Rehabilitation approach in oropharyngeal cancer: Case report

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Abstract
Introduction: Cancer rehabilitation can be preventive, restorative, supportive, and palliative. The rehabilitation goals change as the cancer pathway alters. Following any treatment for head and neck cancer, a physiatrist plays an essential role in preventing various complications and helping patients to mitigate impairments and restore function, optimizing their quality of life.

Case description: This is a case study of a 56-year-old man with squamous cell cancer of the tongue managed with glossectomy, chemotherapy, and radiotherapy. He also has a remote history of acute myeloid leukemia involving the central nervous system, presenting with seizure and infective endocarditis. He underwent a sternotomy and an aortic valve replacement. His postoperative course was complicated by sternal infection, bradycardia with agonal breathing, and a weak pulse, for which the patient underwent cardiopulmonary resuscitation and achieved return of spontaneous circulation and was intubated and managed with antibiotics. He had a tracheostomy and underwent aggressive pulmonary toileting and suctioning in acute care. As the patient stabilized, he was transferred to in-patient rehabilitation.

Interventions: While the patient was in the in-patient rehabilitation unit, cancer rehabilitation issues were addressed, including swallowing, pulmonary rehabilitation, management of upper-extremity deep venous thrombosis and infection, bowel and bladder issues, skin care, and evaluation of mental status. The patient’s cancer prognosis and future were discussed in collaboration with his oncologist. He was discharged with a palliative care plan.

Conclusion: This report illustrates the significance of physical medicine and rehabilitation in management of cancer patients, as most cancer patients experience some deconditioning that results in physical challenges. As the prognosis for most types of cancers improves, it becomes more important to ensure that all cancer patients regain maximum function in the broadest sense to maximize their independence.

Keywords
Oncology, orthopedics/rehabilitation/occupational therapy, otolaryngology

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Introduction
Oropharyngeal cancer is a major health concern globally. Although surgery, radiotherapy, and chemotherapy improve survival, these strategies increase the risk of complications. However, physical medicine and rehabilitation (PM&R) specialists can address these complications. We describe the therapeutic interventions performed in a patient with tongue cancer along with the interdisciplinary approach involving PM&R specialists and other medical professionals used in this case.

Case
A 56-year-old man presented with squamous cell cancer of his tongue. Biopsy of the anterior tongue mass showed a well-differentiated squamous cell carcinoma with a p16 negative status. Positron emission tomography revealed abnormal uptake in the left-sided anterior neck lymph nodes. Within 2 months of the biopsy, he underwent glossectomy of the anterior two-thirds of the tongue with free-flap reconstruction, and bilateral neck dissection (levels 1–4). Histopathological findings showed a tumor (7 cm × 5.3 cm × 3.5 cm) that invaded the underlying tissue (depth of invasion approximately 1.7 cm). All tumor margins...
were negative, and although no perineural invasion was observed, lympho-vascular invasion was equivocal.

The patient received a 6-month chemotherapeutic regimen for head and neck carcinoma; he was administered six cycles of cisplatin (40 mg/m² intravenously on a weekly basis) and two sessions of radiotherapy. His final cancer staging was T4aN3bM0. Unfortunately, the patient developed new-onset seizure and infective endocarditis with an aortic valve vegetation (21 mm) 2 months after chemotherapy and underwent aortic valve replacement followed by a 6-week course of intravenous antibiotic. He developed postoperative sternal infection, bradycardia with agonal breathing, and a weak pulse for which he underwent cardiopulmonary resuscitation for approximately 5 min with return of spontaneous circulation after which he was intubated. Following stabilization and extubation, the patient underwent tracheostomy and aggressive pulmonary toilet, and once stabilized, he was transferred for inpatient rehabilitation to address his deconditioning, cognitive, dysphagia, and dysarthria, and establish a safe discharge plan with proper family education.

His inpatient rehabilitation stay and outcomes will be discussed later after the discussion.

Discussion

Tongue malignancies are challenging because of the short- and long-term consequences of treatment on oral and pharyngeal function, the negative effect on patients’ quality of life, and poor outcomes with advancing cancer. Tongue cancer represents 1% of all new cancer cases in the United States and most frequently affects the lateral aspect (85%) of the oral tongue. Most tongue cancers are well-differentiated squamous cell carcinomas, and poorly differentiated varieties are rare. According to the American Oral Cancer Foundation, oral and oropharyngeal cancers that include laryngeal cancer affect approximately 54,000 individuals with a mortality rate of 13,500 deaths per year in the United States alone with more than 50% have significant morbiidity.

This cancer is historically associated with a high mortality rate because of delayed diagnosis and detection in the advanced stage, and limited therapeutic options are available for advanced lesions.

The tumor-node-metastases staging system developed by the American Joint Committee on Cancer and the Union for International Cancer Control is used to classify lip and oral cavity carcinoma. The updated staging system (2017) includes changes applicable to patients with early stage oral cavity cancer. Previous versions included only the maximum tumor size in a single plane (usually the surface); however, the updated staging system incorporates the maximum depth of tumor invasion as a classification criterion. Per the revised classification, patients with depth of invasion >5 mm and >10 mm are diagnosed with a minimum tumor stage of T2 and T3, respectively. Therefore, patients with small but more deeply invasive tumors are effectively upstaged. Patients with more extensive local disease, regional lymph node involvement, or distant metastasis are diagnosed with stage III or IV disease.

Management of tongue cancer depends on the site and extent of the primary tumor and lymph node invasion. Following is the therapeutic approach to lip and oral cavity cancer:

- Surgery alone
- Radiotherapy alone
- Combination of surgery and radiotherapy

Low-grade tumors are usually treated with surgery or radiotherapy. Advanced disease necessitates chemotherapy. The plan is tailored considering the anticipated functional and cosmetic outcomes and availability of the particular expertise.

Rehabilitation of patients with oropharyngeal cancer involves interdisciplinary coordination to manage cancer-induced issues, challenges from cancer management, and prevention of complications. Addressing speech difficulties with collaboration with speech-language pathologist (SLP), dysphonia that may result from tracheostomy and dysarthria with effective assistive communication strategies is important to comprehend patients’ needs. Implementation of diverse communication strategies and assistive technology is important to educate patients and their families regarding the effective use of these techniques. Sullivan et al. describe the following phases of augmentative and alternative communication in patients with oropharyngeal cancer:

1. Set up phase
2. Immediate postsurgical phase
3. Swallow and speech restorative phases
4. Long-term augmentative and alternative communication

Non-vocal communication such as head nods, gestures, writing, and alphabet and picture communication boards are useful techniques in this context. The role of dietitian complement that of the SLP. The dietitian is responsible to provide proper food recipes and advice on supplements that fulfill the nutritional demands of this population. In addition, the dietitians play a key role in the discharge plan and educate the caregivers on the proper diet programs and how to watch for aspiration complications.

Nasogastric tube (NGT) is usually placed early for nutritional support depending on the dysphagia severity to prevent cachexia and deconditioning. Ahmed et al. reported that clinical judgment is important for G-tube placement, and early G-tube placement is recommended, particularly in those with advanced oral cavity, oropharyngeal, and hypopharyngeal cancers. The mean interval between treatment initiation and G-tube placement is 3 weeks.
Airway compromise may occur from tumor compression, adhesions after radiotherapy, or systemic causes such as acid reflux. The most alarming presentation of airway compromise is stridor, which is defined as a harsh, high-pitched wheezing or vibrating sound that results from turbulent airflow in the upper airways. Otolaryngologists should be consulted regarding tracheostomy, which depends on future therapies and tumor stage. Lower cranial nerve palsies are common in patients with head and neck cancers, with a high risk of progressive polyneuropathy and denervation of various central and peripheral nervous systems. Postradiation fibrosis can also contribute to lower cranial nerve palsies.9

Physiatrists effectively manage conditions observed during rehabilitation. Pain (tumor-induced or secondary to radio- and chemotherapy-induced neuropathy) is common in these patients. The American Cancer Society suggests an individualized pain management strategy that includes the administration of short-course opioids and neuropathic pain medications and other non-pharmacological modalities based on patients’ tolerance levels. This plan is modified depending on a patient’s recovery course.10

Lymphedema is common around the face, neck, and upper extremities. However, diagnosis and management of lymphedema is usually unnoticed, and it remains under-treated because many other issues predominate the presentation.11 Manual lymphatic drainage using gentle circular massage strokes is the modality of choice to manage lymphedema with or without compression bandaging. Simple physical exercise to optimize the neck range of motion, skin care, and complete decongestion therapy are the gold standard treatment for lymphedema.12

Other radio- and chemotherapy-induced complications include trismus, xerostomia, and musculoskeletal and neuro-pathological issues. Denture removal and osseous implants can be considered; however, careful patient selection is important for dental implant surgeries.

Cancer-induced fatigue requires prompt management, with exclusion of secondary medical contributors. Secondary complications from conditions including traumatic brain or spinal cord injury may occur in some patients, and rehabilitation of these patients is challenging for PM&R specialists.

Pulmonary rehabilitation included suctioning through the tracheostomy, lung toilet, and mechanical insufflation–exsufflation therapy. Anticoagulation therapy was administered for upper-extremity deep venous thrombosis.

His sternal infection was treated via collaboration with infectious disease experts. Neurogenic bowel and bladder issues were addressed, and appropriate positioning was ensured to optimize skin care. Occupational therapy evaluation was performed for use of adaptive equipment, including a wheelchair. He gradually progressed and gained strength with daily physiotherapy sessions and also underwent mental status evaluation. His upper-extremity lymphedema was managed with retrograde gentle massage that was satisfactory. Seizure management was warranted in our patient for anoxic brain injury. His spasticity was managed with proper positioning and range-of-motion exercises as well as splints; no medical intervention was required. His cancer prognosis and the future were discussed with his oncologist, and he was discharged with a palliative care plan. The patient was seen in the rehabilitation outpatient clinic and his physical endurance was improving. His mood was improving as he was making progress.

Our patient’s Karnofsky functional scale was improved from 30 upon admission to 60 at the time of discharge. It is worth mentioning that the type functional scales vary in cancer rehabilitation based on institutional needs and the collaboration between the team members.

Conclusion

Oropharyngeal cancer management requires a multidisciplinary approach that depends on the cancer stage. Various therapeutic strategies are used, and as part of an interdisciplinary team including medical experts, PM&R specialists are instrumental in patients’ recovery and planning for future interventions which is sometimes underutilized. Not to forget the role of other team members along the patient’s journey that includes the otolaryngologist, physiotherapist, occupational therapist, SLP, dietitian, social worker, and psychologist who play key roles in ensuring proper care.

Further research is warranted to address preventive strategies to optimize patients’ quality of life.

Bach to our patient

Our patient underwent inpatient cancer rehabilitation that included interdisciplinary collaboration with a SLP and dietitian and placement of a G-tube for swallowing and nutritional support. The SLP addressed his dysarthria and speech challenges with proper therapy that included constraint-induced language therapy and augmentative communication strategies.

Our dietitian was heavily involved in educating the patient and the care giver on the proper food textures to consider and provide resources for protein supplements.

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Ethical approval

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References
1. NIH National Cancer Institute. Cancer of the Tongue—Cancer Stat Facts [Dataset]. https://seer.cancer.gov/statfacts/html/tongue.html
2. Watkinson JC, Gaze MN and Wilson JA. Stell and Marans head and neck surgery. 4th ed. Oxford: Reed Educational and Professional Publishing, 2000.
3. The Oral Cancer Foundation. Oral Cancer Facts. https://oral-cancerfoundation.org/facts/ (accessed 28 February 2019).
4. Ridge JA, Lydiatt WM, Patel SG, et al. Lip and oral cavity. In: Amin MB (ed.) AJCC Cancer Staging Manual. 8th ed. New York: Springer, 2017, pp. 79–94.
5. Murthy S, Low TH, Subramaniam N, et al. Validation of the eighth edition AJCC staging system in early T1 to T2 oral squamous cell carcinoma. J Surg Oncol 2018; 119(4): 449–454.
6. PDQ Adult Treatment Editorial Board. Lip and oral cavity cancer treatment (Adult) (PDQ®): Health Professional Version. Bethesda, MD: National Cancer Institute, 2019, https://www.ncbi.nlm.nih.gov/books/NBK65821/#CDR0000062930_53
7. Sullivan MD, Gaebler CB and Ball LJ. AAC for people with head and neck cancer. In: Beukelman DR, Garrett KL and Yorkston KM (eds) Augmentative communication strategies for adults with acute or chronic medical conditions. Baltimore, MD: Paul H. Brookes, 2007, pp. 347–67.
8. Ahmed KA, Samant S and Vieira F. Gastrostomy tubes in patients with advanced head and neck cancer. Laryngoscope 2005; 115(1): 44–47.
9. Hutcheson K, Lin H, Yuk M, et al. Lower cranial neuropathy after oropharyngeal intensity modulated radiation therapy (IMRT): a prospective study and literature review. IJROBP 2016; 94(4): 968.
10. The American Cancer Society. Managing Cancer Pain at Home. https://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/pain/pain.html (accessed 3 January 2019).
11. Horner MJ, Ries LAG, Krapcho M, et al. SEER cancer statistics review, 1975–2006. Bethesda: National Cancer Institute, 2009, http://seer.cancer.gov/csr/1975_2006/ (accessed 19 December 2009).
12. Foldi M and Foldi E. Practical instructions for therapists—manual lymph drainage according to Dr. E. Vodder. In: Strossenruther RH and Kubic S (eds) Foldi’s Textbook of Lymphology: for Physicians and Lymphedema Therapists. Munich: Urban and Fischer, 2006, pp. 526–546.