

Role of Pectoralis Major Muscle Pedicle Flap in Post Laryngectomy Patients—A Case Series of Three Patient

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ABSTRACT

After total laryngectomy, primary goal of pharyngeal reconstruction is to maintain the alimentary continuity, protect vital structure such as carotid artery and restore the post op swallowing function. Pharyngocutaneous fistula (PCF) is a common and troublesome complication following total and salvage laryngectomy. Pectoralis major muscle flaps are versatile, reliable, and technically less demanding reconstructive options that can be used for primary pharyngeal reconstruction, reinforcement of pharyngeal closure, and management of established fistulae. We present three patients with advanced or recurrent laryngeal carcinoma in whom pectoralis major flaps were used in different reconstructive settings. All three patients demonstrated satisfactory wound healing without recurrent fistula or significant donor-site complications. Oral feeding was successfully resumed in the postoperative period. The pectoralis major flap provides a versatile and dependable option for reconstruction following laryngectomy.

Key words: Laryngectomy, Pharyngocutaneous fistula, PMMC/PMMF flap

INTRODUCTION

Advanced laryngeal cancer patients and patients with recurrent carcinoma post radiotherapy often treated with total laryngectomy and salvage laryngectomy respectively. Pharyngocutaneous fistula is one of the common and most troublesome complication after laryngectomy surgery. Pharyngocutaneous fistula most commonly seen after salvage laryngectomy patients due to radiation damage to microvascular structure leading to delayed wound healing.¹ The primary goal of pharyngeal reconstruction post laryngectomy with pharyngectomy is to maintain the alimentary continuity, protect vital structure such as carotid artery and restore the post op swallowing function.² Among the different option available for pharyngeal reconstruction pectoralis major muscle pedicle flap is one of the flap which is most commonly used and considered work horse flap because of its different use in different clinical scenarios. The flap is first described by Ariyan 1979, after that there were lots of modification and is use for different purpose. The flap exhibits resistant to infection, necrosis, heals rapidly and its technically less demanding.³ In this article we are describing its use in 3 different clinical scenarios, where the PMMC flap is used for different purpose.

Case 1: 57-years-old male presented with hoarseness of voice for 1 year. On laryngoscopy examination a large ulcerated lesion seen involving right pyriform fossa, right arytenoid, aryepiglottic fold extending into right vocal cord and opposite arytenoid with involvement of post cricoid area. Right hemi larynx was found to be fixed. CECT of neck was done which shows a large ulcer infiltrative trans glottic growth centred in the right pyriform sinus, extending to right vocal cord with complete destruction of right aryepiglottic fold, involving right cricoarytenoid unit, crossing the midline to involve the opposite vocal cord and PFS, with subglottic extension and

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post cricoid involvement. After all the routine preoperative evaluation patient was planned for total laryngectomy with pharyngectomy. After the resection of the tumour with a good mucosal margin the remnant pharyngeal mucosa was approximately 2 cm which was difficult to close primarily so PMMC flap was harvested and a patch pharyngoplasty was done. At first after laryngectomy, we have harvested the PMMC flap based on thoracoacromial artery. Skin incision extended superiorly till 2 finger breath below clavicle, and a tunnel was created below the skin for delivery of flap to the neck. During the whole process donor vessel keep in view and muscle bulked around the pedicle was trimmed. Then in the neck sternal head of sternocleidomastoid muscle is released from the clavicle to make space for flap delivery into neck. After the flap is pulled to the neck closure of the pharyngeal defect was started by stitching the margin of the flap to the mucosal margin of the pharynx with 3-0 vicryl interrupted suture from caudal to cranial direction in one side first then continuing to the other side keeping the skin surface of the PMMC flap towards the lumen. Once pharynx is fully reconstructed the muscle bulk of the PMMC flap stitched with the muscle in the base of tongue area and both side sternocleidomastoid muscle anterior margin to give an extra soft tissue support to the pharynx. Then remaining wound was closed in layers. Postoperative period was uneventful; patient wound healed without any pharyngocutaneous fistula. Patient tolerated Ryles tube feed well and discharge on day 14 after the tumour board discussion and was planned for adjuvant CTRT. On follow up period patient is tolerating oral fed, but still on Ryles tube.

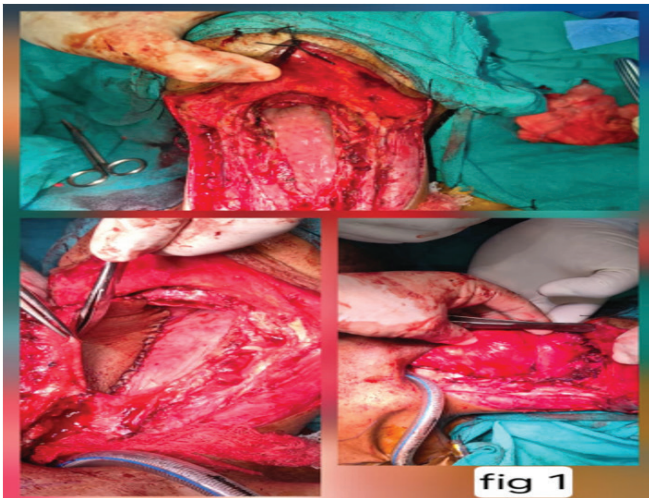


Fig. 1: first picture showing the remnant pharyngeal mucosa, in the second picture showing the PPMC flap margin was stitched with the pharyngeal mucosal margin, 3rd picture shows the neck after closure of the wound with the flap muscle being stitched with the neck muscles all around.

Case 2: 48-years-old male, known case of carcinoma larynx presented to us with difficulty in breathing for 15 days. He was previously diagnosed as carcinoma larynx 6 years back when he received CTRT, after that patient was asymptomatic but after 4 years again diagnosed with recurrent carcinoma

larynx for which he again received CTRT, now after 1 year he presented to us with residual disease in the larynx. Patient first underwent tracheostomy since presented with stridor; on examination there was an ulcer proliferative growth involving bilateral true vocal cord. CECT scan of neck shows an irregular growth at the level of glottis without involvement of any other structure/cartilage. After all preoperative evaluation and tumour board discussion patient was planned for Salvage total laryngectomy, partial pharyngectomy. After surgical removal of the disease primary closure of the pharynx was done in layers. PMMF flap harvested and is used as a patch over the neo pharynx to prevent Pharyngocutaneous fistula. First pharynx was closed in layers primarily. Then PMMF flap harvested which is a variant of PMMC flap where we sacrificed the skin over the PMMC flap and only the muscle and fascia was used for reconstruction. Flap was delivered to the neck through the tunnel under the skin and the muscle of the flap is stitched in the periphery with the remaining muscle in the neck (SCM), superiorly with the suprahyoid muscles, keeping the fascial layer of the flap towards the skin. post operative period was uneventful, wound healed without any complications. Patient tolerated oral feed comfortably after post op day 14. Patient was discharge in a stable condition after tumour board discussion and was started on oral Gefitinib 250 mg.

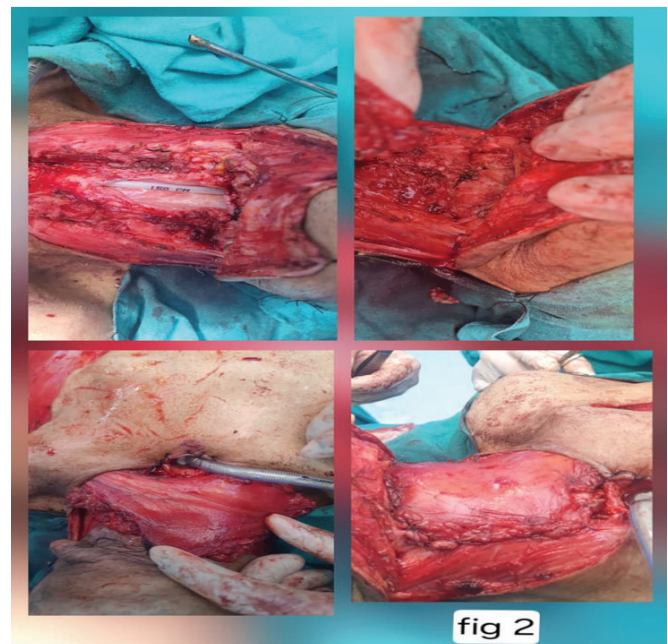


Fig. 2: First picture shows the pharyngeal mucosal defect post tumour excision. 2nd picture showing the primary closure of the pharynx. 3rd and 4th picture shows the PMMF flap being harvested and patch augmentation done over the pharynx.

Case 3: 67-years male, a known case of ca larynx post CTRT one and half years back presented to us with breathing difficulty for 3 months. Tracheostomy was performed since patient presented with stridor. On laryngoscopy examination there was an ulcer proliferative growth seen involving bilateral vocal cord and bilateral PFS. CECT scan of neck shows a

lesion involving glottis and supraglottis extending to bilateral PFS with involvement of thyroid cartilage. After tumour board discussion patient was planned for salvage laryngectomy. Patient underwent surgery but during the postoperative period 10 patient developed Pharyngocutaneous fistula, for which patient was first treated with conservative management which include tight pressure dressing over the wound and patient was started on Inj Glycopyrrolate, but after 2 days when dressing was done the fistula worsen clinically so patient was taken for emergency wound exploration. There was a fistula of 2 cm at the pharyngeal closure site. Wound debridement done. Pharyngeal wound was closed in layers. PMMF harvested and flap was used a patch augmentation over the wound. Post operative period following the exploration was uneventful. Patient wound healed without any complication. Patient was discharged after 2 weeks after tumour board discussion, and patient was put on oral metronomic chemotherapy.

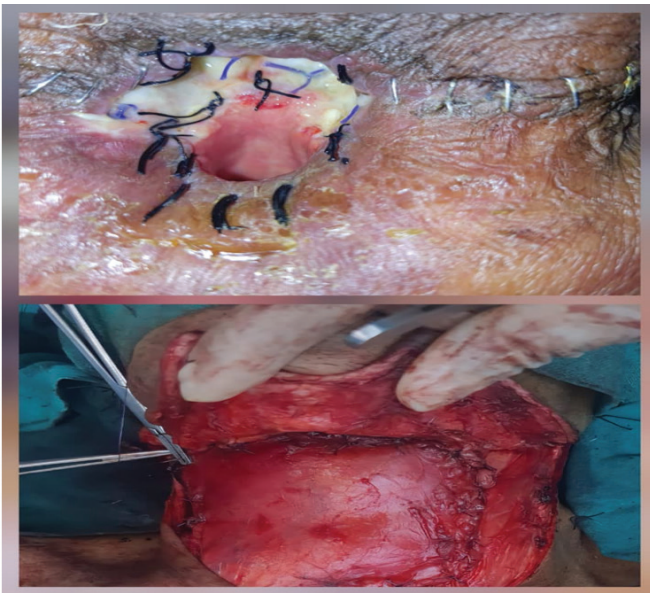


Fig. 3: first picture showing the Pharyngocutaneous fistula, 2nd picture showing the wound after wound debridement and PMMF patch augmentation.

DISCUSSION

The surgical management of advanced laryngeal carcinoma is mainly total laryngectomy with partial or near total / total pharyngectomy depending on extent of the disease. Complications post laryngectomy is very common with incidence of around 67%, and includes fistula, wound complications, dysphagia, bleeding, pharyngeal stenosis, and stomal stenosis.² Out of these complications one of the most troublesome complications is Pharyngocutaneous fistula with incidence ranges from 5-65%.⁴ Saki et al in their study they found incidence rate of 13% for Pharyngocutaneous fistula.⁵ Weinberger et al⁶ in their study classified the Pharyngocutaneous fistula depending on size, position, need for exploration surgery, other signs and involvement of carotid artery into 5 grades.

Grade 1: controlled fistula of <5 cm in diameter through the lateral neck drain without further breakdown and without changes in the clinical state. The stomal integrity is maintained without leakage. This is considered a safe fistula and it heals quickly by conservative measures.

Grade 2: Minor central dehiscence with stomal leakage; superior stomal integrity is maintained; the great vessels are not exposed. There may be a minor dehiscence <5 cm lateral to the stoma which may be preceded by signs of infection. The fistula is safe and is most likely to heal by conservative measures.

Grade 3: Central wound dehiscence, with complete superior stomal dehiscence from the superior skin flap, without great vessel exposure, but with copious salivary secretions. Although it is a safe fistula and conservative measures may suffice, revision surgery with a flap accelerates full healing.

Grade 4: Major central wound dehiscence with retraction of the superior skin flap, exposing a widely open neopharynx and subsequent contraction of the pharyngeal mucosal diameter. Although a safe fistula from the point of view of vascular rupture, flap reconstruction of the skin and pharyngeal remnants is required.

Grade 5: Wide breakdown, both centrally and laterally, with exposure of the great vessels and concomitant high risk of rupture. This is the classic unsafe fistula which requires urgent insertion of a flap for coverage of the vessels and subsequent fistula closure. Life-threatening haemorrhage may require additional intervention.

Pharyngocutaneous Fistula often resolves on its own with “spontaneous” healing rates between 80% and 90%. Conservative management of this condition involves meticulous local wound treatment, compressive dressing, antibiotics, and feeding by a nasogastric tube or parenteral nutrition for at least 1–2 weeks. The use of modified outside-in EndoVAC therapy is also described as a possible conservative treatment option for PCF. However, there is no clearcut consensus regarding the duration for which conservative management to be considered. And grade 3-5 fistula usually they require surgical management.⁹

Cesare et al⁹ also described that CTRT increased the risk of major wound complications like Pharyngocutaneous fistula because RT reduces tissue perfusion and oxygenation by obliterative endarteritis, hypoxia, impaired leukocyte migration and fibrosis, and negatively impacts on the healing capabilities of the pharynx. In the salvage settings they advised to use a pedicled (PF) or free flap (FF) for pharyngeal closure, with the inlay technique, to enhance the circumference of the pharynx, reduce tension on the suture lines.

Along the complication like Pharyngocutaneous fistula, the post-surgical defect presents a further challenge for the surgeon; an adequate reconstructive procedure should guarantee an early restoration of speech and swallowing functions.⁷ The ideal method for laryngopharyngeal reconstruction should have high success rate of tissue transfer, low donor site morbidity,

low fistula and stenosis rates, restoration of the ability to swallow, and tolerance of postoperative radiotherapy. PMMC flaps is considered as the workhorse flap because of a definite reliable vascularity and has got certain advantages like it can be tailored to suit the defect, the muscle pedicle of the flap protects the carotid against blow outs, less cumbersome and does not require the expertise of microvascular anastomosis and has less donor site morbidity.⁸ post operative rehabilitation with respect to swallowing and tolerance to radiotherapy is satisfactory in patients after PMMC flap pharyngoplasty.

Cesare et al also mentioned that pectoralis major myofascial flap (PMMF) as overlay reinforcement of the pharyngeal closure after primary TL, showing that it significantly reduces the risk of PCF, in particular in patients with low skeletal muscle mass (PCF rate decreased from 31% to 9.9%).

Like the other authors we also in our all the three cases used pectoralis muscle flap in the form of PMMC or PMMF. In the first case we used PMMC in the primary setting to repair the pharyngeal defect, in the 2nd case we used the PMMF as a patch augmentation (overlay technique) over the neopharynx and in the 3rd case we used the PMMF after the development of fistula to repair the fistula. And in all the three cases we found that post operatively the wound healed without any complication in the neck or in the donor site.

Conclusion – As laryngectomy is a very commonly performed surgery either as primary or salvage setting, we need to know about the pectoralis muscle flap and its different uses like as a patch pharyngoplasty to close the pharynx, or for augmentation of tissue to prevent Pharyngocutaneous fistula or to repair the Pharyngocutaneous fistula.so, It can be considered as the workhorse flap post laryngectomy.

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