UES DYSFUNCTION AND TREATMENTS - OBJECTIVES

- Define the anatomy and physiology of the UES
- Describe types of UES dysfunction
- Discuss the assessment of swallowing function and UES dysfunction
- Describe treatments of UES dysfunction
- Understand a special case of UES dysfunction
Swallowing is a complex process that involves multiple brain centers and coordination of multiple cranial nerves.

The primary conduit is the esophagus.

Dysphagia is relatively common, but tends to significantly affect certain populations.

- Elderly
- Patients with neurological disorders (CVA, Parkinson’s Disease, ALS)
- Patients who have undergone neck surgery (ACDF, cardiothoracic procedures)
- Head and neck cancer patients (surgery and/or radiation therapy)
ESOPHAGEAL ANATOMY AND CONSIDERATIONS

• The esophagus is the narrowest tube in the GI tract.
• Roughly 8 in (25 cm) length
• 3 typical areas of constriction
  • Upper esophageal sphincter
  • Point at which the aorta and the left mainstem bronchus cross
  • Lower esophageal sphincter
UPPER ESOPHAGEAL SPHINCTER (UES)

- Cricopharyngeus (CP) muscle
  - C-shaped muscle band between the pharynx and the esophagus
  - Arises from the lateral aspects of the cricoid cartilage
  - Has oblique (pars oblique) and transverse (pars fundiformis) components
  - Innervated by the pharyngeal plexus (CN IX and X), superior cervical ganglion
- Function
  - Prevent backflow of gastroesophageal contents (high resting pressure)
  - Prevent aerophagia
  - Allow transit of liquid/food bolus and retrograde transit of gas or vomitus (low resting pressure)
  - When the pharyngeal constrictors contract, the UES relaxes.
TYPES OF UES DYSFUNCTION

- Failure of the CP to allow passage of a bolus in the absence of pharyngeal weakness or other esophageal disease
  - CP achalasia
  - CP spasm
  - Hypertrophy
  - Failure to relax

- Primary dysfunction is a problem with the muscle itself.
  - Muscular disease (MD)
  - Laryngopharyngeal reflux (LPR)

- Secondary dysfunction is due to neurological disease.
  - Localized (CVA)
  - Generalized (PD, ALS, PBP)
Complete history, including pulmonary status
  - Dysphagia questionnaire (part of new patient evaluation)
  - Dysphagia Handicap Index (Silbergleit, Schultz, Jacobson, et al, 2011)
Physical examination
  - Head and neck examination, indirect laryngoscopy
Diagnostic studies
  - FEES/FEEST
  - VFSS (MBS)
  - CT or MRI
  - Esophageal Manometry
  - Esophagoscopy (TNE vs. traditional EGD)
ASSESSMENT OF SWALLOWING-HISTORY

• It takes more effort for me to swallow.
• I must think about swallowing.
• Foods get stuck in my throat.
• I no longer eat _____ because it gets stuck in my throat.
• I have the sensation that something is stuck in my throat and swallowing makes it worse.
• I feel like I am swallowing around something.
• I have had two pneumonias recently.
• I have lost 15 pounds because of my swallowing difficulty.
ASSESSMENT OF SWALLOWING

• Complete history, including pulmonary status
  • Dysphagia questionnaire (part of new patient evaluation)
  • Dysphagia Handicap Index (Silbergleit, Schultz, Jacobson, et al, 2011)

• **Physical examination**
  • Head and neck examination, indirect laryngoscopy

• Diagnostic studies
  • FEES/FEEST
  • VFSS (MBS)
  • CT or MRI
  • Esophageal Manometry
  • Esophagoscopy (TNE vs. traditional EGD)
ASSESSMENT OF SWALLOWING—PHYSICAL EXAM
ASSESSMENT OF SWALLOWING

- Complete history, including pulmonary status
  - Dysphagia questionnaire (part of new patient evaluation)
  - Dysphagia Handicap Index (Silbergleit, Schultz, Jacobson, et al, 2011)
- Physical examination
  - Head and neck examination, indirect laryngoscopy (FFL)
- Diagnostic studies
  - FEES/FEEST
  - VFSS (MBS)
  - CT or MRI
  - Esophageal Manometry
  - Esophagoscopy (TNE vs. traditional EGD)
ASSESSMENT OF SWALLOWING – DIAGNOSTIC STUDIES

- Pooling of secretions in the pyriforms and at the inlet on FFL/FEES
- Characteristic bar seen on VFSS, C4-C6
TREATMENT OF UES DYSFUNCTION

• Medical
  • Diet modification
  • Treatment of GERD, if applicable

• Therapeutic
  • Swallow therapy

• Surgical
  • Mechanical widening with dilation
  • Decrease the resting tone
    • Botox
    • Myotomy
TREATMENT OF UES DYSFUNCTION - DILATION

- EGD
  - Gastroenterologist or gen surgeon
  - Requires conscious sedation

- Rigid esophagoscopy
  - Otolaryngologist
  - Requires general anesthesia
TREATMENT OF UES DYSFUNCTION - DILATION

• Case report
  • 77 year old female presents with a 13 mo history of dysphagia, history of epiglottic squamous cell carcinoma
  • Had a PEG placed prior to initiating chemoradiation therapy
  • Continued to have dysphagia with aspiration following treatment
  • No improvement in swallowing following 5 dilations by GI
  • Ordered VFSS
TREATMENT OF UES DYSFUNCTION-
DILATION
TREATMENT OF UES DYSFUNCTION - BOTOX

- Chemically denervates (weakens) the CP
- Injection performed under direct visualization during rigid esophagoscopy
- Takes 48-72 hours to take effect
- May last 3-6 months or longer in some cases

TREATMENT OF UES DYSFUNCTION - BOTOX

Case Report
- 57 yo male reports solid foods stick in his throat
- 30-40 lb weight loss over 9-12 mo
- Underwent dilation with minimal improvement
- Underwent Botox injection the following month with some improvement
- Presented 5 years later with worsened symptoms
- Had significant improvement with Botox injection
- Has done well for 18 months
TREATMENT OF UES DYSFUNCTION - MYOTOMY

- Cut the fibers of the CP muscle under direct visualization
- Can be done via open approach or endoscopically
- Concern for increased GERD, regurgitation after procedure
TREATMENT OF UES DYSFUNCTION-
MYOTOMY
TREATMENT OF UES DYSFUNCTION - ZENKER’S DIVERTICULUM

• Zenker’s diverticulum
  • Pouch of the pharyngeal mucosa just above a hypertonic CP muscle
  • Usually occurs in a triangular area bound by the oblique and transverse segments of the inferior constrictor muscle
  • Key symptom is regurgitation of undigested food after eating
  • Diagnosed with VFSS or barium swallow exam

[Verma, S. www.throatdisorder.com]
TREATMENT OF UES DYSFUNCTION - ZENKER’S DIVERTICULUM

• Treatment MUST involve division of the CP muscle to be effective.
  • Endoscopic
  • Open
• Zenker’s will tend to recur if only the diverticular sac is addressed and the CP is not treated.
TREATMENT OF UES DYSFUNCTION-ZENKER’S DIVERTICULUM

- Endoscopic approach
  - Suction tubing is placed in the esophagus carefully
  - Diverticuloscope is placed in the esophagus with the upper tine in the esophageal lumen and the lower tine in the diverticulum
  - CP muscle is exposed
  - Division of the CP muscle fibers with either carbon dioxide laser or stapler
TREATMENT OF UES DYSFUNCTION-ZENKER’S DIVERTICULUM
TREATMENT OF UES DYSFUNCTION-ZENKER’S DIVERTICULUM

• The diverticulum is not removed, but the lip is made more shallow so that swallowed substances will not become lodged in the diverticulum.
• Typically, a small remnant of the lip is left to prevent disruption of mucosa.

TREATMENT OF UES DYSFUNCTION - ZENKER’S DIVERTICULUM

• Open approach
  • Neck incision is made 2 fingerbreadths above the collar bone or along the border of the SCM
  • Carotid sheath and SCM muscle are retracted
  • Diverticulum is exposed
  • Diverticulum can be tied off and excised or inverted and tacked to the SCM muscle
  • CP myotomy should be performed
TREATMENT OF UES DYSFUNCTION-
ZENKER’S DIVERTICULUM

Figure 2. Cervical esophagomyotomy and concomitant resection of a pharyngoesophageal diverticulum.

A. After mobilization of the diverticulum, the esophagomyotomy is performed in either direction from the base of the pouch for the same distance as described in figure 1.  
B. After the esophagomyotomy is completed, the base of the diverticulum is crossed with a TA-30 stapler and amputated.

(From Orringer MB (1980) Extended cervical esophagomyotomy for cricopharyngeal dysfunction J Thorac Cardiovasc Surg 80 : 669-678.)
TREATMENT OF UES DYSFUNCTION - ZENKER’S DIVERTICULUM

• Endoscopic approach
  • No external incision required
  • Shorter operative time
  • Shorter hospital stay and recovery time
  • May not be able to expose diverticulum

• Open approach
  • Requires external incision
  • Longer operative time
  • Longer hospital stay and recovery time
  • Improved exposure of diverticulum
TREATMENT OF UES DYSFUNCTION - ZENKER’S DIVERTICULUM

- Case report
  - 74 year old female presented with persistent dysphagia following open repair of a Zenker’s diverticulum 1 year prior
  - Described solid foods and pills “sticking” in her upper throat, but denied regurgitation
  - Normal laryngeal examination

- Why would this patient still have dysphagia following open diverticulotomy?
TREATMENT OF UES DYSFUNCTION-ZENKER’S DIVERTICULUM

- VFSS revealed normal oral and pharyngeal phases of the swallow
- During lateral views, a diverticulum in the cervical esophagus was noted with retrograde movement of bolus from the diverticulum into pharyngeal area.
- Barium pill was noted to lodge in the diverticulum and took several sips of carbonated beverage to clear.
- Taken to OR for endoscopic diverticulotomy
TREATMENT OF UES DYSFUNCTION-
ZENKER’S DIVERTICULUM
TREATMENT OF UES DYSFUNCTION-
ZENKER’S DIVERTICULUM
• Post-operative VFSS revealed
  • Normal oral and pharyngeal phases of swallow
  • Mild and inconsistent residues are noted at the level of Zenker's repair, primarily with semisolid/solid textures, and cleared with subsequent swallows.
  • No retention of placebo pill bolus.
  • Patient was extremely happy with improved swallowing

• Must treat the CP muscle to get a good, lasting result!
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