Surgical anatomy
Esophagus

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- Key points
- Anatomy & histology
- Physiology
- Esophageal symptoms assessment
- Esophageal testing
Key points

- Etiology of underlying esophageal disorders.
- Indications for endoscopy.
- Indications & finding of Esophageal manometry.
- Empiric therapy for classic gastroesophageal reflux disease.
- Alarming symptoms of esophagitis in immunocompromised patient.
Anatomy

- The esophagus is a muscular tube connecting the pharynx to the stomach
- 23-25 cm in length
- The structure and function are much more complex.
- A thorough understanding of the anatomy and physiology is essential to understanding esophageal disease states.
Anatomy

Sites of external compression

- The Aorta.
- Left main stem bronchus.
- Diaphragm.

**Clinical application in foreign body impaction.**
Anatomy
Histology

- **Mucosa.**
  - Stratified squamous epithelium
  - Lamina propria,
  - Muscularis mucosa.

- **Submucosa.**

- **Muscularis propria.**
  - Skeletal muscle. Upper 1/3
  - Smooth muscle. Lower 2/3

- **Adventitia.**

- **No serosa, (unique).**

**Pathologies from each layer**
Anatomy innervation

- CN X → Smooth muscle
- Myenteric plexus. (peristalsis)
- Meissner's plexus.
- Neurotransmitters:
  - ACH (excitatory), proximal
  - NO (inhibitory), distal
Anatomy
blood supply

- Segmental orientation.
- Blood supply to other viscera.

** orientation of vessel during esophagectomy.
**Physiology**

- **Primary Peristalsis:**
  Food bolus, contracts proximally to distally

- **Secondary Peristalsis:**
  Esophageal distention (residual food bolus) and reflux

- **Tertiary Contractions:**
  Nonperistaltic propel bolus in a retrograde direction to proximal esophagus
Physiology
UES

- Composed of the *cricopharyngeus muscle*
- Rest: Tonic contracture
- Pharyngeal phase: Relaxation
**Physiology**

**LES**

- 10–40 mm Hg
  - Achalasia: >40
  - Scleroderma <10

- Below Diaphragm
  - Hiatal hernias if above diaphragm)

- Physiological sphincter (not a true anatomic sphincter)
Esophageal Symptom Assessment

- Heartburn.
- Dysphagia: sensation of food being delayed in its normal passage from mouth to stomach. Patients often complain of a sensation of food “sticking.”
- Odynophagia.
- Regurgitation.
- Aspiration.
Esophageal Symptom Assessment dysphagia
Esophageal testing

- Barium swallow
- Endoscopy
- Manometry
Esophageal testing endoscopy

- Evaluation
  - Mucosa
  - Structural abnormalities.

- Rigid or flexible
- Diagnostic and/or therapeutic.
Esophageal testing endoscopy: indications

- Weight loss
- Upper gastrointestinal bleeding,
- Dysphagia, odynophagia and chest pain,
- Partial or no response to empiric therapy,
- Evaluation for Barrett's esophagus
- Foreign body
Esophageal testing
manometry

- Measures
  - Intraluminal pressures.
  - Coordination of the pressure activities of LES, esophageal body, and UES.

- Assessment of patients with symptoms suggestive of esophageal motor dysfunction (achalasia, Scleroderma,DES)
Esophageal testing
manometry
# Esophageal testing

## Manometry

<table>
<thead>
<tr>
<th>Finding</th>
<th>Normal</th>
<th>Achalasia</th>
<th>Diffuse Esophageal Spasm</th>
<th>Nutcracker</th>
<th>Ineffective Esophageal Motility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal lower esophageal sphincter (LES) pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-45 mm Hg</td>
<td></td>
<td>Normal or high</td>
<td>Normal</td>
<td>Normal</td>
<td>Low or normal</td>
</tr>
<tr>
<td>LES relaxation with swallow</td>
<td>Complete</td>
<td>Incomplete</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Wave progression</td>
<td>Peristalsis</td>
<td>Aperistalsis</td>
<td>Peristalsis with at least 20% simultaneous contractions</td>
<td>Normal</td>
<td>30% or more failed nontransmitted contractions</td>
</tr>
<tr>
<td>Distal wave amplitude</td>
<td>30-180 mm Hg</td>
<td>Usually low (may be normal or high)</td>
<td>Normal</td>
<td>High</td>
<td>30% or more &lt;30 mm Hg</td>
</tr>
</tbody>
</table>
Primary symptoms of underlying esophageal disorders, most often due to mechanical or motility disturbance, include heartburn, dysphagia, odynophagia, and regurgitation.

Indications for endoscopy are presence of weight loss, upper gastrointestinal bleeding, dysphagia, odynophagia, chest pain, poor response to therapy, and for evaluation for Barrett's esophagus.

Esophageal manometry measures coordination of intraluminal pressure activities of the three functional regions of the esophagus: the lower esophageal sphincter, esophageal body, and upper esophageal sphincter; it is used in patients with dysphagia and noncardiac chest pain suggesting motility disorders.
Patients with Barrett's esophagus require continued endoscopic surveillance to detect the development of dysplasia and adenocarcinoma.

The cardinal symptom of infectious esophagitis, commonly found in immunosuppressed patients, is odynophagia.
Thank you