hernias.

### B. Increase abdominal pressure duo to:

1. Obesity.
2. Pregnancy most commonly in the third trimester.
3. Increased gastric volume.



The most common cause of (GERD).

decrease the pressure of the LES.

### Pathogenesis of GERD:

1. Impaired lower esophageal sphincter
2. hypersecretion of acid
3. Decreased acid clearance resulting from impaired peristalsis or abnormal saliva production. **e.g. Shokran syndrome: decreased saliva production which causes dry mouth and difficulty in passing food down the esophagus.**
4. Delayed gastric emptying or duodenogastric reflux of bile salts and pancreatic enzymes.

### Clinical Manifestations:

#### Most common symptoms:

- Heartburn—retrosternal burning discomfort
- Regurgitation—effortless return of gastric contents into the pharynx without nausea, retching (**strong involuntary effort to vomit**), or abdominal contractions

Antacids often relieve the previous two symptoms, if not then it's considered alarming. That's when we perform an endoscopy to investigate.

#### Atypical symptoms (alarm symptoms):

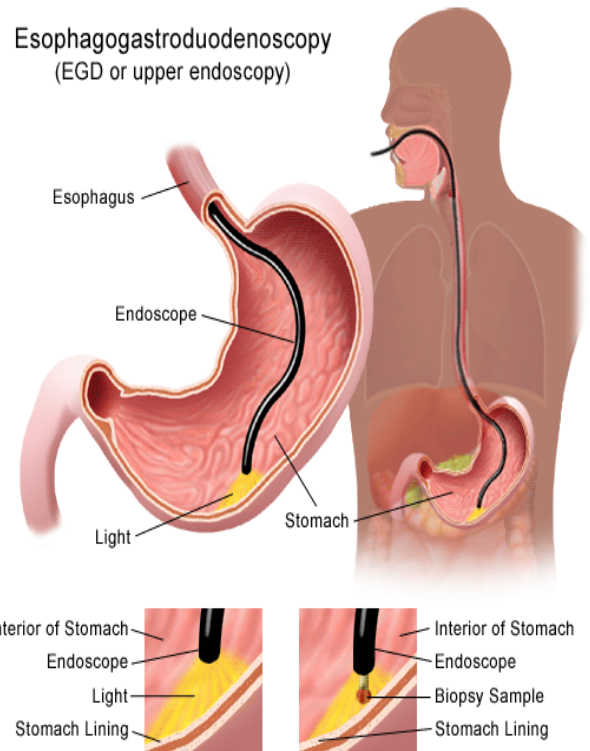
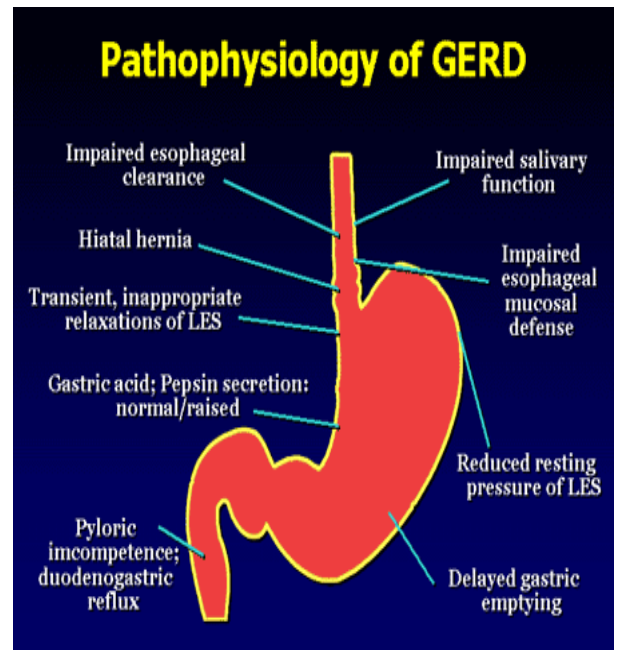
Chest pain (**angina like**), wheezing (**asthma like symptoms**) and coughing **especially 30 minutes after the meal**.

### Diagnostic Evaluation:

1. If classic symptoms of heartburn and regurgitation exist in the absence of “alarm symptoms” **with normal ECG and normal lung examination**, the diagnosis of GERD can be made clinically and treatment can be initiated.
2. Esophagogastroduodenoscopy:

Endoscopy (with biopsy if needed):

- In patients with alarm signs/symptoms
- Those who fail a medication trial
- Those who require long-term Rx (**treatment**)



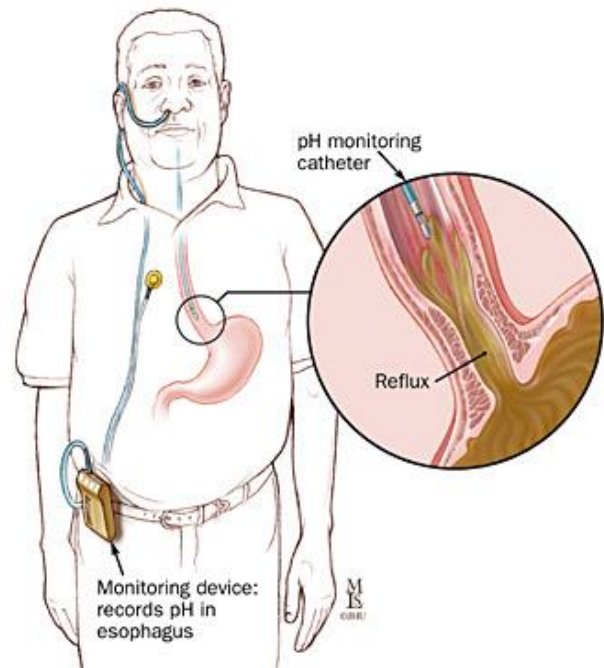
### 3. pH:

#### 24-hour pH monitoring

- Accepted standard for establishing or excluding presence of GERD for those patients who do not have mucosal changes
- Trans-nasal catheter or a wireless capsule shaped device **to measure the pH in the lower esophagus.**

#### Complications:

- Erosive esophagitis
- Stricture
- Barrett's esophagus
- **Metaplasia and carcinoma**

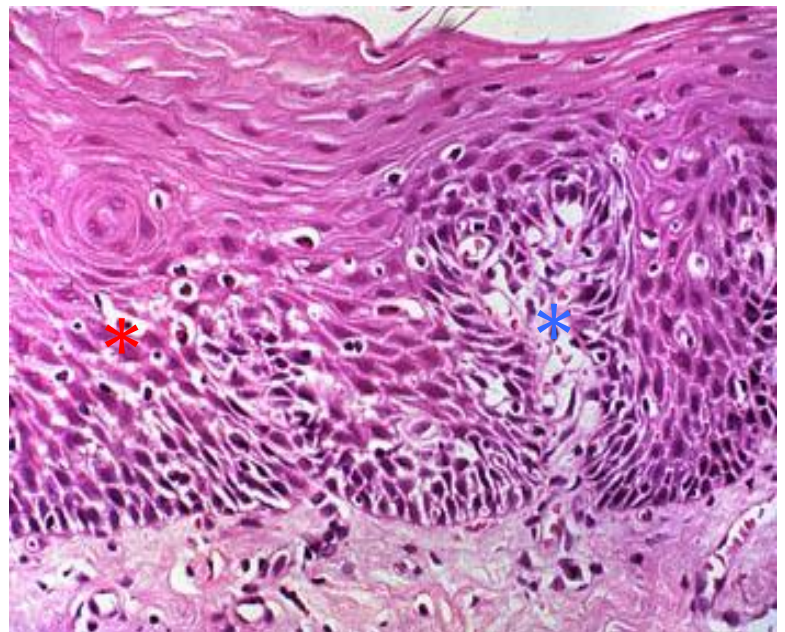


Trans-nasal catheter

**N.B:** Normally the esophagus is pink and smooth in the case of (esophagitis or malignancy) its red and granular.

#### 1. Erosive esophagitis:

- Responsible for 40-60% of GERD symptoms
- Severity of symptoms often fails to match severity of erosive esophagitis. **This means that sometimes a patient may complain of severe pain and symptoms, but when an endoscopy is performed it turns out that there is little or no visible esophageal damage and vice versa.**



**When we perform a biopsy microscopically we'll see:**

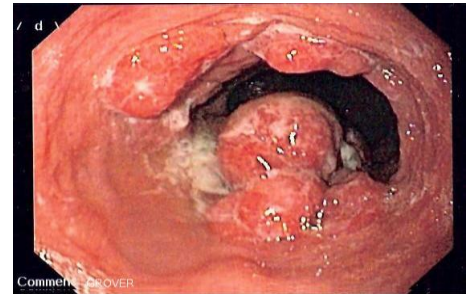
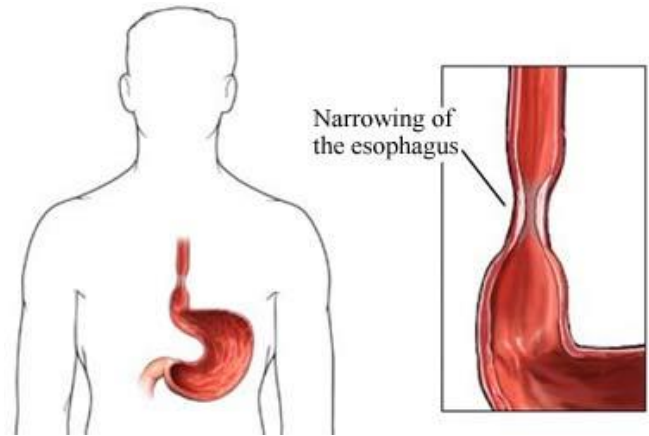
- 1- **Hyperplasia.** Basal zone should be made of 1 layer, but in the case of hyperplasia that is in erosive esophagitis it is made of 5 to 6 layers. \*
- 2- **Elongation of lamina propria papillae.** They usually involve one third of the mucosa, but in case of metaplasia they reach two thirds of the mucosa. \*
- 3- **Infiltration by Eosinophils and neutrophils.**

## 2. Esophageal stricture

- Result of healing of erosive esophagitis
- May need dilation

## 3. Barrett's Esophagus

- Intestinal metaplasia of the esophagus
- 10-15% of GERD will get Barrett's esophagus and 1% of them will develop carcinoma.
- Associated with the development of adenocarcinoma which is the most common type of lower esophageal neoplasm
- Acid damages lining of esophagus and causes chronic esophagitis
- Irritated areas undergo metaplastic transformation from stratified squamous cells to become abnormal columnar cells.
- This specialized intestinal metaplasia can progress to dysplasia (showing polymorphism, hyperchromatism, mitosis and abnormal cell maturity) and adenocarcinoma
- Many patients with Barrett's are asymptomatic
- Usually squamous cell carcinoma occurs in the middle third of the esophagus (this is not related to esophagitis)



### Treatment:

- H<sub>2</sub> receptor Blockers
- Proton pump inhibitors
- Antireflux surgery if the patient doesn't respond to the previous treatments he must undergo surgery. In this surgery they narrow the opening of the diaphragm.

# Summary

- Gastroesophageal Reflux can be **physiological**: that is asymptomatic, experienced after meals with no nocturnal symptoms, or **pathological**: symptomatic, with or without food, and with nocturnal symptoms.

- **GERD can be caused by:**

- A. Abnormal lower esophageal sphincter (LES):**

- 1) Frequent transient LES relaxation
    - 2) Hypotensive LES
    - 3) Certain Foods (e.g. coffee, alcohol)
    - 4) Medications (e. g. calcium channel blockers)
    - 5) Hiatal hernia

- B. Increased abdominal pressure:**

- 1) Obesity
    - 2) Pregnancy most
    - 3) Increased gastric volume

**Most common symptoms are:** Heartburn (retrosternal burning discomfort), retching, abdominal contractions, or regurgitations without nausea.

**Atypical symptoms (alarm symptoms):** Chest pain (**angina like**), wheezing (**asthma like symptoms**) and coughing

**Diagnostic Evaluation:** **clinically, Esophagogastroduodenoscopy** to see if there is any esophageal damage, and 24-hour pH monitoring if there is no apparent damage.

**Complications include:**

- 1) Erosive esophagitis (morphology: basal hyperplasia, elongation of lamina propria papillae, and infiltration of eosinophils and neutrophils)
  - 2) Stricture from the fibrosis and healing
  - 3) Barrett's esophagus (intestinal metaplasia of the lower esophagus)
  - 4) **Metaplasia and carcinoma**