Framework for Speech–Language Pathology Services in Patients with Oral Cavity and Oropharyngeal Cancers

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KEYWORDS

• Speech–language pathology • Dysphagia • Dysarthria • Functional outcomes • Rehabilitation

KEY POINTS

- Speech and swallowing impairments take many forms in this population and are driven by tumor burden and location, treatment modality, comorbidities, and age.
- Baseline functional assessment with speech–language pathology is best practice for most patients diagnosed with oral cavity or oropharyngeal cancers.
- Postoperative rehabilitation needs vary greatly by procedure and patient; early initiation of postoperative rehabilitation is advocated.
- Radiotherapy generally has greater impact on swallowing over speech function in this population.
- Proactive swallowing therapy models are considered best practice to maximize pharyngeal activity through the duration of radiotherapy.

INTRODUCTION

This article provides a framework for speech–language pathology services in the assessment and treatment of patients with oral cavity and oropharynx cancers. For purposes of this article, we maintain the assumptions that (1) oral cavity cancers are primarily treated surgically as a single modality when early stage and typically require adjuvant radiotherapy (RT) or chemoradiation (CRT) for advanced stages of disease and that (2) oropharyngeal cancers are largely treated without surgery and often require multimodality treatment with shifting trends toward primary transoral resection in patients with low to intermediate risk disease.

NATURE OF THE PROBLEM

The complexity of the head and neck region involves an abundance of neurovascular structures responsible for breathing, speaking, and eating. Locoregional treatment modalities aim to eradicate head and neck tumors while intending to preserve these essential functions. However, treatment modalities for head and neck cancer (HNC), which include surgery, RT, and CRT, can impact both the anatomy as well as the tissue characteristics and neural inputs of the structures and muscles involved in speech and swallowing. Thus, speech and swallowing problems are among the most challenging functional deficits to rehabilitate after oncologic treatment for HNC.

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Much of the recent increase in prevalence of HNC is attributed to the growing epidemic of a virally mediated form of disease associated with the human papillomavirus (HPV).[1] Persistent HPV infection can alter immune function and cause genetic damage, which may progress to squamous cell carcinoma arising from the epithelial mucosa of the upper aerodigestive tract most typically in the oropharynx. This epidemiologic shift is impacting individuals (males > females; 3:1) primarily in their 40s and 50s who have no significant history of tobacco and/or alcohol use.[2] Fortunately, improved therapeutic response and increased survival are associated with HPV-related disease (HPV+).[3,4] However, outside of an investigational setting, treatment regimens and dosing presently remain equivalent to standards derived for populations with tobacco related HNC. Thus, clinicians currently face a growing population of young and otherwise healthy cancer survivors who are challenged by sometimes devastating, often long-term, consequences of HNC treatment, chief among these issues speech and swallowing deficits.

DYSPHAGIA

The incidence of dysphagia at time of HNC diagnosis is reported as high as 40%[5] and is often a direct consequence of tumor invasion into the swallowing musculature in patients with locally advanced tumors (baseline dysphagia is rare in patients with early stage disease). After diagnosis, dysphagia severity is then typically exacerbated, if present at diagnosis, or originated by oncologic treatment. Pretreatment dysphagia severity has been shown to correlate with disease stage,[6–8] whereas the severity of posttreatment dysphagia is directly related to the site of lesion, presence of neck metastasis, and the cancer treatment modality. Multimodality therapies are common practice for treatment of HNC, with approximately 80% of all patients with HNC receiving RT during the course of treatment for their disease.[9,10]

Dysphagia after RT is characterized by a decreased range of motion of the laryngopharyngeal structures involved in swallowing. RT targets rapidly dividing cancer cells while attempting to spare slower dividing somatic cells. Acute and late effects of radiation on normal tissues depend on many factors, such as the RT field, dose per fraction, number of fractions (including fractions per day), interfraction interval, total dose, and the duration over which the dose is delivered. Muscles critical to swallowing often overlap RT targets or are in close proximity such that bystander dose is unavoidable. Conformal methods of delivery, such as intensity-modulated radiation therapy and volumetric arch therapy, among others, are now the standard of care for delivery of RT to patients with HNC. This strategy allows for the delivery of a therapeutic dose to the tumor while protecting, as much as possible, the nearby dose-limiting structures, such as the orbital regions, eyes, parotid glands, and the dysphagia-aspiration related structures (ie, pharyngeal constrictors, larynx, and submental muscles).[11–14] Despite sparing of these dose-limiting structures, a low-dose "bath" of radiation to normal muscles occurs, delivering a low dose to various structures including nerves, ligaments, tendons, bones, as well as the vascular system within the radiation field.[13] As such, even with modern RT techniques, meaningful numbers of patients develop radiation-associated dysphagia (RAD) as a long-term consequence of this therapy. In oropharyngeal cancers, the severity of dysphagia is reported to impact quality of life[15] and decisional regret[16] about cancer treatment with larger effect sizes than other toxicities.

After CRT, it is estimated that 39% to 64% of patients have chronic swallowing deficits.[17–19] Dysphagia presents as the primary functional concern for this patient population,[20] drives perception of quality of life after CRT and significantly predicts for pneumonia during long-term survivorship.[21] Specific to patients with primary tumors of the oropharynx, it is estimated that 7% to 31% develop chronic aspiration,[17,22] 11% develop aspiration pneumonia,[21] and 4% are chronically dependent on a feeding tube after CRT.[23] The high prevalence of dysphagia within this patient population further contributes to significant medical, psychosocial, and nutritional sequelae.

Functional outcomes after surgical resection for HNC vary significantly. However, surgical resection, with or without microvascular reconstruction, may yield more predictable functional outcomes specific to tumor size (clinical T stage) and location.[24] Advanced tumors (ie, T3-T4), requiring larger resection often result in worse postoperative function owing to the anatomic and neurophysiologic consequences of surgery.[25] Further, location of the surgical bed within the aerodigestive track directly relates to functional outcomes. In general, within the oral cavity and oropharynx, oral phase impairments are dominant after oral tongue and floor of the mouth resection, whereas pharyngeal phase impairments, including aspiration, are more prevalent succeeding base of tongue resection.[25]

SPEECH

Deficits in speech intelligibility for oral and oropharynx patients with cancer are often a result of (1) direct surgical excision of the structures