Dysphagia in TL_ ASHA 2009

Epidemiology of Laryngeal Cancer

- An estimated 12,250 men and women were diagnosed with laryngeal cancer in 2008 in the U.S.
- Laryngeal cancer is more common in males and has a peak incidence during the sixth and seventh decades of life (Ries et al., 2008).
- Primary treatment options for laryngeal cancer include surgery, radiation therapy, chemotherapy, or a combination of these treatments.
- There has been an increase in use of nonsurgical and surgical interventions designed to preserve the larynx over the past few decades (Department of Veterans Affairs Laryngeal Cancer Study Group, 1991).
- Total Laryngectomy (TL) may be performed as a primary procedure or as a secondary or salvage procedure following failure of more conservative treatment (Agrawal & Goldenberg, 2008; Chu & Kim, 2008; Gaziano, 2002; Jalisi & Jalisi, 2005).

Changes to Structure & Function of the Neopharynx after TL

(e.g., Sullivan & Hartig, 2001; McConnel et al., 1988)

- Excision of all laryngeal structures occurs.
- Removal of larynx results in increased resistance to flow from loss of superior & anterior movement which assists in opening of UES.
- Collapsing of the pharynx results in doubling of average pharyngeal transit times (PTTs) & effective swallowing requires greater propulsive forces to overcome increased pharyngeal resistance.
- Formation of tracheostoma results in increased tortuosity of pharynx.
- Method of closing pharynx affects swallowing.
- Need for additional resection of mucosa will further narrow lumen.
- Reconstruction techniques result in greater swallowing dysfunction.
- Concurrent loss of tongue base correlates with increased dysphagia due to loss of bolus propulsive forces.
Swallowing in TL

- Estimates of dysphagia in the total laryngectomy population range from 17% (Balfe et al., 1982) to 70% (Maclean, Cotton, & Perry, 2008).
- Per Maclean et al. (2008) variations in percentage of reported occurrence of dysphagia may depend on the definition of dysphagia in a given study (e.g., reduced pharyngeal clearance, need for modified diet, change in diet consistency, or need to use swallow strategies).
- Post-laryngectomy dysphagia has been linked to oral stage deficits due to hyoid resection, pharyngeal stage deficits related to altered dynamics of the neopharynx, as well as esophageal stage deficits.

Etiologies of Dysphagia after TL
(Sullivan & Hartig, 2001)

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Chemo-Radiation Therapy
- Xerostomia, mucositis, odynophagia
- Submucosal fibrosis/scarring
- Lymphedema
- Gastroesophageal reflux (GER)
- Abnormal proximal esophageal motility/ peristalsis
- Fibrosis and scarring of pharyngeal tissues

Additional Swallowing Issues Following TL

- Complications may be more pronounced in patients who require salvage laryngectomy for recurrence after completion of chemoradiation treatment (Starmer et al., 2008).
- Ackerstaff, Hilgers, Aaronson, and Balm (1994) found that as many as 25% of total laryngectomy patients report diet alterations, as well as alterations to their premorbid style of eating.
- Other common swallowing complaints include additional time required to complete a meal, drinking increased amounts of water, poor sense of taste (dysgeusia) and smell (hyposmia).
Quality of Life Issues

- Ward, Bishop, Frisby, and Stevens (2002) demonstrated that any degree of alteration to normal swallowing function has a negative impact on quality of life (QOL).
- Patients with long-term dysphagia identified significantly increased levels of disability, handicap, and distress.
- Armstrong et al. (2001) reported that swallowing difficulties resulting in overall poorer state of health often persist following TL for 6 months or more. For example, 42% of subjects reported difficulty eating in public and 38% reported changes in quantity of food intake at 6 months following TL.
- This population may require more long-term social support than is typically available for adjustment following TL.

Swallowing Evaluation

- Given the multifactorial etiologies of dysphagia following total laryngectomy, instrumental assessment is critical to:
  - define the physiology of the post-laryngeal reconstruction swallow,
  - identify any anatomical abnormalities that may contribute to the dysphagia and rule out recurrent or new disease.
- Imaging of the entire swallowing sequence is warranted in this population, considering both the potential for disturbances to esophageal motility following TL (Choi et al., 2003) and the risk of recurrent tumor or second primary in the esophagus (Jung & Adams, 1980).

Swallowing Evaluation

- Oral feeding is typically initiated 5-7 days post-operatively in patients who have not undergone XRT and 7-14 days post-operatively in patients where XRT has been provided (Agrowal & Goldenberg, 2008).
- Prior to commencing oral intake, most patients are assessed with sips of blue dye to rule out the presence of subcutaneous fistulae or wound breakdown.
- It is also important to note that swallowing problems in the TL population can occur both in the acute period of postoperative recovery, as well as long-term following surgery, radiation and/or chemotherapy (Goguen et al., 2006; Maclean et al., 2008; Samlan & Webster, 2002).
Case Examples

Pharyngocutaneous Leak

Esophagram Leak Study

- Internal tracts or fistulae can only be identified radiographically and should be assessed for when more extensive resection or poor wound healing is a risk.
- Provides information about site and extent of breakdown.
- Conducted by Radiologist.
- Uses water-soluble contrast (Gastrografin, Omnipaque, Visipaque).
- Advantages of water soluble contrast: Healing is not compromised by residual contrast in tissues; will not permanently remain in soft tissues of neck.
- Disadvantages: Less radiopaque, disperses quickly and may not detect subtle leaks, causes severe pulmonary edema if aspirated.
Post-Operative Radiographic Assessment of Function

- If no evidence of leak, follow with VFSS using barium.
- Assess bolus clearance through the oral cavity and reconstructed neopharynx.
- Obtain A-P and lateral views.
- Consider use of 13mm pill.
- Ask for spot films.
- Assess effectiveness of interventions.
- Funnel shape of the neopharynx in A-P projection.

13mm Pill Hang-Up

Stricture or Stenosis

- Most common cause of dysphagia
- Tight closure
- Scarring/fibrosis
- Post-op infection
- Salivary fistulae
- Signs/Symptoms:
  - sensation of bolus sticking in throat
  - oral or nasal regurgitation
  - pooling of secretions
  - solid food dysphagia
Stricture or Stenosis

Stricture/Stenosis: A-P View

Stricture/Stenosis: Lateral View
Pseudoepiglottis or Pseudodiverticulum

- Band of scar tissue at tongue base can form a *pseudoepiglottis* or *pseudodiverticulum* (pharyngeal pouch).
- Collects saliva, liquid or food.
- Signs/Symptoms include halitosis and backflow.
Pseudodiverticulum

Pharyngoesophageal Segment Abnormalities

- Thickening or prominence arising from the posterior pharyngeal wall
- T-bar
- Static
- Transient

Pharyngoesophageal Segment Abnormality: Lateral View
Pharyngoesophageal Segment Abnormality: A-P View

Video Clip

Radial Forearm Free Flap (RFFF) Reconstruction
Videoendoscopy Examination
(Coffey, 2007)

- Useful adjunct to VFSS
- Permits visualization of the following parameters:
  - Tongue base retraction
  - Neopharyngeal residue location and quantity
  - Interaction of prosthesis with swallow
  - Bolus backflow
  - Effects of strategies

Duckbill Voice Prosthesis Proximity to Posterior Neopharyngeal Wall

Applesauce Residue throughout the Neopharynx and on Voice Prosthesis
Other Considerations

- Myriad of both **structural** and **physiologic** etiologies impacting post-laryngectomy swallowing.
- Imaging augments information obtained from the clinical history, clinical/bedside swallow evaluation, as well as dysphagia- and disease-specific quality of life scales.
- Imaging of the entire swallowing mechanism is critical considering potential disturbances to esophageal motility following TL and risk of recurrent tumor or second primary in the esophagus.
- Ongoing vigilant monitoring is needed for late-appearing dysphagia (fibrosis, tumor recurrence, second primary).

Questions? Comments?

Please see/download handout for references.
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