

**Presentation and Management of Common Esophageal Diseases**  
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**Anatomy of the esophagus:**

- It is an epithelial lined muscular tube, 25 cm long, and extends from the level of C<sub>6</sub> to T<sub>11</sub>.
- Has three portions:
  - Cervical.
  - Thoracic.
  - Abdominal.
- Its muscular coat has two layers:
  - Outer longitudinal.
  - Inner circular.
- The upper third is composed of striated muscle, while the lower two thirds are composed of smooth muscles.
- It is lined by keratinized squamous epithelium which changes to columnar epithelium 2 cm above the gastroesophageal (GE) junction.
- It has two sphincters:
  - The upper esophageal sphincter (UES).
  - The lower esophageal sphincter (LES).
- Anatomical areas of narrowing:
  - At the level of the cricoid cartilage.
  - In the mid thorax, from compression by the aortic arch and left main bronchus.
  - At the level of the esophageal hiatus of the diaphragm.

 **Dysphagia**

- Difficulty in swallowing.
- *It is not painful swallowing (i.e. odynophagia).* <sup>Ⓢ</sup>
- Causes:
  - Diseases of the mouth and tongue, e.g. tonsillitis.
  - Neuromuscular disorders, e.g. bulbar palsy, myasthenia gravis.
  - Motility disorders, e.g. achalasia, scleroderma, diffuse esophageal spasm.
  - Intrinsic lesions, e.g. foreign body, benign or malignant strictures, esophageal web or ring.
  - Extrinsic pressure, e.g. goiter, pharyngeal pouch, lymph node, aortic aneurysm, enlarged left atrium.

## 🚩 Gastroesophageal Reflux Disease (GERD)

- A normal phenomenon experienced intermittently by most people.
- Occurs when the amount of gastric juice exceeds the normal limit with or without esophageal mucosal injury (esophagitis).

### Epidemiology:

- 7% of the general population have heartburn, but 20-30% of them have GERD.
- No sexual preference.
- Affects all age groups.

### Pathophysiology:

- Factors that prevent gastric juice reflux into the esophagus:
  - LES (normal length and pressure).
  - GE junction must lie intraabdominally.
  - The competence of the angle at which the esophagus joins the stomach (angle of His).
  - Esophageal clearance must be able to neutralize the acid refluxed from the stomach.
  - The stomach must empty properly.
  - Contraction of the crural muscle of the diaphragm (pinchcock-like action).
- GERD develops due to one or more of the following:
  - Most commonly a mechanical (hypotensive LES) or functional (frequent transient LES relaxation) problem of the LES.
  - Certain foods (e.g. coffee, alcohol), medications (e.g. calcium channel blockers, nitrates,  $\beta$ -blockers), or hormones (e.g. progesterone) can decrease the pressure of the LES.
  - Reduced esophageal clearance of acid because of poor esophageal peristalsis.
  - Obesity and pregnancy (increased intraabdominal pressure).
  - Hiatus hernia (impairment of the pinchcock-like action of the diaphragm).
  - Delayed gastric emptying.

### Clinical features:

- Heartburn; the *major feature*. 🙌
  - Retrosternal burning pain radiating to the epigastrium.
  - Aggravated by bending and lying down, relieved by antacids.
- Regurgitation of food and acid into the mouth.
- Water brash (salivation).
- Dysphagia:
  - Occurs at late stages, due to a stricture.
- Respiratory symptoms; cough, nocturnal asthma, pneumonia.
- Clinical examination is usually normal.

### Differential diagnosis:

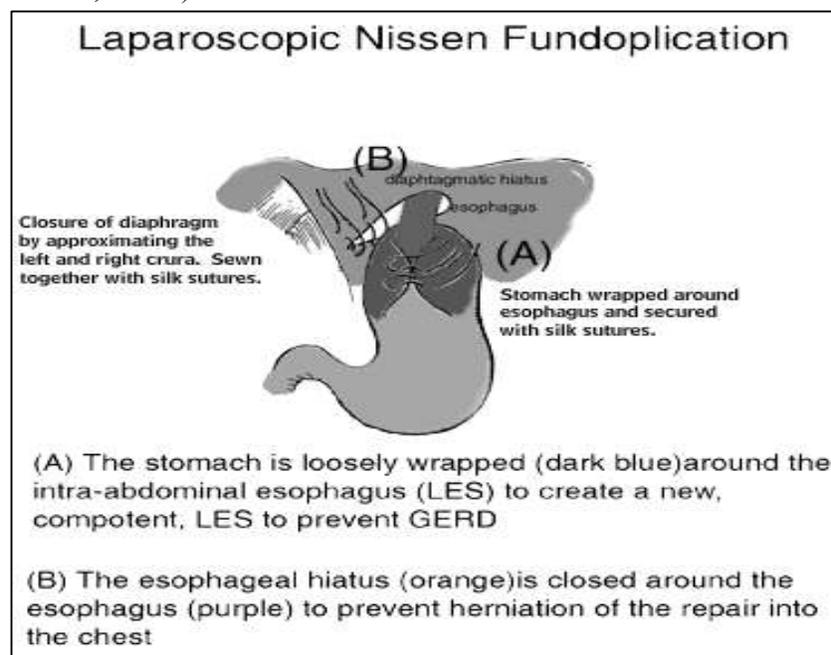
- MI.
- Peptic ulcer disease.
- Cholecystitis.
- Esophageal cancer.

### Investigation:

- It is a clinical diagnosis.
- Patients under 45 years without alarm symptoms should be treated initially without investigations.
- Investigations include:
  - Ambulatory 24 hour pH monitoring (gold standard).
  - Barium swallow (ulceration, stricture, hiatus hernia).
  - Esophageal manometry; assesses the function of LES and esophageal body.
  - Esophagogastroduodenoscopy (EGD):
    - a. Identifies the presence and severity of esophagitis.
    - b. Excludes other diseases such as peptic ulcer disease.

### Treatment:

- Lifestyle modifications, including:
  - Losing weight (if overweight).
  - Avoiding alcohol, coffee, tobacco, chocolate, citrus juice.
  - Avoiding large meals.
  - Waiting after a meal before lying down.
  - Elevation of the head of the bed.
- Medical therapy:
  - Antacids.
  - H<sub>2</sub> receptor blockers.
  - Proton pump inhibitors (PPI's).
  - Prokinetic agents.
- Surgical treatment:
  - Fundoplication, most commonly Nissen's fundoplication.
  - Indications:
    - a. Uncontrolled symptoms by medical therapy.
    - b. The presence of Barrett's esophagus.
    - c. The presence of extraesophageal manifestations of GERD (respiratory, ENT, dental).



**Complications:**

- Esophagitis:
  - 50% of patients.
  - Male: female ratio is 2-3:1.
- Barrett's esophagus:
  - Columnar metaplasia of the lower esophagus which extends at least 3 cm above the GE junction.
  - Male: female ratio is 10:1.
  - *Most serious and may progress into cancer.* ☞
- Respiratory complications:
  - Includes: pneumonia, asthma and lung fibrosis.

**✚ Achalasia**

- A primary oesophageal motility disorder characterized by failure of the LES to relax and the absence of peristalsis.

**Epidemiology:**

- Incidence: 1/100,000 per year.
- No sex difference.
- Typically 25-60 years.

**Pathophysiology:**

- LES pressure:
  - Excitatory (acetylcholine, Substance P).
  - Inhibitory (nitric oxide).
- Cause:
  - Unknown, but one theory suggests degenerative changes in the vagal nerve.

**Clinical features:**

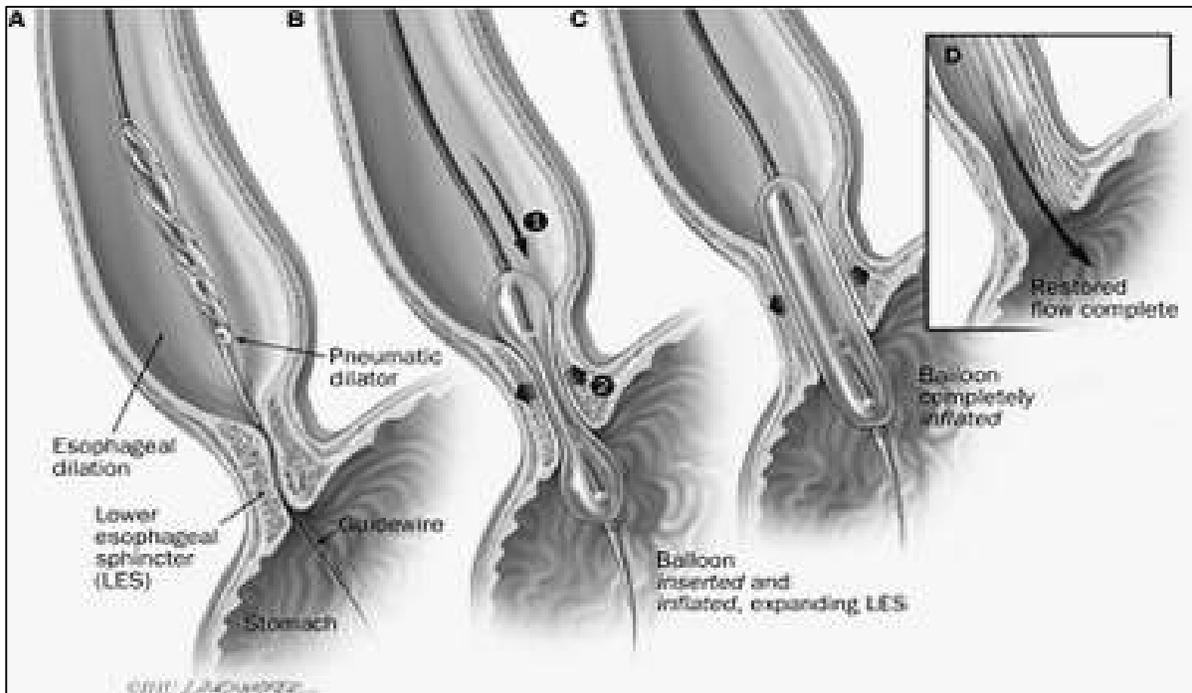
- *Progressive (gradual) dysphagia.* ☞
- Regurgitation.
- Chest pain.
- Weight loss.
- Stomach cancer.

**Investigation:**

- Manometry:
  - High LES pressure.
  - Absent peristalsis.
  - Failure of LES to relax.
- Barium swallow:
  - The esophagus appears dilated and contrast passes slowly into the stomach.
  - The distal esophagus is narrowed, resembling a *bird beak.* ☞
- Endoscopy:
  - Dilated esophagus with food residue.

**Treatment:**

- Drug therapy:
  - Smooth muscle relaxants e.g. nitrate, calcium channel blockers, anticholinergic.
  - 10% of patients benefit from this treatment, especially elderly patients.
- Pneumatic dilation:
  - A balloon is insufflated at the level of the gastroesophageal junction to rupture the muscle fibre.
  - Success rate is 70-80%.
  - 50% will require more than one dilation.



- Surgery:
  - Heller's myotomy (open or laparoscopic).
  - Used when the dilation fails.
  - Done by making division of the muscle fibers of the lower esophagus and proximal stomach followed by partial fundoplication to prevent reflux (10%).
  - Relieve symptoms in 85-95% of patients.
- If surgery fails, we repeat the dilation, and then we do a second operation (i.e. esophagectomy).

**+ Hiatus Hernia**

- It is an abnormal protrusion of the stomach through the esophageal hiatus of the diaphragm into the thorax.
- Caused by weakness of the muscles around the hiatus.
- More common in female, obese, middle aged and elderly patients.

**Types:**

- A. Type I: sliding hiatus hernia (90%).
- B. Type II: paraesophageal hiatus hernia (10%).
- C. Type III: combination of both (rare).

**A. Sliding hiatus hernia:**

- Occurs when the stomach slides through the diaphragmatic hiatus and the gastroesophageal junction lies within the chest.

**Clinical features:**

- Asymptomatic.
- Heart burn and regurgitation:
  - *The most common feature.* 📌
  - Due to incompetent LES.
  - Aggravated by bending or lying down and relieved by antacids.
- Dysphagia.
- Large herniation may cause cough, palpitation or hiccups by mechanical effect.

**Investigations:**

- Upper GI endoscope.
- Barium swallow.

**Complications:**

- Reflux of gastric acid produces esophagitis that, if chronic, will lead to Barrett's esophagus which in turn may become cancerous (adenocarcinoma).

**Treatment:**

- Same as GERD.

**B. Paraesophageal hiatus hernia:**

- Here the gastroesophageal junction lies in its position but the fundus of the stomach has herniated through the diaphragmatic hiatus.

**Clinical features:**

- Usually *not associated with reflux.* 📌
- Dysphagia.
- Epigastric and lower chest pain.
- Palpitation.
- Hiccups.
- Quick fullness and chest compression after eating.

**Investigations:**

- Chest x-ray confirmed by barium swallow.

**Complications:**

- Obstruction.
- Volvulus.
- Strangulation.
- Acute or chronic bleeding.
- Perforation.

**Treatment:**

- Surgical:
  - Operative reduction of the stomach, approximation of the diaphragmatic defect around the hiatus.
  - Fundoplication frequently added to reduce herniation recurrence and to prevent gastroesophageal reflux.

**Tumors of the Esophagus****A. Benign tumors:****Leiomyoma:**

- Are 75% of esophageal benign tumors.
- Usually in the distal two thirds of the esophagus (in the middle and distal thirds).
- *Lesions less than 5 cm are usually asymptomatic.*
- The potential to malignant degeneration are quiet low.
- Diagnosis:
  - Chest radiograph.
  - Barium swallow (appears to indent the lumen of the esophagus).
  - Endoscopy.
  - Endoscopic ultrasound.
- Treatment:
  - Excision via thoracotomy.

**B. Malignant tumors:****Epidemiology:**

- *It's the 3<sup>rd</sup> most common cancer of the digestive tract and the 7<sup>th</sup> leading cause of cancer related deaths.*
- Male: female ratio 3:1.
- Black: white ratio 4:1.
- Peak in 50-70 years of age.

**Causes:**

- A malignant change in cells that line the esophagus (tumors often invade the submucosa and then the muscular layer of the organ).

**Risk factors:**

- Age more than 50.
- Male sex (three times higher than female).
- Alcohol and tobacco use.
- Low socioeconomic level.
- Other medical conditions.
- Diet.
- Obesity.

**Pathology:**

- 70 % are squamous cell carcinoma.
- Growth of the cancer occurs by:
  - Intraesophageal spread.
  - Direct extension.
  - Lymphatics.
  - Blood.
- Distant metastases to liver, lungs and bones are present in 25-30% of cases.

**Clinical features:**

- Usually late presentation.
- Dysphagia.
- Retrosternal pain on swallowing, coughing up blood and regurgitation.
- With metastatic disease, there will be:
  - Enlarged cervical lymph nodes.
  - Jaundice.
  - Hepatomegaly.
  - Hoarseness.
  - Chest pain.
- General features of malignancy.

**Investigations:**

- Barium swallow.
- Endoscopy with biopsy and cytology.
- Endoscopic ultrasonography; to asses depth of invasion and infiltration.
- Bronchoscopy, in proximal tumors.
- Looking for metastases; using chest x-ray, abdominal US, CT chest and abdomen and laparoscopy.

ESOPHAGEAL CANCER	
TNM Staging	
<b>Primary Tumor (T)</b>	
■ T1	invades lamina propria or submucosa
■ T2	invades muscularis propria
■ T3	invades adventitia
■ T4	invades adjacent structures
<b>Regional Lymph Nodes (N)</b>	
■ N0	no involvement
■ N1	involvement
<b>Metastases (M)</b>	
■ M0	none
■ M1	present

**Treatment:**

- Depends on the stage of the tumor.
- Surgery:
  - 50% of tumors are resectable at presentation.
  - Curative in early lesions and as a part of multimodal therapy in advanced cases.
  - Contraindications include metastatic disease, tumor invasion of nearby structures and severe cardiovascular or pulmonary disease.
- Radiotherapy:
  - Often combined with chemotherapy to reduce dysphagia in patients with advanced or metastatic disease.
  - It also may be used to shrink the tumor before surgery or after surgery to destroy remaining cancer cells.
  - Contraindications:
    - a. Large tumors more than 9 cm.
    - b. Presence of a tracheal bronchoesophageal fistula.
- Chemotherapy:
  - May be used in combination with radiation to relieve symptoms but it is not used as a primary treatment for esophageal cancer.

**Prognosis:**

- Depends on the stage.
- The overall 5 year survival rate is 20-25%.

**Prevention:**

- Avoiding heavy alcohol consumption and tobacco use may help prevent squamous cell carcinoma
- Patients with frequent heartburn should undergo regular endoscopic screening.

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*For extra reading*  
*Lawrence's Essential of General Surgery*  
*Chapter 13            239-253*

*Churchill's Pocketbook of Surgery*  
*Chapter 14            259-268*

*The Future Surgeons*

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