

Esophageal Disorders

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Educational Goals

At the end of the section on esophageal disorders, you should understand:

1. The three important questions in the symptom differential of common causes of dysphagia. These should provide a strong suspicion of the diagnosis. Know the typical presentation of common disorders.
2. A barium swallow radiograph is the preferred initial diagnostic approach to most patients with dysphagia.
3. The important components in pathophysiology of GE reflux.
4. The complications of GERD.
5. Endoscopy (not barium study) is the appropriate test to evaluate patients with chronic GERD. Understand the reasons why this is so.
6. Chest pain from GE reflux or esophageal motility disorders (i.e., diffuse esophageal spasm) can mimic angina. The evaluation always begins with ruling out cardiac disease.

Key Words

- o achalasia
- o adenocarcinoma
- o ambulatory pH monitoring
- o barium swallow
- o Barrett's Esophagus
- o Bernstein test
- o botulinum toxin (botox)
- o chest pain
- o CREST syndrome
- o diffuse esophageal spasm
- o dysphagia
- o esophageal dysphagia
- o esophageal manometry
- o esophageal moniliasis
- o esophageal ulcer
- o esophagoscopy
- o GERD
- o globus sensation
- o heartburn
- o lower esophageal (Schatzki's) ring
- o mechanical obstruction
- o motility disorder
- o nutcracker esophagus
- o odynophagia
- o oropharyngeal dysphagia
- o peptic stricture
- o Plummer Vinson syndrome
- o pneumatic dilatation
- o Schatzki's ring
- o scleroderma
- o squamous cell carcinoma
- o surgical myotomy
- o transient LES relaxation
- o upper esophageal web
- o Zenker's diverticulum

Symptoms of Esophageal Dysfunction:

Odynophagia

Dysphagia

Heartburn

Chest Pain

Odynophagia

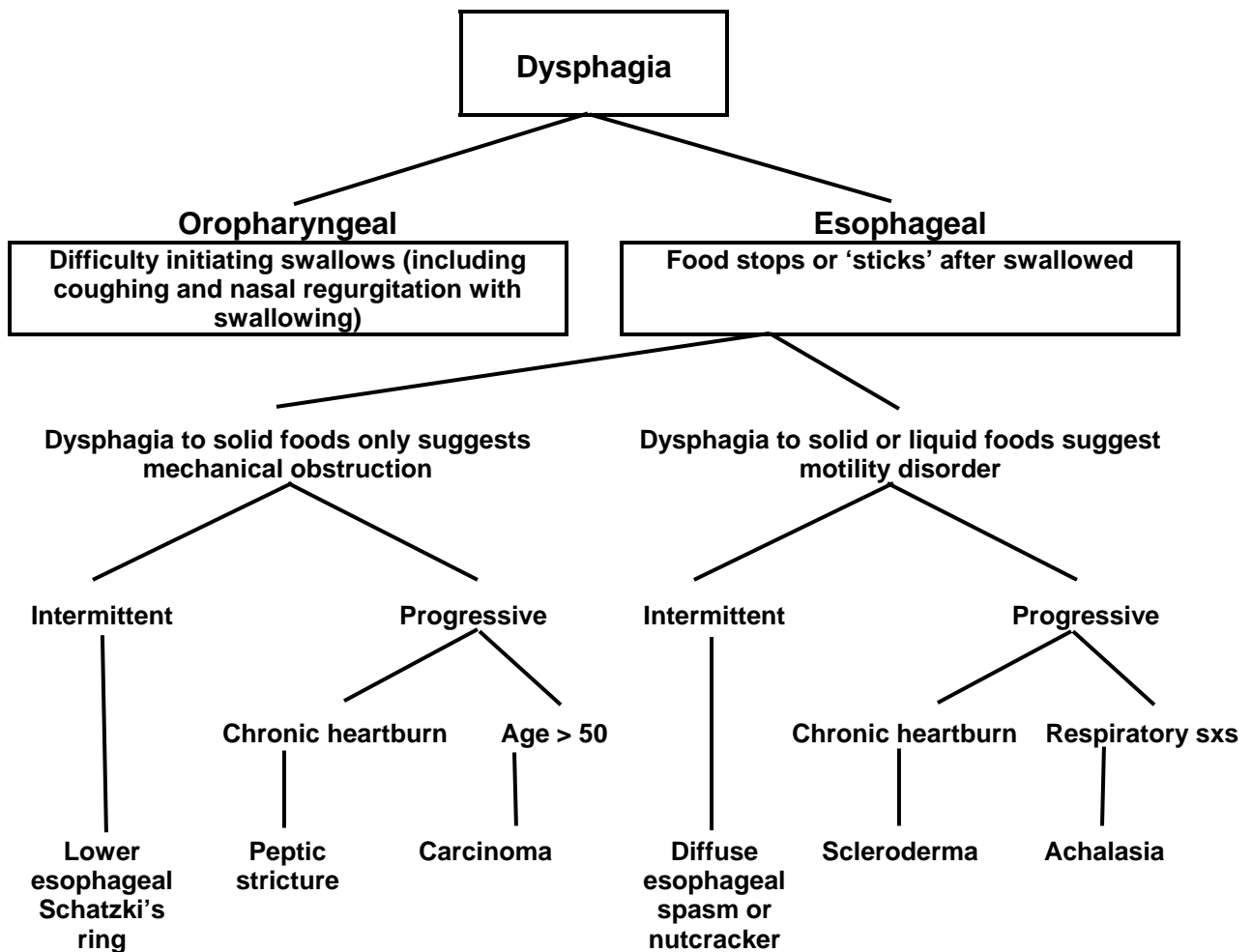
1. Pain with swallowing. Usually indicates an inflammatory process in the esophagus. Common situations are:
 - A. Infection in esophagus in patient with AIDS (Candida, herpes, CMV)
 - B. Pill induced esophageal ulcer (alendronate, doxycycline).

Dysphagia

1. **Types of dysphagia**
 - A. Oropharyngeal: Difficulty initiating a swallow (a transfer problem), or coughing or choking with swallowing due to aspiration.

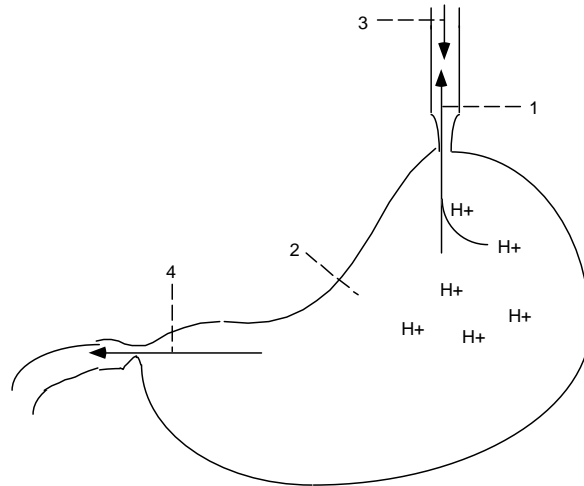
1. May be caused by a great variety of muscle, neural, or local diseases. The underlying disease is usually readily apparent, with dysphagia only an associated or complicating problem.
 2. Food may pass into nasopharynx or larynx (aspiration)
 - a. Associated symptoms: difficulty initiating a swallow, choking or coughing with swallowing, nasal regurgitation.
 - b. Often worse with liquids
 3. X-ray studies (cine swallowing study) show retention of barium in valleculae or pyriform sinuses, or barium in respiratory tract.
- B. Esophageal - sticking of food during passage to the stomach (a transport problem).
1. Dysphagia is often the presenting symptom, and the underlying disease process is usually not apparent; dysphagia usually indicates organic disease and evaluation is required.
 2. Careful history is very helpful in esophageal dysphagia.
 - a. Not odynophagia (pain with swallowing)
 - b. Not globus sensation - This is the sensation that there is a lump in the throat that is always present, may improve with swallowing.
 - c. Hx alone should give strong suspicion of correct dx in up to 85% of cases
 - d. Three **major** questions:
 - 1) Food type causing symptoms
 - a) Solids only - mechanical obstruction disorder
 - b) Both liquids and solids - motility disorder
 - 2) Localization
 - a) At suprasternal notch - not specific
 - b) Along sternum - more specific
 - 3) Intermittent or progressive symptoms (progressive means dysphagia to smaller and smaller pieces of solid, and then even to liquids).
 - e. Important associated symptoms
 - 1) Presence of heartburn
 - 2) Chest pain
 - 3) Nighttime cough
 3. Dysphagia due to mechanical obstruction (typically solid food only)
 - a. Major causes of dysphagia:
 - 1) Peptic stricture (secondary to chronic esophagitis)
 - a) Usually a long history of heartburn and antacid use - symptoms may remit as stricture develops
 - b) Fixed narrowing in distal esophagus
 - c) Usually readily seen on barium swallow
 - 2) Lower esophageal (Schatzki's) ring
 - a) Thin mucosal invagination in distal esophagus
 - b) Asymptomatic ring present in about 10% of normals
 - c) Easily missed on barium swallow if not looked for specifically, so include solid marshmallow bolus)
 - d) Diagnosis strongly suggested by typical history - intermittent dysphagia for solids
 - 3) Carcinoma: progressive dysphagia: initially only for solid food
 - a) History of progressive dysphagia
 - b) Physical exam may show extreme weight loss
 - c) Irregular narrowing of esophageal lumen on barium swallow
 - d) Diagnosis confirmed by esophagoscopy with biopsy and/or cytology
 - e) Adenocarcinoma and squamous cell carcinoma have same clinical presentation, although adenocarcinoma might have long history of symptoms of gastroesophageal reflux.
 - f) Squamous cell carcinoma – heavy smoking and alcohol increase risk.
 - g) Adenocarcinoma – arises in Barrett's Esophagus which is a complication of chronic GERD. Adenocarcinoma of the esophagus is increasing in incidence.

- b. Minor causes of dysphagia:
 - 1) Esophageal diverticula
 - a) Proximal (Zenkers): oropharyngeal dysphagia
 - b) Distal: occasionally will cause dysphagia by mechanically obstructing the lumen
 - 2) Plummer Vinson Syndrome: iron deficiency anemia and associated dysphagia secondary to an upper esophageal web
 - 3) Esophageal moniliasis
 - a) Usually in compromised host
 - b) Often odynophagia is a major problem
 - c) "Cobblestone esophagus" on x- ray
- 4. Dysphagia due to neuromuscular (motility) disorders (dysphagia for solids and liquids)
 - a. Major causes (esophageal manometric studies often give specific diagnosis)
 - 1) Achalasia
 - a) LES with incomplete relaxation, often hypertensive
 - b) Aperistalsis of the esophageal body
 - c) Slowly progressive symptoms
 - d) Nocturnal respiratory symptoms common
 - e) X-ray features
 - (1) Dilated esophagus
 - (2) Smoothly tapered distal end ("bird beak")
 - (3) Air/fluid level in posterior mediastinum
 - (4) Absent gastric air bubble
 - f) Treatment: botulinum toxin (botox); pneumatic dilatation or surgical myotomy
 - 2) Scleroderma
 - a) Weak lower esophageal sphincter and low amplitude or nonexistent contractions in the esophageal body
 - b) Usually heartburn and regurgitation are major symptoms
 - c) Often associated Raynauds
 - d) Physical examination may show skin changes: telangiectasia, sclerodactyly, or calcinosis cutis (CREST syndrome)
 - 3) Diffuse esophageal spasm (DES)
 - a) May present as severe chest pain, relieved by nitroglycerin
 - b) Manometric findings are less specific, simultaneous (non-peristaltic) contractions are required for dx, they must be intermixed with some peristaltic contractions.
 - c) Diagnosis requires symptoms of dysphagia and/or chest pain plus definite esophageal manometric abnormalities
- 5. Important laboratory tests for evaluation of dysphagia
 - a. Barium swallow (esophagogram) - important screening test for dysphagia patients, i.e., the first test
 - b. Esophagoscopy (with biopsy) - most critical in suspected mechanical lesions: particularly to R/O carcinoma, is required in achalasia to R/O adenocarcinoma at the GE junction causing "secondary achalasia."
 - c. Esophageal manometry - often specific for motility disorders



Heartburn

1. **Definition:** A burning retrosternal sensation, usually occurring within 1-2 hours after eating or when lying down or bending over; often with radiation cephalad and with an associated acid taste, and relieved by upright posture and/or antacids, or even glass of water.
2. **Prevalence:** a very common problem in the U.S. (occurs daily in about 10% of the adult population and occasionally in > 1/3). Very common during pregnancy.
3. **Pathogenesis:**
 - A. Primarily due to acidic gastroesophageal reflux (GER). The role of alkaline or bilious gastroesophageal reflux is not clear.
 - B. Reflux secondary to factors modifying anti-reflux competence of the lower esophageal sphincter (see Table 1). Foods may also irritate the esophageal mucosa - citrus juices, coffee, tomato products, alcohol (?)
 - C. Important components in pathogenesis.
 1. Defective LES pressure barrier
Abnormal **transient LES relaxations** are very important.
 2. Gastric factors - Acid/pepsin; Bile; Volume
 3. Esophageal clearing defects
 - a. Peristalsis
 - b. Gravity
 - c. Salivary flow: volume and HCO₃
 4. Delayed gastric emptying



D. Relation to hiatus hernia - present concepts indicate there is often no clear cause-and-effect relation of hiatus hernia to GE reflux and heartburn, although there may be an association of increased GERD in some patients with hiatus hernia. Many individuals with a hiatus hernia do not have reflux symptoms.

4. Associated symptoms

- A. Regurgitation - effortless flow of gastric material into mouth (bitter taste)
- B. Pulmonary symptoms - such as asthma and cough; particularly at night. Can be due to reflex response to reflux into the distal esophagus or actual aspiration.
- C. Hoarseness; laryngitis
- D. Chest pain (perhaps associated with motility disorders)

5. Laboratory tests

- A. 24 hour ambulatory esophageal pH monitoring - a direct test for reflux, is the "gold-standard" test for gastroesophageal reflux. It is also considered the most specific test for gastroesophageal reflux disease. Measures pH in proximal and distal esophagus and stomach continuously for 24 hours.
- B. Endoscopy (with biopsy) - Useful but invasive, to rule out other pathology. Endoscopic biopsy is sensitive for reflux esophagitis. Endoscopy is only test that evaluates for Barrett's esophagus, and so is required if long-standing history of heartburn.
- C. Bernstein test - (optional) infusion of acid into the esophagus. A positive test is defined by reproducing the patient's typical symptom. It indicates acid sensitivity of the esophagus and is considered to be fairly specific for reflux injury.

6. Treatment

- A. Lifestyle changes: no eating for 3 hours before lying down, elevate head of bed, avoid foods or medications that can worsen reflux (see Table 1), stop smoking, if overweight, loose weight.
- B. Acid suppression: histamine-2 receptor antagonists, proton pump inhibitors, antacids for immediate relief

7. Complications of GE reflux:

- A. Esophagitis
- B. Peptic stricture
- C. Esophageal hemorrhage
- D. Esophageal ulcer
- E. Pulmonary symptoms
- F. Barrett's esophagus change of mucosa of distal esophagus from squamous mucosa to columnar mucosa. Definition is in transition; nowadays many require intestinal type mucosa with goblet cells for diagnosis of Barrett's. However, for now, I still include the classical definition which is: extension of columnar mucosa of any kind more than 3 cm above the squamocolumnar junction. Barrett's esophagus has an increased risk of

adenocarcinoma, and current recommendations for patients with Barrett's esophagus are to perform screening endoscopy every 1-2 years. The finding of mild dysplasia warrants closer observation. The finding of severe dysplasia suggests high risk of cancer (actually small foci of cancer often already present and missed on biopsies). Severe dysplasia is generally treated with esophagectomy, although newer endoscopic ablation treatments are being evaluated.

Esophageal Chest Pain

1. Because of its location in chest and similar innervation, esophageal pain may mimic pain from coronary artery disease, even including an exertional component and relief with nitroglycerin.
 - A. Etiology of recurring angina-like chest pain:
 - Coronary artery disease: 70-80%
 - Esophageal abnormally: 15-20%
 - Musculoskeletal disorders: 5-10%
 - Other: 5-10%
2. Esophageal abnormalities causing chest pain
 - A. Gastroesophageal reflux disease (GERD)
 - B. Esophageal motility disorders -
 - "Nutcracker esophagus" (NE)
 - Diffuse esophageal spasm (DES)
 - Non-specific esophageal motility disorder (NEMD)
 - Achalasia
 - Hypertensive LES
3. Diagnostic approach for esophageal cause of chest pain:
 - A. Associated history
 1. Heartburn or regurgitation
 2. Dysphagia or odynophagia
 - B. Esophageal manometry: may find motility abnormalities at baseline (this is likely to be a time when patient is not having their pain, since chest pain is usually intermittent) These motility abnormalities at baseline suggest that there is an abnormal motility event which causes the patient's chest pain. This event is rarely identified.
 1. "Nutcracker esophagus"
 - High amplitude (>180 mmHg) peristaltic contractions
 2. Diffuse esophageal spasm
 - a. Simultaneous (non-peristaltic) contractions occurring with at least 20% of wet swallows intermixed with peristaltic contractions.
 - b. Other associated findings: Repetitive peaks (>2/wave); Long duration (>6 sec); Spontaneous contractions; May be high amplitude; Maybe abnormal LES
 3. Non-specific esophageal motility disorder (NEMD)
 4. Achalasia
 5. Hypertensive LES (optional, now considered part of NEMD)
 - a. Elevated LES pressure (>45 mmHg)
 - b. Incomplete LES relaxation
 - c. Normal peristalsis
 - C. Ambulatory 24 hour esophageal pH monitoring
Best means to evaluate possible GERD as a cause of chest pain; if episodes of pain are associated with episodes of esophageal acid exposure than GERD is a likely etiology of the chest pain.
 - D. Esophagoscopy: Often performed to "R/O significant pathology" such as unsuspected esophagitis, esophageal ulcer
 - E. Barium esophagogram-non-invasive test to R/O other pathology, generally not indicated in evaluation of chest pain alone. Useful to:
 1. Support diagnosis of achalasia
 2. Double contrast studies may show specific mucosal lesions in esophagitis
 3. Diagnose large hiatal hernia

4. R/O stricture
4. Critical concerns:
- Never accept an esophageal defect as the cause of chest pain until significant coronary disease is excluded.
 - Presence of esophageal motility abnormality = Esophagus is probably the cause of the patient's chest pain. Confirmation of this can do much to allay patient's fear that they have cardiac disease.
 - Don't fail to look for GE reflux in patients with unexplained symptoms such as chest pain, laryngitis, hoarseness, asthma (and other respiratory symptoms)

Table 1. Lower Esophageal Sphincter (LES) Pressure Changes After Drugs And Foods

Increase LES Pressure	Decrease LES Pressure
Foods, etc.	
Protein	Fat
Antacids	Chocolate
	Alcohol
	Peppermint/Onions
	Smoking
Drugs	
Cholinergic (bethanechol)	Anticholinergic (atropic)
Dopamine antagonist (metoclopramide)	Calcium channel antagonist
	Theophylline
	Nitrate
	Xylocaine

Chest Pain of 910 cases, 255 had abnormal manometry:	Dysphagia of 251 cases, 132 had abnormal manometry:
48% Nutcracker esophagus	10%
36% Non-specific motor disorder	39%
10% Diffuse esophageal spasm	13%
4% Achalasia	36%
2% Hypertensive LES	2%

(Adapted from Reference # 9)

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