



## **Dysphagia after Chemoradiation Therapy**

Dysphagia is one of the most common complications after chemoradiation therapy. Patients undergoing chemoradiation need to be followed long-term and their swallow function should be assessed serially with a detailed patient history, physical exam, and swallow evaluation.

### **Pathophysiology**

- In contrast to normal wound healing from trauma, radiation-induced injuries have an accruing and repetitive nature.
- Hydroxyl radicals from radiation damages DNA in rapidly proliferating cells and impedes normal function of organelles in the surrounding cells.
- Early radiation injury is characterized by acute inflammation leading to edema and pain from mucositis which lead to acute dysphagia. Early injuries can resolve in months or sometimes persist, producing chronic changes that lead to consequential late effects.
- Late radiation injury is characterized by induction of TGF-Beta, progressive collagen accumulation, permanent fiber disorganization, altered microvasculature, and eventual loss of elasticity.
  - Barcellos-Hoff MH, Park C, Wright EG. Radiation and the microenvironment - tumorigenesis and therapy. *Nature reviews Cancer*. 2005; 5(11):867–875. DOI: 10.1038/nrc1735
  - King, Suzanne N., et al. "Pathophysiology of radiation-induced dysphagia in head and neck cancer." *Dysphagia* 31.3 (2016): 339-351
- Factors associated with increased risk of dysphagia after chemoradiation include older age, advanced T stage, larynx/hypopharynx primary site and neck dissection after CRT. Machtay, Mitchell, et al. "Factors associated with severe late toxicity after concurrent chemoradiation for locally advanced head and neck cancer: an RTOG analysis." *Journal of Clinical Oncology* 26.21 (2008): 3582.

### **Assessment:**

- Evaluation begins with a comprehensive history and physical exam. History should include assessment of dysphagia symptoms and dysphagia consequences like weight loss, history of pneumonia, and other evidence of malnutrition.
- Evidence shows there is discordance between patient reported dysphagia and actual swallow function. Thus objective analysis of swallow is important.
  - Pedersen, A., et al. "Swallowing outcome measures in head and neck cancer—How do they compare?." *Oral oncology* 52 (2016): 104-108.
- Physician exam should include: oral hygiene, dentition, trismus, dry mucosa, oral tongue strength and mobility, ability to cough and hyolaryngeal elevation during swallow.



- For anatomical and functional analysis of pharyngeal and laryngeal phases of swallow, a flexible endoscopic evaluation of swallowing (FEES) should be performed. This exam will allow assessment vallecular residual and thus provide information on base of tongue and pharyngeal muscle strength and epiglottic dysfunction. FEES will also allow assessment of laryngeal penetration, aspiration and regurgitation. FEES does not assess oral and upper esophageal sphincter (UES) function.
- To assess UES function, a modified Barium swallow (MBS) can be done. MBS can also provide further information on strength of pharyngeal muscle, epiglottic dysfunction, and laryngeal penetration and aspiration.
- Pharyngoesophageal manometry can be ordered to assess pharyngeal and esophageal contraction and dysmotility.
- Transnasal esophagoscopy and Barium esophagram can be used to assess strictures.
  - Jamal, Nausheen et.al, “Chemoradiation-Induced Dysphagia.” *Dysphagia Evaluation and Management in Otolaryngology/ Chhetri and Dewan. 1st Ed. Elsevier. 2019. 115-121.*

### **Treatment**

- Management of radiation-induced dysphagia is different in the acute and chronic phases.
- Dysphagia during or soon after chemoradiation is likely from mucositis causing edema and pain. Dysphagia management in this phase should start with pain control and adopting a soothing diet that can be easily tolerated.
- The goal during the acute period is to keep the patient swallowing for as long as possible during the treatment period. Patients who stop swallowing during this time is at increased risk to develop esophageal stenosis and strictures and to become G-tube dependent.
- Chronic dysphagia is treated based on the etiology of dysphagia. A multi-disciplinary approach with a swallow therapist, dietitian, dentist and social worker is recommended.
- Surgical treatment from dysphagia include: Partial laser epiglottectomy for epiglottic dysfunction, CO2 laser treatment of strictures with balloon dilation, cricopharyngeus myotomy, supraglottoplasty, and epiglottoplasty.
- Complete esophageal stenosis can be treated through a retrograde approach through a G-tube and with a staged a procedure/ stent placement to open the esophagus. Occasionally, when dilation and stenting cannot be completed, a resection with a tubed free flap is needed.
- Management of radiation-induced dysphagia should be focused on prevention. Working closely with the radiation oncology, head and neck oncology team and swallow therapist before, during and after treatment is essential. Swallow prevention protocol with swallow exercises should be presented to patients before treatment. Such protocol can help maintain swallow function in head and neck cancer patients undergoing RT. Studies have shown patients who are able to comply with swallow exercises are less likely to receive a G-tube or develop stenosis and are more likely to maintain the ability to tolerate a regular diet.



- Duarte, Victor M., et al. "Swallow preservation exercises during chemoradiation therapy maintains swallow function." *Otolaryngology–Head and Neck Surgery* 149.6 (2013): 878-884.
- Patients with radiation dysphagia should be referred to a head and neck surgeon immediately to prevent delayed treatment.