

Head and Neck Microvascular Reconstruction in Puerto Rico: Developing a Two-team approach to Microvascular Reconstructive Surgery

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Hypopharyngeal carcinoma as a subsite of head and neck cancer, carries with it the lowest 5-year relative survival rate. Treatment of hypopharyngeal cancer relies on single therapy or multimodality treatment: surgery, radiation and/or chemotherapy. When surgical intervention is chosen, the type of operation depends on the extent of the lesion and the regions involved and will often require some form of reconstruction. We present the case of a 69-year-old male patient with T4aN3M0 hypopharyngeal carcinoma treated in Puerto Rico utilizing a two-team approach for removal of the primary tumor as well as harvesting of the free-flap for reconstruction. This approach allows for decreased operative time by having two surgical teams operating at the same time. The benefits of free flap reconstruction include: larger resection margins, better functional outcomes in terms of swallowing, and decreased post-operative morbidity in irradiated patients. [P R Health Sci J 2020;39:58-61]

Key words: Free flap, Hypopharynx, Reconstruction

Squamous cell carcinoma of the hypopharynx accounts for approximately 3% of all head and neck cancers and includes primary hypopharyngeal tumors as well as advanced tumors from other sites, most notably the larynx. Cancer of the hypopharynx has the lowest 5 – year survival relative rate when compared to other subsites of the head and neck (1). The most frequently affected site is the pyriform sinus, which accounts for 70% of all cases (2).

Treatment modalities include: surgical resection or radiotherapy as single-modality treatment versus multimodality therapy with primary chemoradiation or surgical resection with radiation or chemoradiation. The modality chosen depends on various factors including tumor staging and the patient's general medical condition. When surgical intervention is chosen, the type of operation depends on the extension of the lesion and the subsites involved, requiring some form of reconstruction (3).

We present a case of a 69-year-old male patient with T4aN3M0 hypopharyngeal carcinoma treated in Puerto Rico utilizing a two-team approach for removal of the primary tumor as well as harvesting of the free-flap for reconstruction. The availability of surgeons able to perform this kind of surgery should be made known to the medical community in Puerto Rico to improve access to this treatment modality for patients with head and neck malignancy. Free-flap reconstruction has been a standard of care for many years in other regions of the world but has not been widely available in Puerto Rico until more recently.

Case Report

A 69-year-old patient with a long-standing smoking history presented with progressive odynophagia and dysphagia for 3 months. Flexible laryngoscopy was performed and the patient was found with a small ulceration in the left pyriform sinus and postcricoid space. MRI and PET-CT were performed for evaluation of a suspected neoplasm of the hypopharynx. Results revealed a left hypopharyngeal neoplasm invading the larynx with erosion of the thyroid cartilage with extra-laryngeal extension.

The patient was taken to surgery for direct laryngoscopy and biopsy. Intraoperatively, a neoplasm was found at the level of the left pyriform sinus apex extending to the laryngeal surface of the pyriform sinus. The post cricoid space was also involved by the tumor which extended laterally to the proximal esophagus but did not involve the cricopharyngeus muscle. The patient also presented with unilateral left vocal fold immobility.

Decision was made to take the patient to the operative room for definitive surgery which included a total laryngopharyngectomy

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(TLP), bilateral and central compartment selective neck dissection and reconstruction with a tubed anterolateral thigh free flap (ALTF). The neck area was prepped and draped in sterile fashion and a TLP with bilateral neck dissection was performed (Figure 1) while a second surgical team harvested an ALTF from the right leg. The flap was tubed in the leg while still being perfused to decrease ischemia time (Figure 2). Once resection of the primary tumor, neck dissections, and neck recipient vessel preparation was complete, it was then transferred to the neck space for reconstruction of the neopharynx. Total operative time was 8 hours. A Cook Swartz Arterial Doppler® (Medtronic Corporation, Dublin Ireland) was used to monitor arterial perfusion, and a skin paddle was externalized in the neck for monitoring flap perfusion.

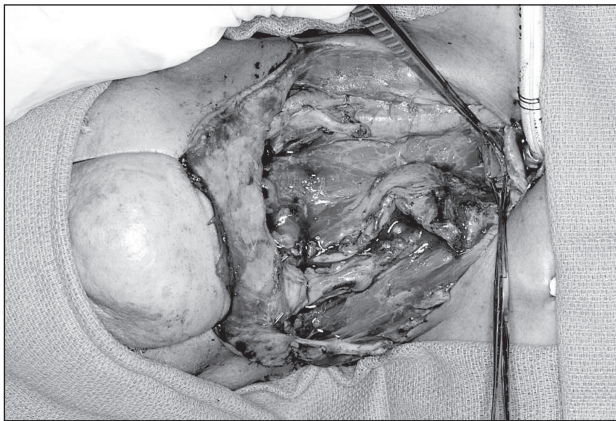


Figure 1. Intraoperative picture showing surgical site after total laryngopharyngectomy and bilateral neck dissection.

Esophagogram was performed after 13 days in the hospital which showed no evidence of pharyngocutaneous fistula (Figure 3) and patient was discharged home the next day. The patient was alive 12 months after surgery talking with a tracheoesophageal prosthesis (TEP) and tolerating a regular diet.

Discussion

The ALTF was first described in 1984 but has gained increasing popularity among head and neck reconstructive surgeons over the past decades (4-5). Proponents of the ALTF argue that decreased donor site morbidity and ability to harvest large flaps make the ALTF an excellent source of tissue for pharyngoesophageal reconstruction as compared to radial forearm free flap. Other advantages of the ALTF include: a large skin paddle with the option to harvest with vascularized muscle for coverage of exposed great vessels, and separation of surgical site from the head and neck enabling a 2-team approach (5).

In a recent retrospective review of functional swallowing and voice outcomes after TLP in patients with ALTF, 90% of patients were able to maintain their oral nutrition following excision and reconstruction. Ten (39%) of the 26 patients were able to

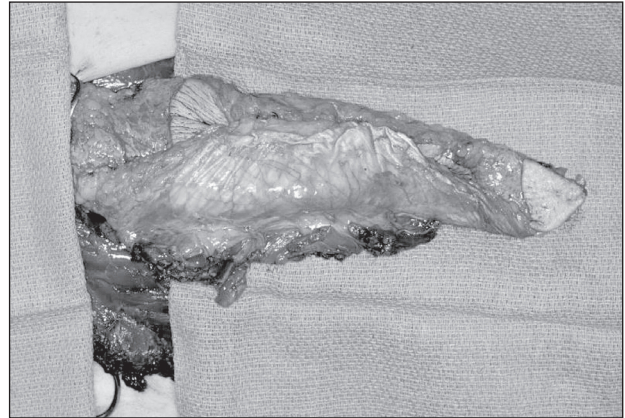


Figure 2. Intraoperative picture showing tubed ALTF attached at donor site before transfer to neck site.

resume a regular oral diet inclusive of all food consistencies, and 12 (46%) maintained a soft diet. Four patients (15%) were only able to swallow a pureed diet because of limitations in oral function after surgery (6). Studies have shown that up to 71% of patients who undergo total laryngopharyngectomy with free-flap reconstruction achieve intelligible speech with good patient-perceived voice-related quality of life and another recent comparison of voice outcomes between radial forearm free flap and ALTF reconstruction showed no difference in 4 measured voice quality parameters (7,8). Our patient had a TEP placed 6 months after initial surgery with adequate voice production.

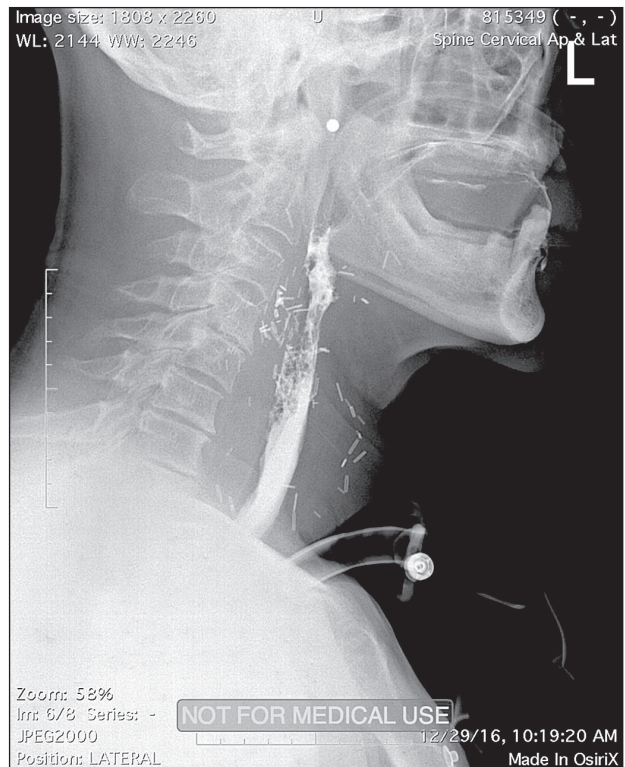


Figure 3. Barium esophagogram showing passage of contrast through neopharynx into distal esophagus without leakage into neck spaces.

Early cancers of the hypopharynx can be treated with radiotherapy alone. In terms of locoregional control and survival rates, results are comparable to those of surgery alone. (9). However, radiotherapy alone does not appear to provide a satisfactory outcomes in advanced hypopharyngeal tumors in terms of locoregional control and survival. Mean five-year survival in patients treated with radiotherapy alone is estimated to be between 12.7 and 13.9% (3,10-12).

With the advent of concomitant chemoradiotherapy for head-and-neck squamous cell carcinomas, since the late 1990s, patients have been offered chemoradiotherapy regimens as definitive treatment for advanced hypopharyngeal cancer. This treatment modality was based on a landmark study by the Department of Veterans Affairs which concluded that induction chemotherapy and definitive radiation therapy can be effective in preserving the larynx in a high percentage of patients, without compromising overall survival (13). Populational studies before and after the introduction of this treatment modality have revealed that the addition of chemoradiotherapy to the armamentarium of treatment options did not improve outcomes for hypopharyngeal cancer at the population level (14).

Indications for TLP are tending to give way to laryngeal preservation protocols or are increasingly reserved for oncologic salvage situations of tumor recurrence in previous radiation therapy sites. Primary TLP however, remains indicated in case of transcartilage extension (T4), massive subglottal extension or contraindications for neoadjuvant chemotherapy. In practice, transcartilage extra-laryngeal extension is the main indication for first-line radical surgery, where laryngeal preservation protocols have been shown to offer poorer survival (15).

For hypopharyngeal carcinomas that are too large for voice sparing procedures, radical surgery that includes total laryngectomy and partial or total pharyngectomy is needed. Primary closure of the pharynx without the need for tissue transposition is usually possible when the residual mucosa of the hypopharyngeal defect is greater than 3 cm in width. If insufficient mucosa remains, pedicled or free tissue transfer patch flaps may be used to allow optimal reconstruction (16).

As previously described, small defects are usually amenable to primary closure as long as at least 3cm of healthy mucosa remains in hypopharynx. The resection defect of tumors affecting the lateral wall of the pyriform sinus can be closed directly if the extent of the lesion is less than 50%.³ Larger defects usually require free flap reconstructions and pharyngo-esophageal defects with extension to cervical esophagus require free flap reconstruction as well as gastric pull up to provide continuity to the digestive tract from oropharynx to esophagus (17).

This case presented here is to our knowledge the first described case of a free-flap reconstruction after TLP performed in Puerto Rico using a two-team approach. The availability of surgeons able to perform free flap reconstructions provides patients who were previously considered inoperable due to

high post-operative morbidity a chance to undergo a surgical intervention that could potentially increase their chances of survival. It is necessary for the medical community to know about this resource in order to offer their patients the best available treatment. Surgical reconstruction with free-flaps is considered a standard of care in many countries and should be readily accessible to all patients in Puerto Rico. Until recently there were few surgeons in Puerto Rico able to perform this type of reconstruction and availability was scarce. Newly trained physicians are now offering these services in Puerto Rico improving the accessibility of this type of reconstruction for our patients.

Resumen

De todos los tumores malignos de cabeza y cuello, el cáncer de hipofaringe se caracteriza por tener la sobrevida más baja de todos los demás subsitios a 5 años. Cuando se opta por llevar a cabo una intervención quirúrgica para su manejo hay que tener en cuenta el defecto que va a permanecer luego de la excisión del tumor primario, por lo tanto, hay que tener disponible tejido viable y libre de tumor para su reconstrucción. Aquí presentamos el primer caso descrito en Puerto Rico de un paciente de 69 años de edad con un cáncer de hipofaringe T4a que fue intervenido quirúrgicamente mediante un abordaje combinado de resección del primario y reconstrucción con colgajo libre. Este abordaje combinado disminuye el tiempo de operación y la reconstrucción con colgajo libre disminuye la morbilidad asociada a la remoción del tumor primario.

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