Poltava State Medical University

GastroEzophageal Reflux Disease

Department of internal medicine №1

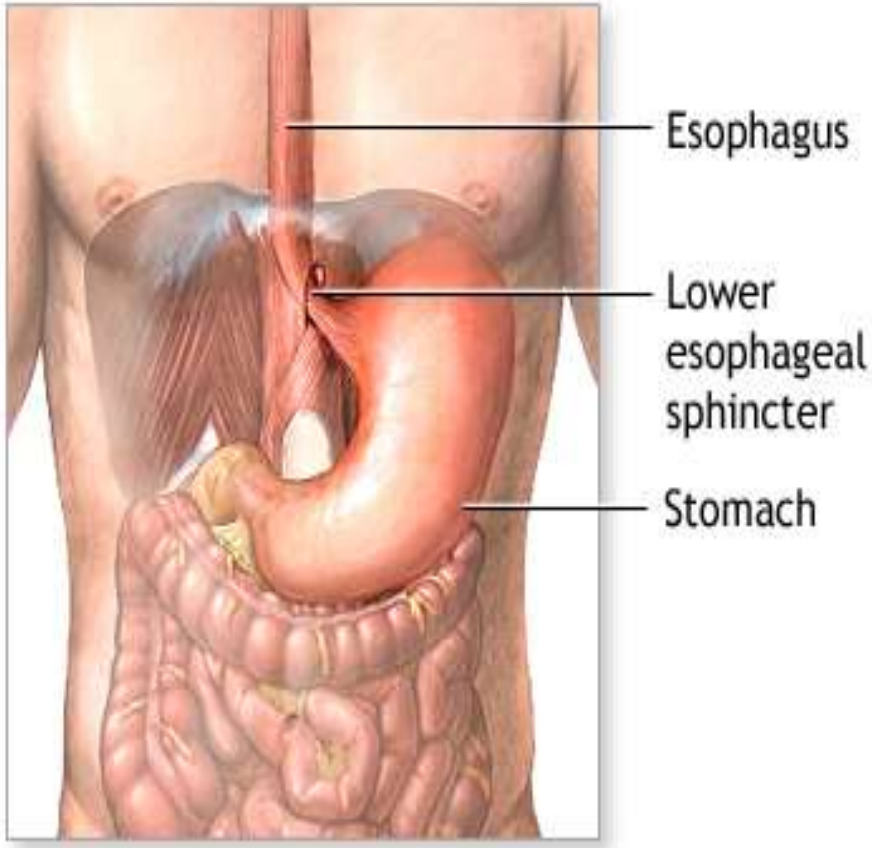
Plan of the lecture

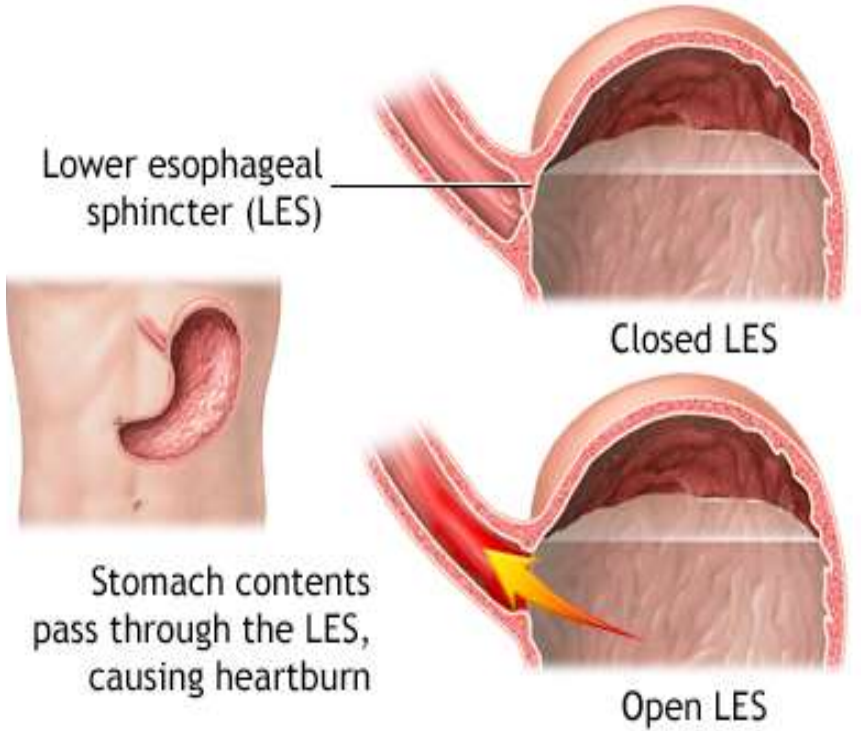
I. Introduction
II. Definition
III. Etiology and Pathogenesis
IV. Risk factors
V. GERD clinical criteries

Plan of the lecture

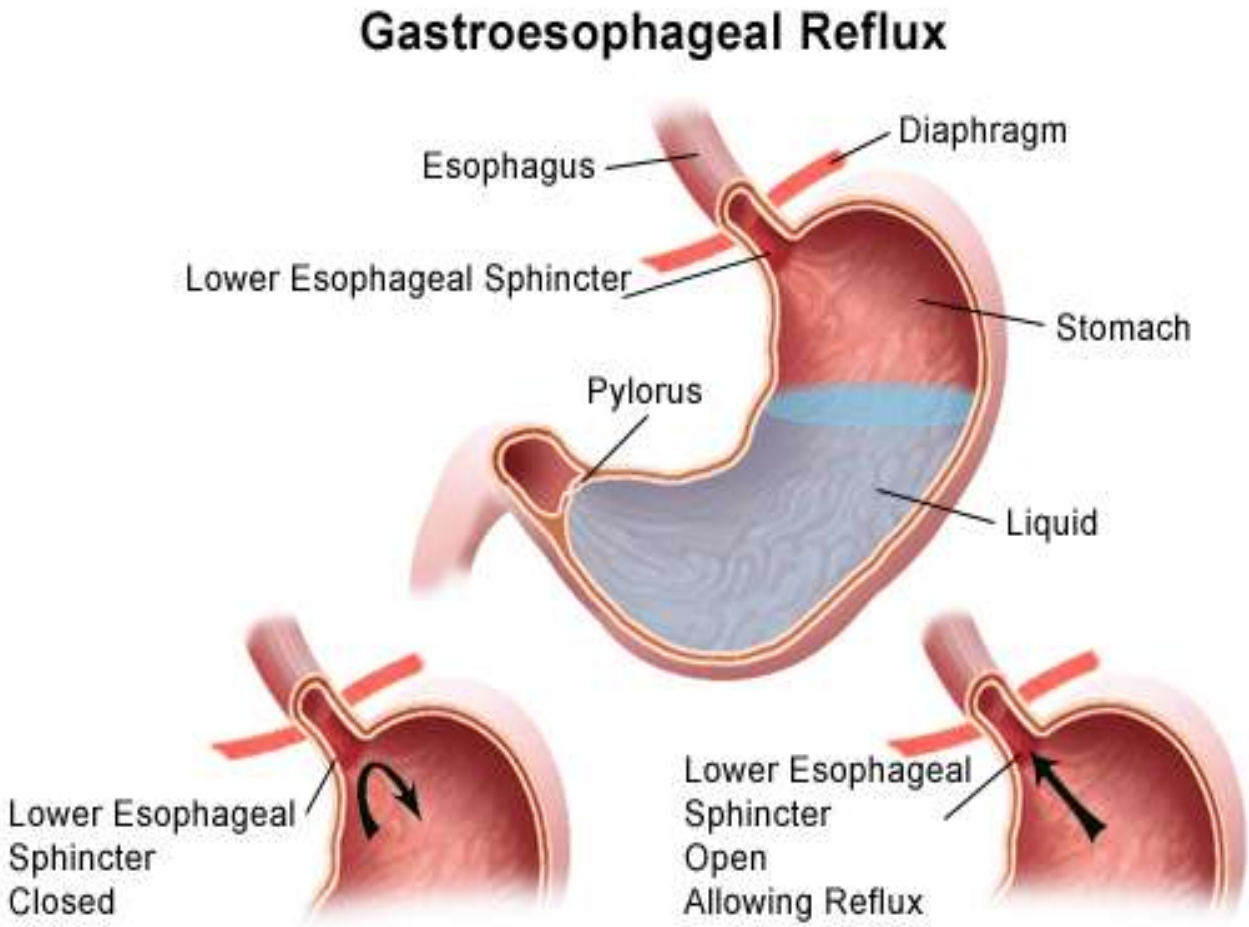
- ***V.1.Typical (esophageal) symptoms***
- **V.2. *Atypical (extraesophageal) symptoms***
- **VI. *Differentials***
- **VII. *Imaging Studies***
- **VIII. *Treatment***
- **VIII. 1. *Lifestyle modifications***
- **VIII.2. *Pharmacologic therapy***
- **VIII.3. *Surgical C***
- **IX. *Complications***
- **X. *Prognosis***

I.Gastroezophageal reflux





Gastroezophageal reflux



II. *Gastroezophageal reflux*

- ***Gastroezophageal reflux*** – regurgitation of acid stomac content into distal ezophageal part, provocated by some food or body situation changes.

Gastroezophageal reflux disease

- ***Gastroezophageal reflux disease*** **(GERD) – chronic disease that results from the backflow of gastric contents into the esophagus (gastro-esophageal reflux), causing specific symptoms and/or mucosal damage.**

Montreal Classification of GERD

- **Erosive GERD (with esophagitis),**
- **Nonerosive GERD (is characterized by the absence of mucosal breaks on endoscopy),**
- **Barret's esophagus (with long segment or short segment).**

Predilection

- GERD occurs in all age groups.
- The prevalence of GERD increases in people older than 40 years.
- No sexual predilection exists. GERD is as common in men as in women.
- The male-to-female ratio for esophagitis is 2:1-3:1. The male-to-female ratio for Barrett esophagus is 10:1.

III. *Etiology and Pathogenesis*

Decreasing of lower esophageal sphincter tone

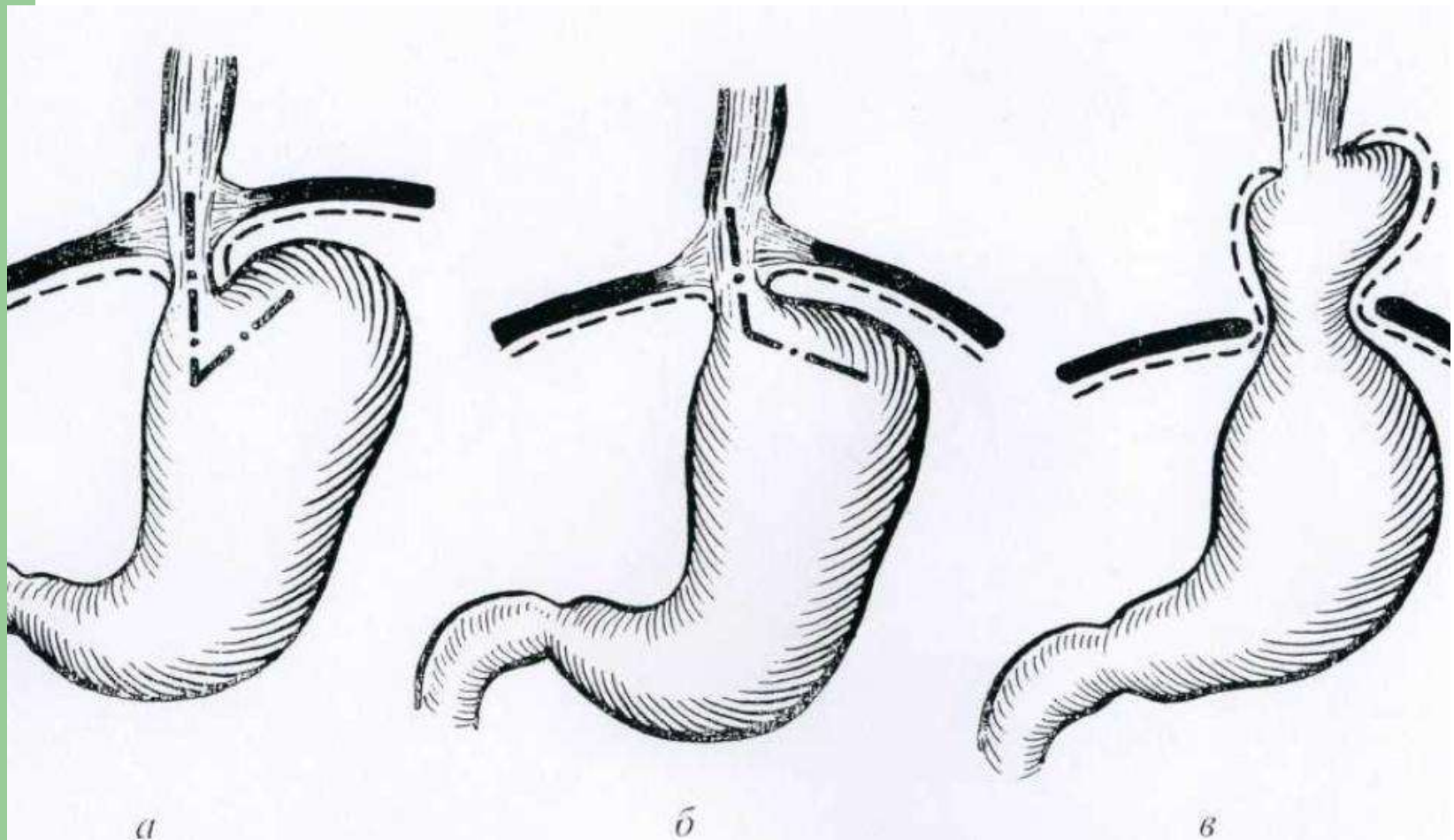
- Gastrointestinal enzymes: secretin, pancreozymin
- Food: fats, chocolate, coffee, alcohol, tomatoes, citrus
- Medicines: spasmolitics, β-adrenergic agonists, Ca-channel blocatores, benzodiasepines, barbiturates, opiates

Pathogenesis

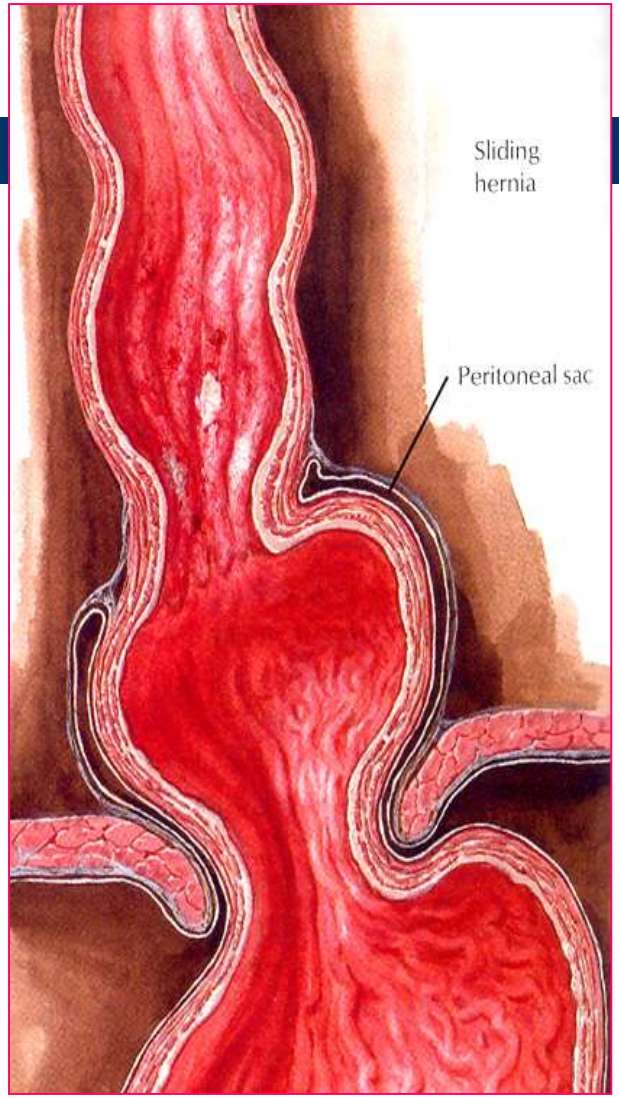
Disorder of esophagus cardiac part anatomy structure – esophageal hernia,
- His corner changes,
- sclerodermia

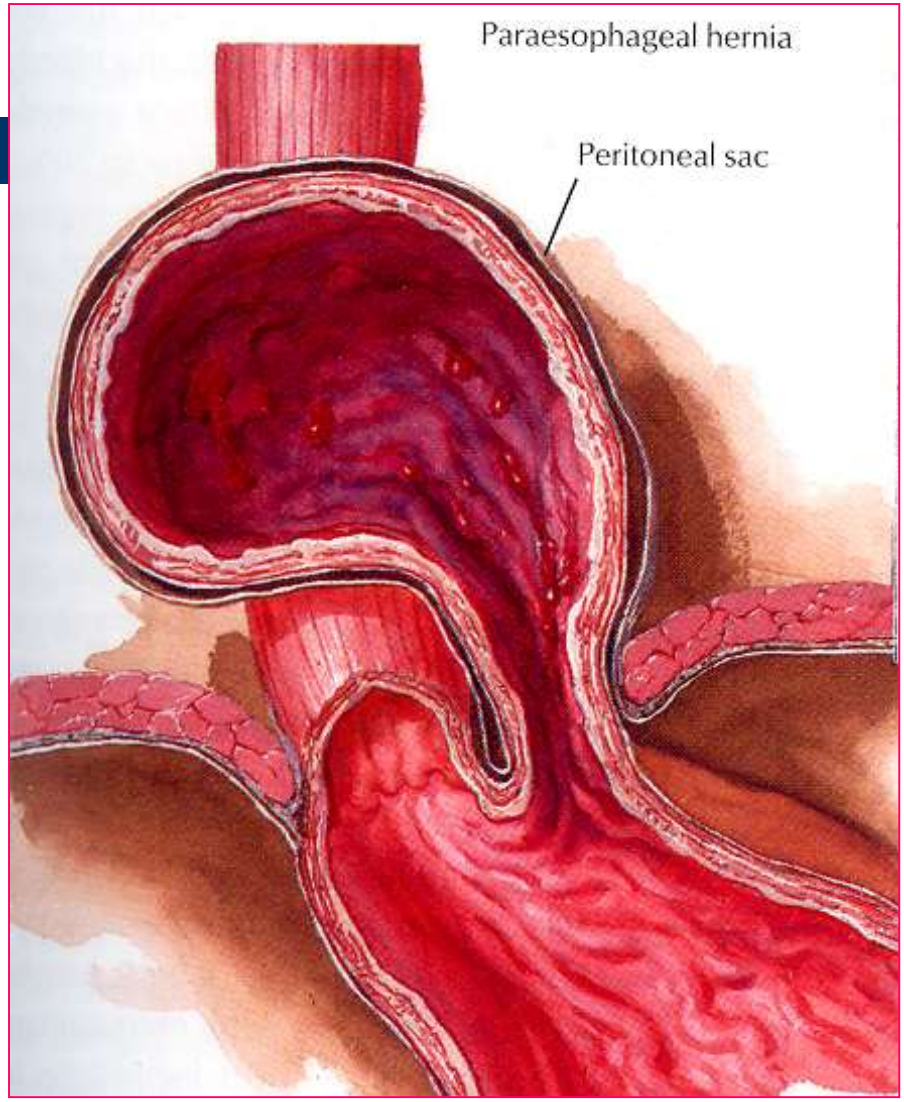
Increasing pressure in abdominal cavity and stomac
- obesity,
- pylorospasm,
- pylorostenosis,
- pregnancy
- large meals

Hiatal hernia



Hiatal hernia





Pathogenesis

- Decreasing of esophageal clearence:
  saline production decreasing
  peristalsis decreasing
- Increasing or refluxate damage properties:
  pH lower 4,0
  bile

Pathogenesis

- Decreasing of esophageal mucus epithelium defended properties
  - *NSAI drugs*
  - *alcohol*
  - *termical trauma*
  - *iron-deficiency anemia*

IV. *Risk factors*

- Some studies have shown that GERD is highly prevalent in patients who are morbidly obese and that a high body mass index (BMI) is a risk factor for the development of GERD

  The mechanism by which a high BMI increases esophageal acid exposure is not completely understood. Increased intragastric pressure and gastroesophageal pressure gradient, incompetence of the LES, and increased frequency of transient LES relaxations may all play a role in the pathophysiology of the disease in patients who are morbidly obese.

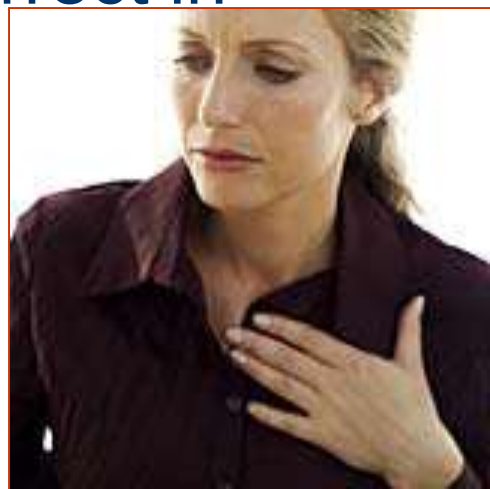
Risk and etiological factors

- obesity, pregnancy, hiatal hernia, tobacco abuse, alcohol consumption, overeating, taking medicines that decrease lower esophageal sphincter contractility (nitrates, calcium channel blockers, beta adrenergic agonists, papaverine, no-spa, anticholinergics, theophylline, morphine, meperidine, diazepam, and barbiturates etc.).
- A genetic component may also play a role in GERD exacerbation.
- Character of food can have an influence too, e.g. peppermint, coffee, fatty meal etc.

V. *Clinical*

- GERD can cause **typical** (esophageal) symptoms or **atypical** (extraesophageal) symptoms.

  However, a diagnosis of GERD based on the presence of typical symptoms is correct in only 70% of patients.



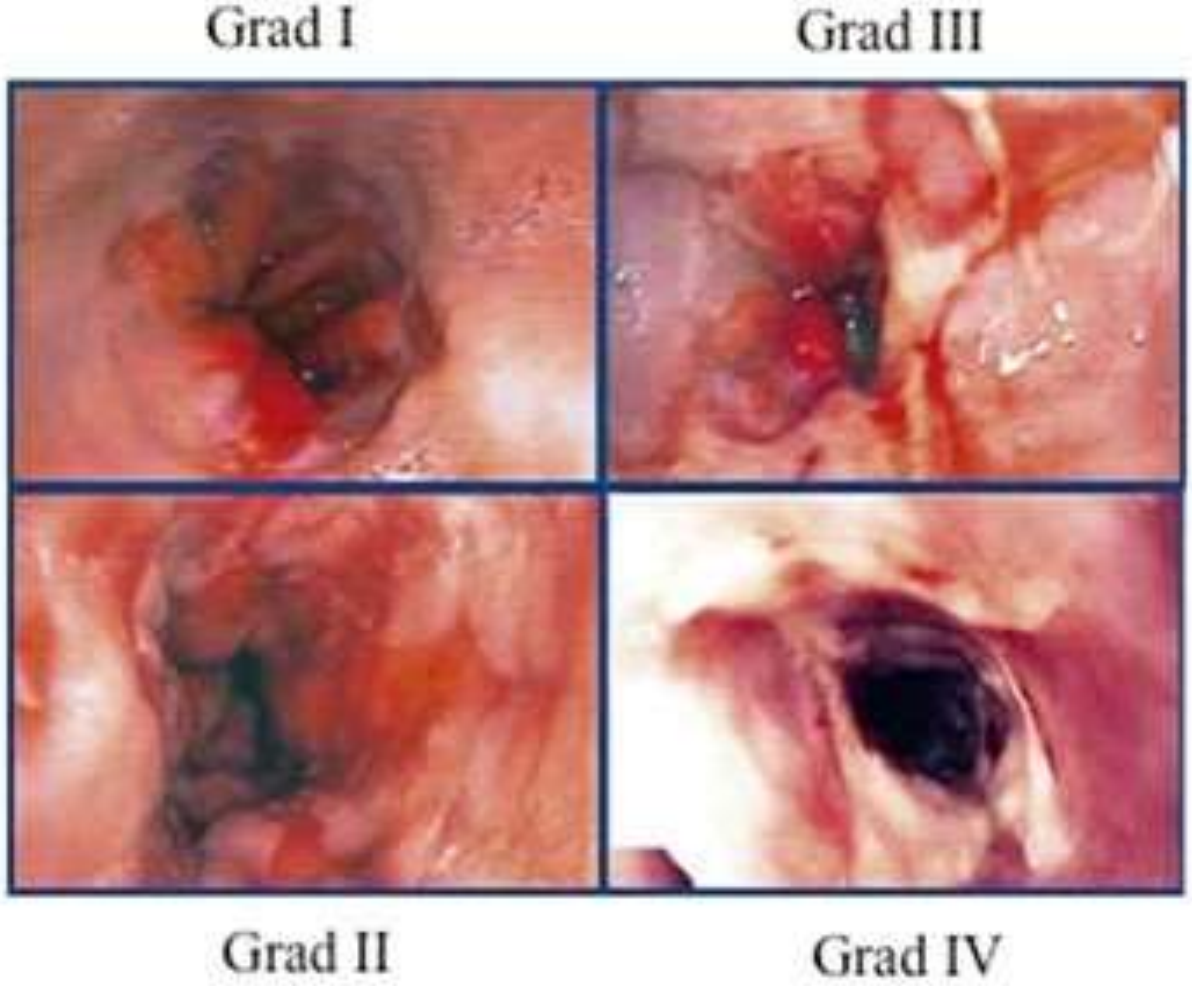
GERD criteries

- More than 50 reflux episodes a day
- pH lower 4,0 with duration 1 and more hours
- Duration more than 3 months

LA Classification of Esophagitis by grade (1999):

- **Grade A** – one (or more) mucosal break no longer than 5 mm that does not extend between the tops of two mucosal folds;
- **Grade B** – one (or more) mucosal break more than 5 mm long that does not extend between the tops of two mucosal folds;
- **Grade C** – one (or more) mucosal break that is continuous between the tops of two or more mucosal folds but which involve less than 75% of the circumference;
- **Grade D** – one (or more) mucosal break which involves at least 75% of the esophageal circumference

Esophagogastroduodenoscopy



V.1. *Typical (esophageal) symptoms*

Heartburn, Regurgitation, Dysphagia

- ***Heartburn*** is the most common typical symptom of GERD. Heartburn is felt as a retrosternal sensation of burning or discomfort that usually occurs after eating or when lying down or bending over.

Typical (esophageal) symptoms

- ***Regurgitation*** is an effortless return of gastric and/or esophageal contents into the pharynx. Regurgitation can induce respiratory complications if gastric contents spill into the tracheobronchial tree.

Typical (esophageal) symptoms

- ***Dysphagia*** occurs in approximately one third of patients because of a mechanical stricture or a functional problem (eg, nonobstructive dysphagia secondary to abnormal esophageal peristalsis). Patients with dysphagia experience a sensation that food is stuck, particularly in the retrosternal area.

V.2. *Atypical (extraesophageal) symptoms*

- ***Coughing*** and/or ***wheezing*** are respiratory symptoms resulting from the aspiration of gastric contents into the tracheobronchial tree or from the vagal reflex arc producing bronchoconstriction. Approximately 50% of patients who have GERD-induced asthma do not experience heartburn.
- ***Hoarseness*** results from irritation of the vocal cords by gastric refluxate. Hoarseness is often experienced by patients in the morning.

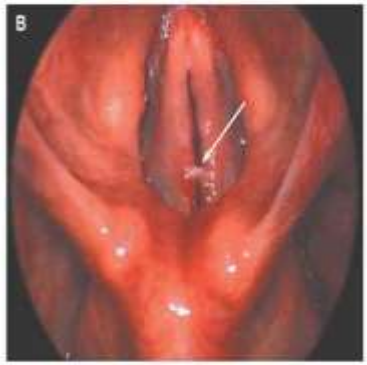
Atypical (extraesophageal) symptoms

- Reflux is the most common cause of ***noncardiac chest pain***, accounting for approximately 50% of cases. Patients can present to the emergency department with pain resembling a myocardial infarction. Reflux should be ruled out (using esophageal manometry and 24-h pH testing if necessary) once a cardiac cause for the chest pain has been excluded. Alternatively, a therapeutic trial of a high-dose proton pump inhibitor (PPI) can be tried.

Atypical symptoms

- Additional atypical symptoms from abnormal reflux include damage to the lungs (eg, pneumonia, asthma, idiopathic pulmonary fibrosis),
- vocal cords (eg, laryngitis, cancer),
- ear (eg, otitis media),
- and teeth (eg, enamel decay).

Atypical symptoms

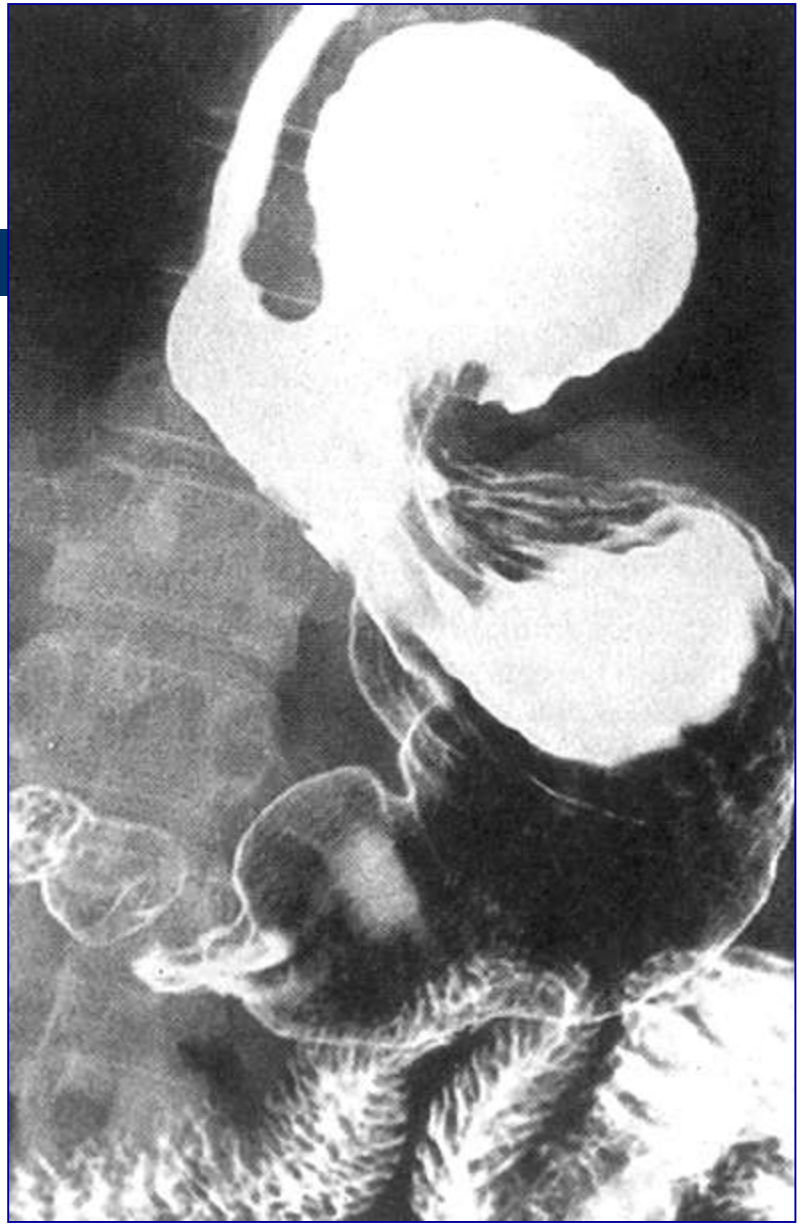


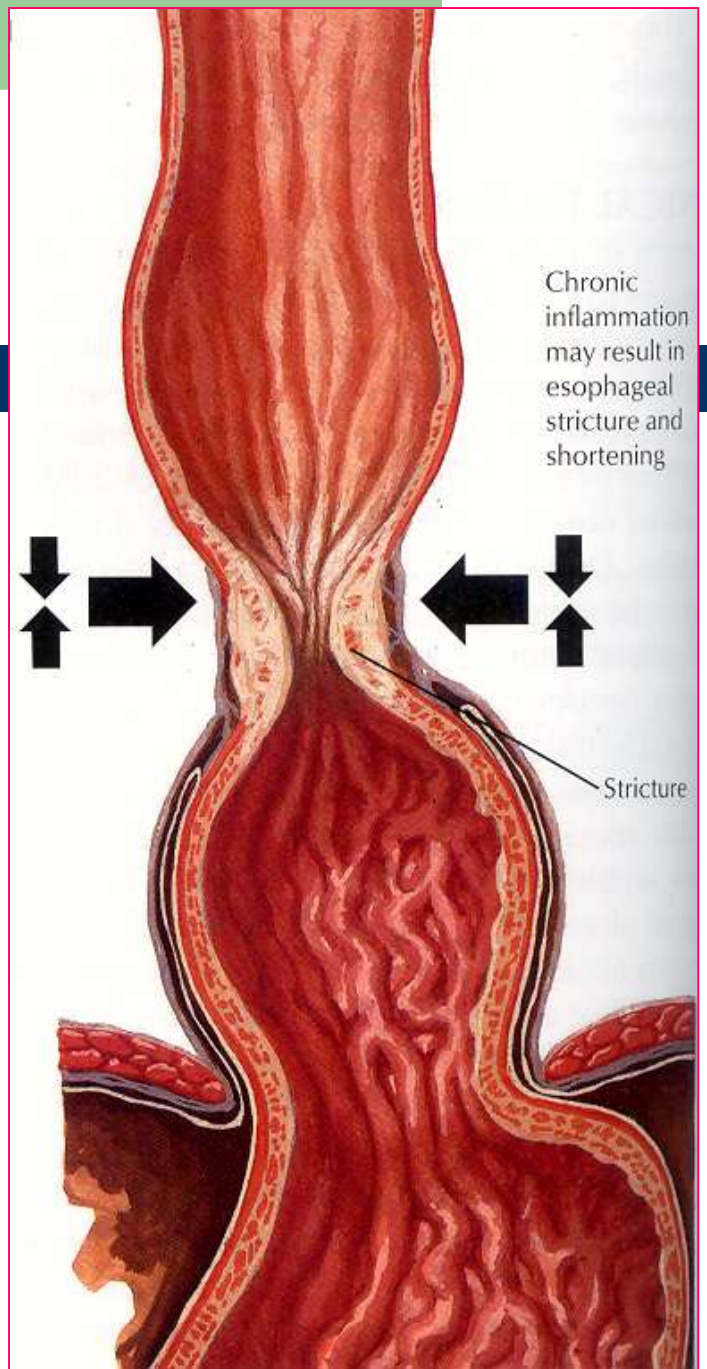
VI. *Differentials*

Achalasia
Cholelithiasis
Coronary Artery Atherosclerosis
Esophageal Cancer
Esophageal Spasm
Esophagitis
Gastritis Chronic
Irritable Bowel Syndrome
Peptic Ulcer Disease

VII. *Imaging Studies*
Barium esophagogram

- Barium esophagogram is particularly important for patients who experience dysphagia.
- Barium esophagogram can show the presence and location of a stricture and the presence and shape of a hiatal hernia.

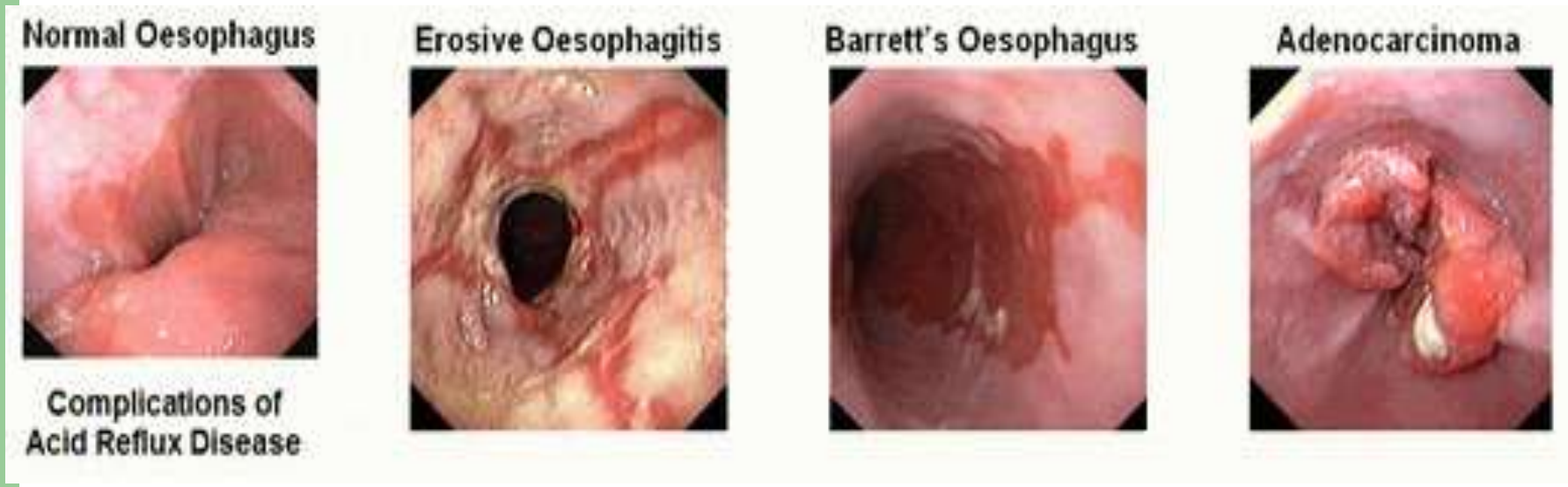



Chronic inflammation may result in esophageal stricture and shortening
Stricture

Esophagogastroduodenoscopy

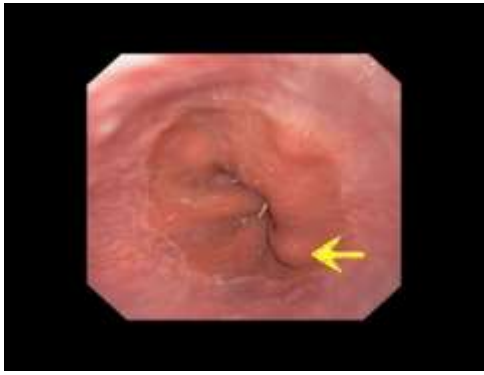
- Esophagogastroduodenoscopy (EGD) identifies the presence and severity of esophagitis and the possible presence of Barrett esophagus.
- EGD also excludes the presence of other diseases (eg, peptic ulcer) that can present similarly to GERD.
- Although EGD is frequently performed to help diagnose GERD, it is not the most cost-effective diagnostic study because esophagitis is present in only 50% of patients with GERD.

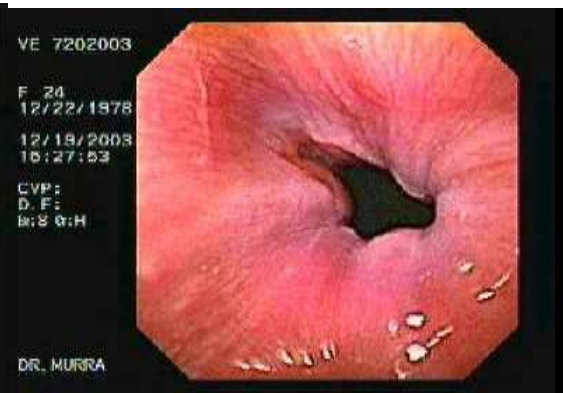
Esophagogastroduodenoscopy



Esophagogastroduodenoscopy

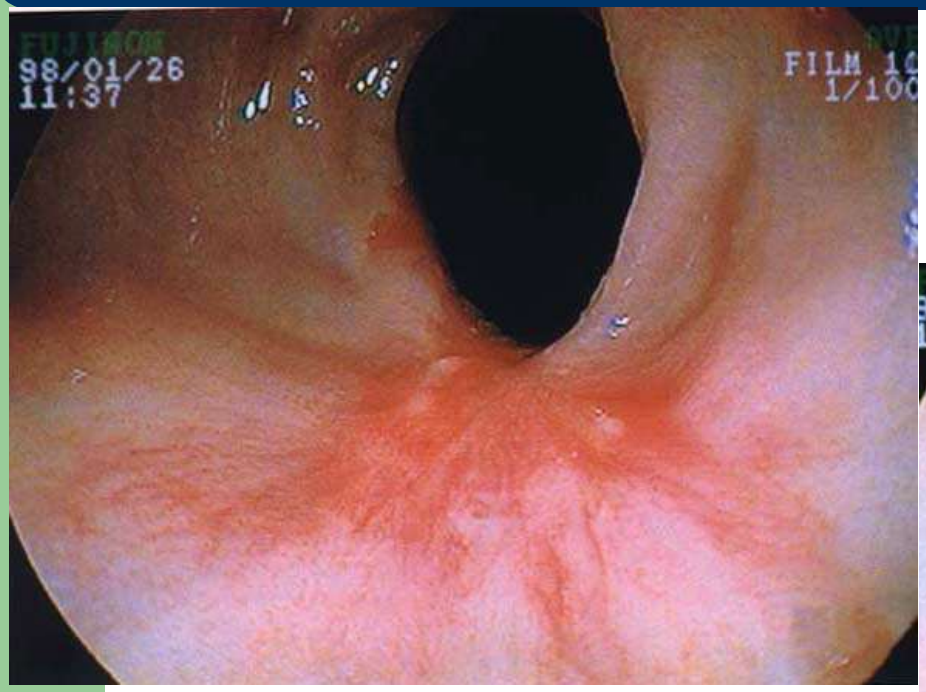


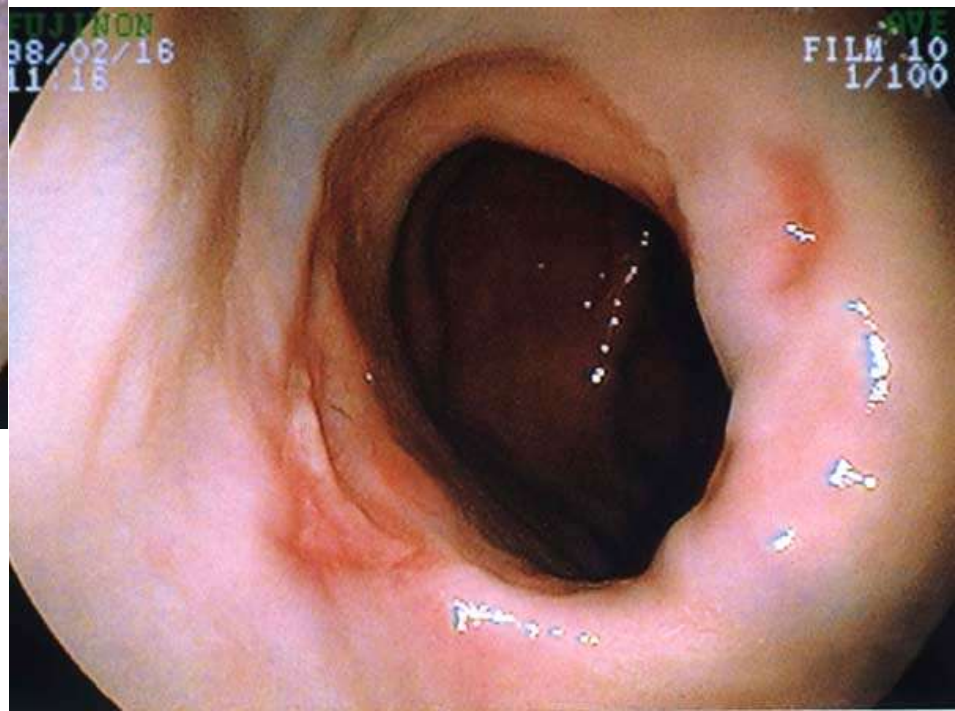





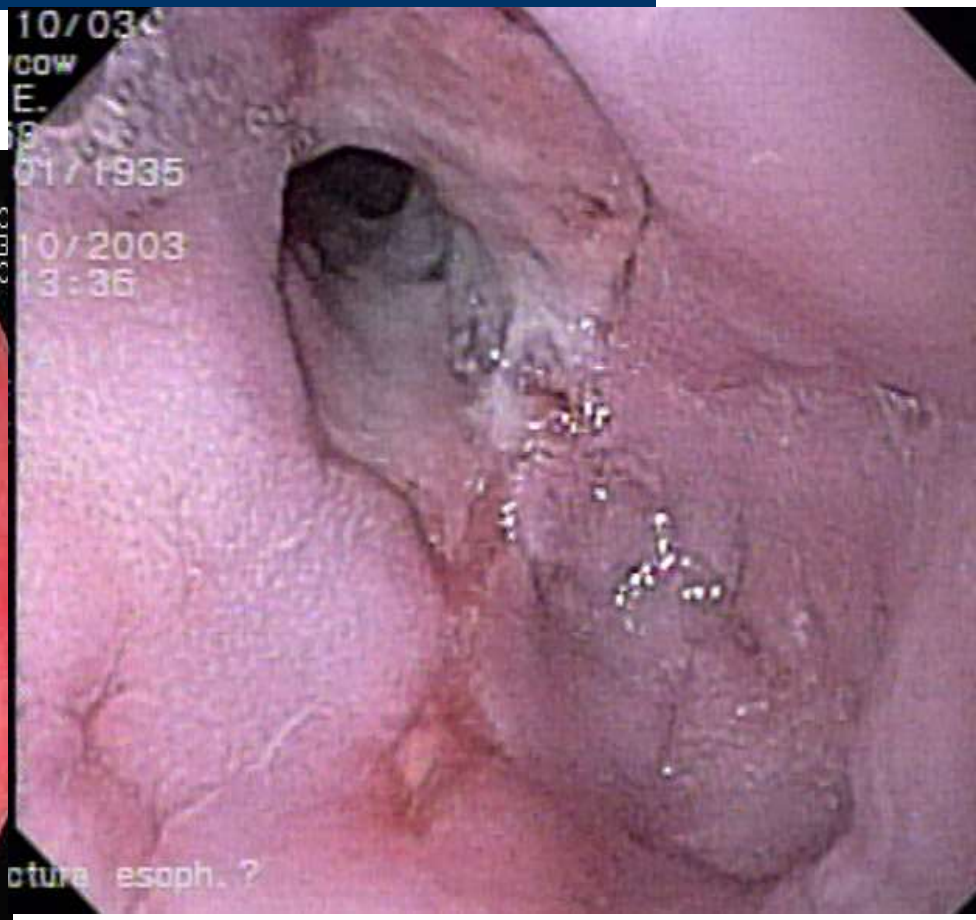

Errosive reflux-esophagitis

Errosive reflux-esophagitis

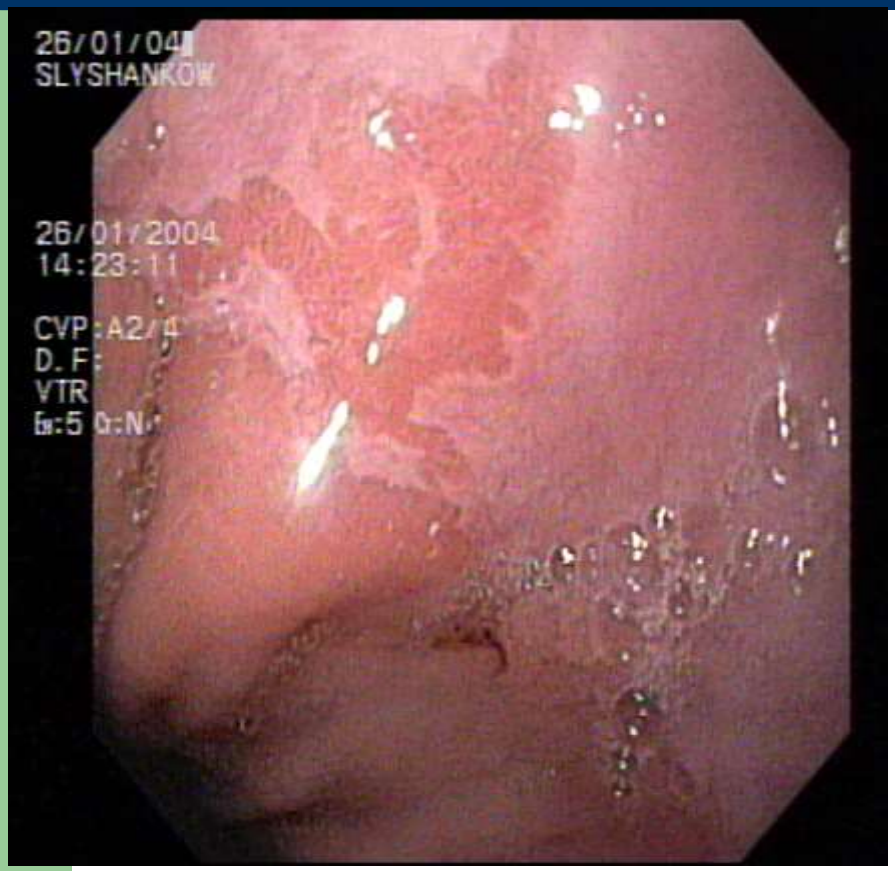


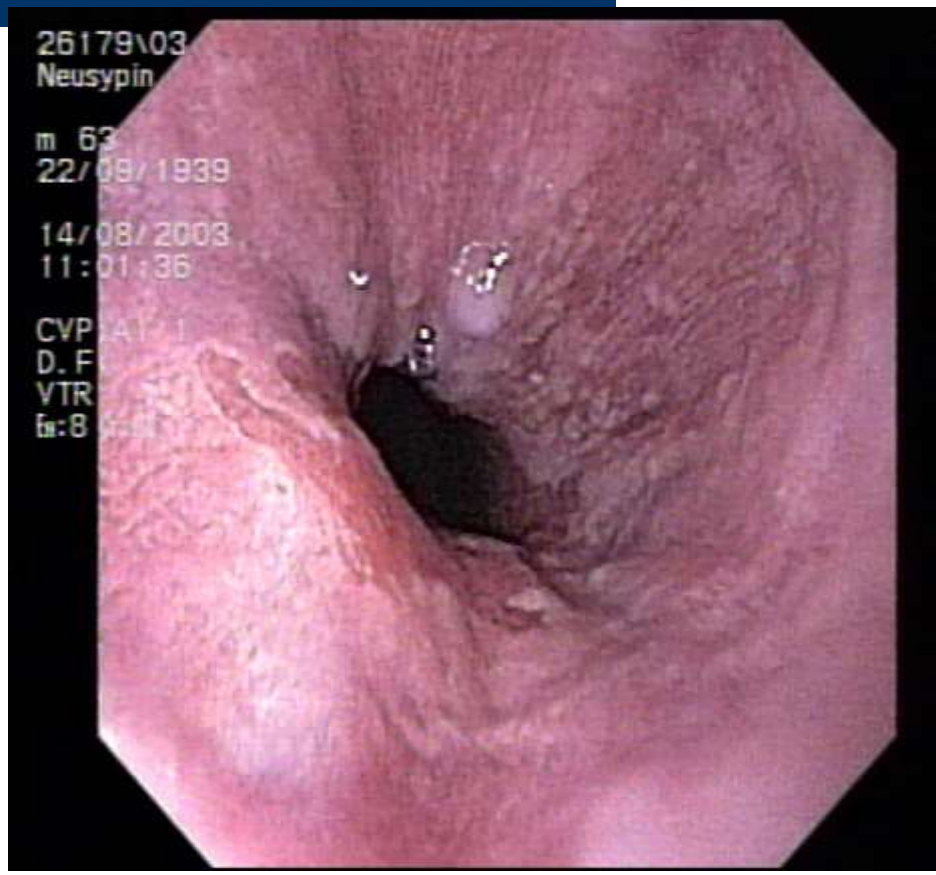


Peptic esophageal stricture



Barrett esophagus



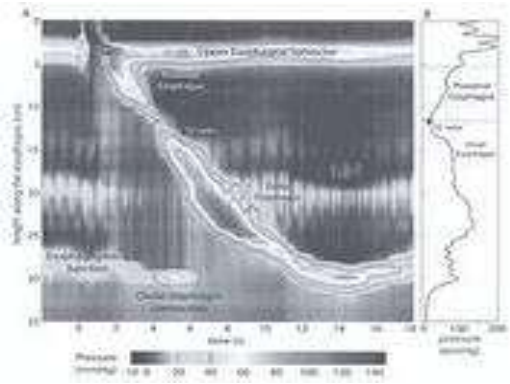


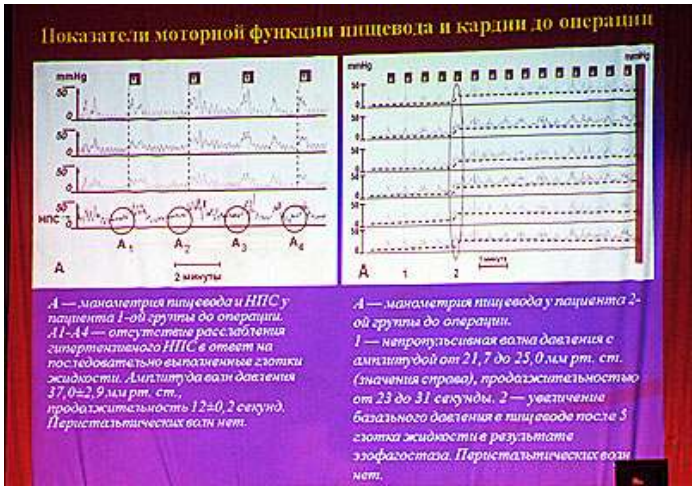
Videocapsules endoscopy

Esophageal manometry

- Esophageal manometry defines the function of the LES and the esophageal body (peristalsis).
- Esophageal manometry is essential for correctly positioning the probe for the 24-hour pH monitoring.

Esophageal manometry



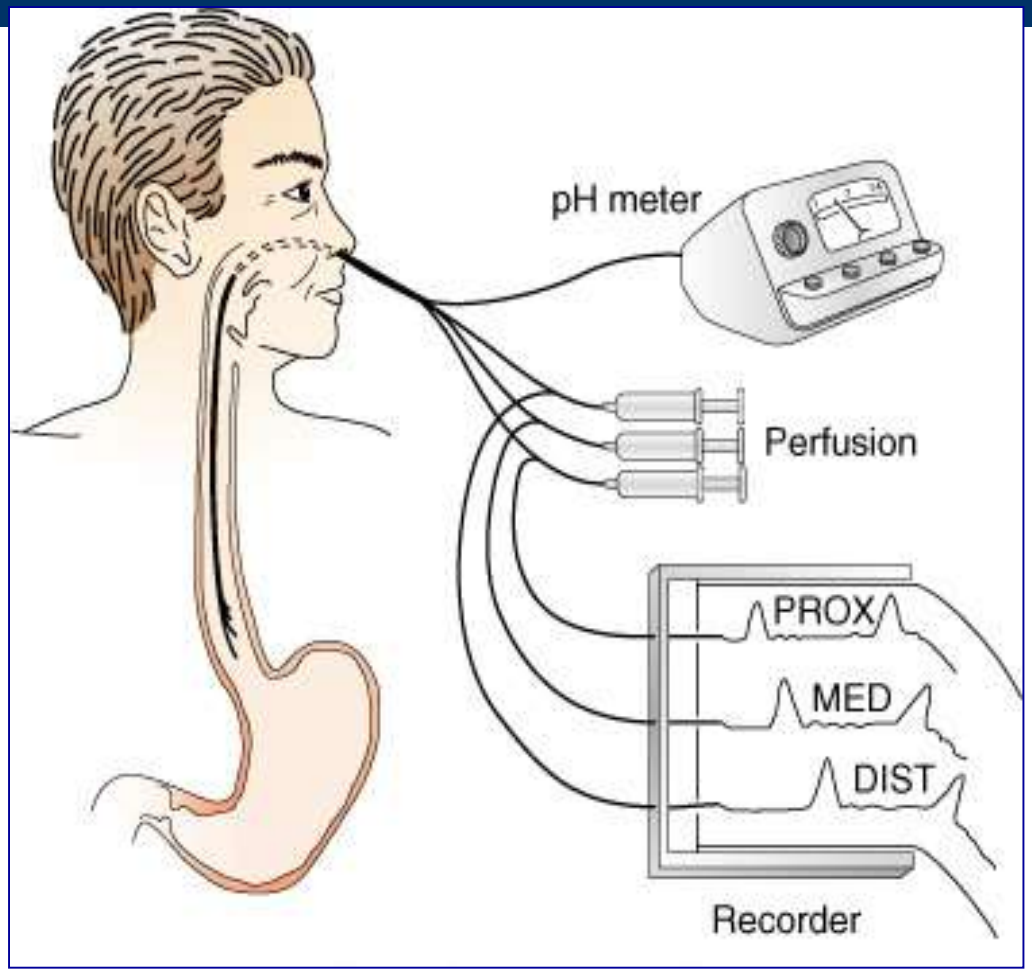


Ambulatory 24-hour pH monitoring

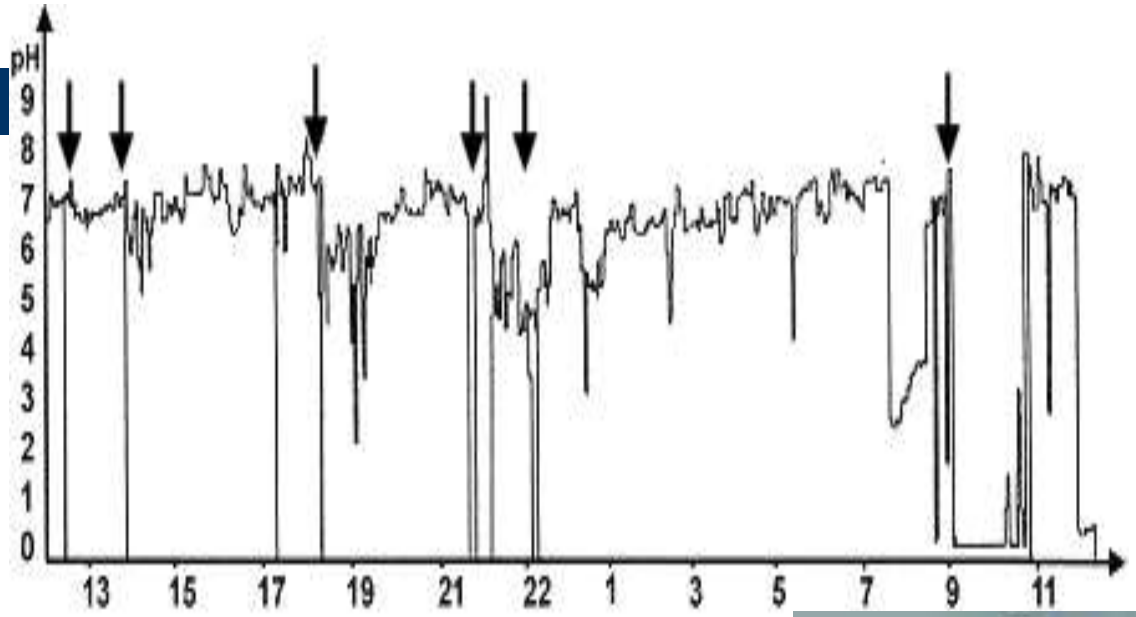
- Ambulatory 24-hour pH monitoring is the criterion standard in establishing a diagnosis of GERD with a sensitivity of 96% and a specificity of 95%.
- Ambulatory 24-hour pH monitoring quantifies the gastroesophageal reflux and allows a correlation between the symptoms of reflux and the episodes of reflux.

Patients with endoscopically confirmed esophagitis do not need pH monitoring to establish a diagnosis of GERD

24-hour pH monitoring



Ambulatory 24-hour pH monitoring



Ambulatory 24-hour pH monitoring by "Gastroscan-24"

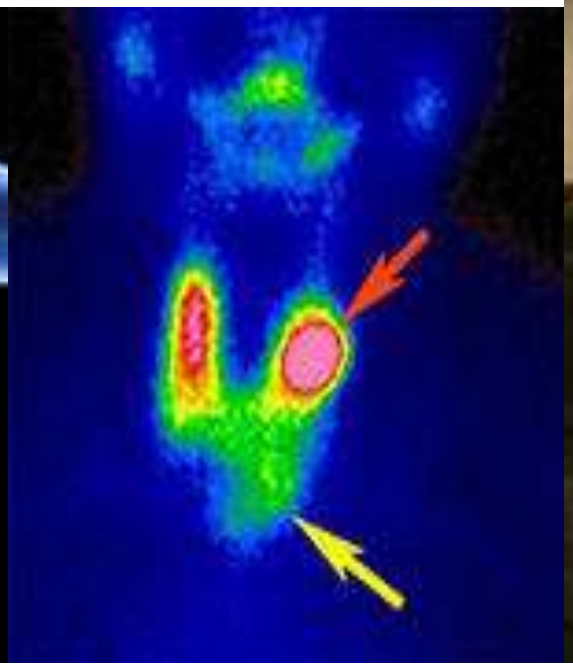
Indications for esophageal manometry and prolonged pH monitoring

- Persistence of symptoms while taking adequate antisecretory therapy, such as PPI therapy
- Recurrence of symptoms after discontinuation of acid-reducing medications
- Investigation of atypical symptoms, such as chest pain or asthma, in patients without esophagitis
- Confirmation of the diagnosis in preparation for antireflux surgery

Radionuclide measurement of gastric emptying

- Although delayed gastric emptying is present in as many as 60% of patients with GERD, this emptying is usually a minor factor in the pathogenesis of the disease in most patients (except in patients with advanced diabetes mellitus or connective tissue disorders).
- Patients with delayed gastric emptying typically experience postprandial bloating and fullness in addition to other symptoms.

Scintigraphy



VIII. *Treatment*

- **Treatment is a stepwise approach. The goals are to control symptoms, to heal esophagitis, and to prevent recurrent esophagitis or other complications. The treatment is based on lifestyle modification and control of gastric acid secretion.**

VIII. 1. *Lifestyle modifications*

- **Losing weight (if overweight)**
- **Avoiding alcohol, chocolate, citrus juice, and tomato-based products**
- **Avoiding large meals**
- **Waiting 3 hours after a meal before lying down**
- **Elevating the head of the bed 8 inches**

Treatment. General Measures.

- **Avoidance of foods or beverages that may provoke symptoms, such as alcohol, coffee, spicy foods, fatty food, chocolate etc. and late meals (less than 2-3 hours before bedtime)**
- **Elevating the head of the bed to 30 degrees for patients with nocturnal regurgitation or heartburn**
- **Weight loss for obese patients**
- **Tobacco cessation.**

VIII.2. *Pharmacologic therapy*

- **PPIs** ***are the most powerful medications available. They should be used only when GERD has been objectively documented. PPIs work by blocking the final step in the H+ ion secretion by the parietal cell. They have few adverse effects and are well tolerated for long-term use.***

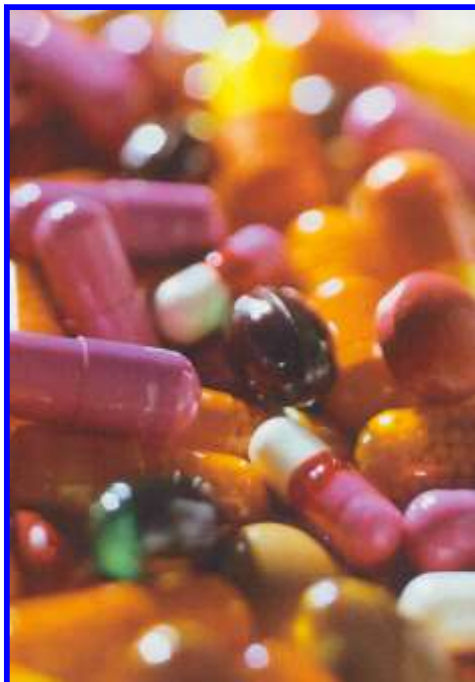
However, recent data have shown that PPIs can interfere with calcium homeostasis and aggravate cardiac conduction defects. They have also been responsible for hip fracture in postmenopausal women.

Pharmacologic therapy

- **Prokinetic agents *improve the motility of the esophagus and stomach. These agents are somewhat effective but only in patients with mild symptoms; other patients usually require additional acid-suppressing medications, such as PPIs. Long-term use of prokinetic agents may have serious, even potentially fatal, complications and should be discouraged.***

Pharmacologic therapy

- **Antacids *were the standard treatment in the 1970s and are still effective in controlling mild symptoms of GERD. Antacids should be taken after each meal and at bedtime*.**



Pharmacologic therapy

- **Histamine H2 receptor antagonists** ***are the first line agents for patients with mild-to-moderate symptoms and grades I-II esophagitis. Histamine H2 receptor antagonists are effective for healing only mild esophagitis in 70-80% of patients with GERD and for providing maintenance therapy to prevent relapse. Tachyphylaxis has been observed, suggesting that pharmacologic tolerance can reduce the long-term efficacy of these drugs.***
- ***Additional H2 blocker therapy has been reported to be useful in patients with severe disease (particularly those with Barrett esophagus) who have nocturnal acid breakthrough.***

VIII.3. *Surgical Care*

Surgical Care

- Approximately 80% of patients have a recurrent but nonprogressive form of GERD that is controlled with medications. Identifying the 20% of patients who have a progressive form of the disease is important because they may develop severe complications, such as strictures or Barrett esophagus. For patients who develop complications, surgical treatment should be considered at an earlier stage to avoid the sequelae of the disease that can have serious consequences.

Indications for fundoplication

- Patients with symptoms that are not completely controlled by PPI therapy can be considered for surgery. Surgery can also be considered in patients with well-controlled disease who desire definitive, one-time treatment.

Indications for fundoplication

- The presence of Barrett esophagus is an indication for surgery. Whether acid suppression improves the outcome or prevents the progression of Barrett esophagus remains unknown, but most authorities recommend complete acid suppression in patients with histologically proven Barrett esophagus.

Indications for fundoplication

- The presence of extraesophageal manifestations of GERD may indicate the need for surgery. These include the following: (1) respiratory manifestations (eg, cough, wheezing, aspiration); (2) ear, nose, and throat manifestations (eg, hoarseness, sore throat, otitis media); and (3) dental manifestations (eg, enamel erosion).

Indications for fundoplication

- Young patients
- Poor patient compliance to medications
- Postmenopausal women with osteoporosis
- Patients with cardiac conduction defects
- Cost of medical therapy

IX. *Medication*

The goals of pharmacotherapy are to prevent complications and to reduce morbidity

IX. *Medication*

- Inhibition of gastric acid secretion is the cornerstone of the treatment of GERD, and proton pump inhibitors (PPIs) are superior to histamine (H2)-receptor antagonists for both the healing of esophagitis and the control of symptoms. Once-daily standart dosage of PPIs 30-60 minutes prior to meal for 4-8 weeks (nonerosive form, Grade A, B) or 8-12 weeks (Grade C, D) is adequate. High dose (twice daily) is usually used for severe or refractory symptoms. H2-receptor antagonists are useful in patients who are intolerant of PPIs, and can be used at bedtime to supplement PPIs in patients who have persistent symptoms.

Medication. PPIs (standart dosage):

- Esomeprazole 40mg
- Lansoprazole 30mg
- Omeprazole 20mg
- Pantoprazole 40mg
- Rabeprazole 20mg
- Dexlansoprazole (long-acting form) 60mg

Medication

Esomeprazole (Nexium) S-isomer of omeprazole. Inhibits gastric acid secretion by inhibiting H+/K+ ATPase enzyme system at secretory surface of gastric parietal cells. Adult dose - 20-40 mg PO qd for 4-8 wk

Lansoprazole (Prevacid) Inhibits gastric acid secretion. Used for up to 8 wk to treat all grades of erosive esophagitis. Adult dose - 15-60 mg PO qd or 15 mg bid

Medication

Omeprazole (Prilosec) Used for up to 4 wk to treat and relieve symptoms of active duodenal ulcers. May use for up to 8 wk to treat all grades of erosive esophagitis. Adult dose - 20 mg PO qd or bid

Rabeprazole (Aciphex) For short-term (4- to 8-wk) treatment and relief of symptomatic erosive or ulcerative GERD. In patients not healed after 8 wk, consider additional 8-wk course. Adult dose - 20 mg PO qd for 4-8 wk

Medication

- ***H2 receptor antagonists***

  These agents are reversible competitive blockers of histamine at the H2 receptors, particularly those in the gastric parietal cells where they inhibit acid secretion. The H2 antagonists are highly selective, do not affect the H1 receptors, and are not anticholinergic agents. Although IV administration of H2 blockers may be used to treat acute complications (eg, GI bleeding), the benefits are not yet proven.

  Famotidine is the most potent H2 blocker.

Medication

- **Famotidine (Pepcid)**Competitively inhibits histamine at H2 receptor of gastric parietal cells, resulting in reduced gastric acid secretion, gastric volume, and hydrogen concentrations.20 mg PO bid (40 mg bid)
- **Nizatidine (Axid)**Competitively inhibits histamine at the H2 receptor of the gastric parietal cells, resulting in reduced gastric acid secretion, gastric volume, and hydrogen concentrations.

Medication.

- Also antacid medications (e.g. Maalox) can be used. Antacids neutralize acids in the stomach, and are the drugs of choice for mild GERD symptoms. They may also stimulate the defensive systems in the stomach by increasing bicarbonate and mucus secretion. They should be prescribed 1-1,5 hours after meal.

Medication.

- Magnesium salts have major side effect of diarrhea. Magnesium salts offered in combination products with aluminum (Maalox) to balance the side effects of diarrhea and constipation.

Medication.

- Prokinetic drugs help the stomach empty its contents more quickly and strengthen the esophageal sphincter. These are considered second-line access drugs due to side effects. The most widespread prokinetics are: Domperidone 10mg 3 times a day,

  Itoprid 50mg 3 times a day.

X. *Complications*

“MUSE”:

- **Metaplasia**
- **Ulcer**
- **Stricture**
- **Erosion**

Bleeding

Respiratory complications

Complications

- esophageal strictures,
- Barrett’s esophagus,
- ulcer of esophagus,
- bleeding,
- laryngitis, pharyngitis, sinusitis,
- adenocarcinoma,
- interstitial fibrosis,
- dental erosions (dental enamel loss).

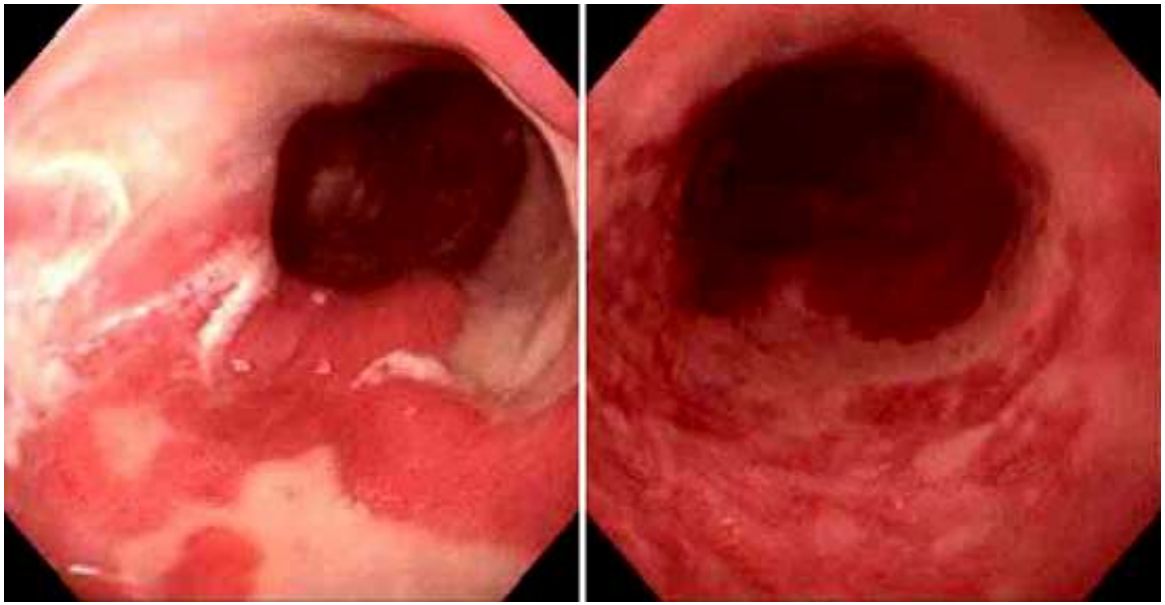
Complications

- ***Esophagitis*** (esophageal mucosal damage) occurs in approximately 50% of patients.
- ***Barrett esophagus*** is one of the most serious complications of GERD because it may progress to cancer.
- ***Respiratory complications*** include pneumonia, asthma, and interstitial lung fibrosis.

Barrett esophagus

Barrett esophagus is thought to be caused by the chronic reflux of gastric juice into the esophagus. Barrett esophagus occurs when the squamous epithelium of the esophagus is replaced by the intestinal columnar epithelium. Barrett esophagus is present in 8-15% of patients with GERD and may progress to adenocarcinoma.

Barrett esophagus



XI. *Prognosis*

- Most patients with GERD do well with medications, although a relapse after cessation of medical therapy is common and indicates the need for long-term maintenance therapy.
- Identifying the subgroup of patients who may develop the most serious complications of the disease and treating them aggressively is important. Surgery at an early stage is most likely indicated in these patients.
- After a laparoscopic Nissen fundoplication, symptoms resolve in approximately 92% of patients.


Omeprazole 20mg
Lansoprazole 30mg
Pantoprazole 40mg