

Clinical Evaluation of Pectoralis Major Myocutaneous Flap Following Pharyngo-laryngeal Cancer Surgery to Reconstruct Tissue Defects

Aaryan Kanwarinder Singh¹, Kanhaiya Nayak Bhagel¹, Bhanu Pratap Rana¹, Subhabrata Das²

¹Resident, Department of Surgery, Pacific Institute of Medical Sciences, Udaipur.

²Associate Professor, Department of Surgery, Pacific Institute of Medical Sciences, Udaipur.

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Corresponding author: Dr Subhabrata Das

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Abstract

Objective: To investigate the procedures and outcomes of pharyngolaryngeal cancer surgery using the pectoralis major myocutaneous flap.

Methodology: The surgical approach was based on pathologic conditions in 23 cases of patients with pharyngolaryngeal cancer, and the surgical flaws were fixed using a pectoralis major myocutaneous flap.

Results: Out of 23 patients, 1 had skin flap necrosis, 4 had pharyngeal fistulas, and 1 had hypopharyngealesophageal stenosis; aside from 1 pharyngeal fistula patient who passed away from infection-caused carotid artery rupture, the remaining patients all had normal swallowing function.

Conclusion: The pectoralis major myocutaneous flap has a dependable blood supply and sufficient tissue volume for repair. Applying these techniques appears to increase patient survival and postoperative quality of life.

Keywords: Cancer, Pharyngo laryngeal cancer, Myocutaneous flap, Pectoris major flap.

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Introduction

A pedicle flap technique called the pectoralis major myocutaneous flap (PMMF) is employed in reconstructive head and neck surgery. PMMF benefits include adequate blood supply, no need to relocate, high radiation tolerance, high survival rate, and straightforward operation. Because of the myocutaneous flap, PMMF has a wide range of transferability and can be used to repair the majority of head and neck tissue defects below the eyebrow arch. PMMF is not easily necrosed, and the safety of clinical application

is good. It can repair skin or mucosal defects as well as fill the gaps of larger tissue defects. The PMMF is commonly used to heal injuries in otolaryngology, head and neck surgery [1-3].

Methodology

25 instances (23 men and 2 women) of post-operative tissue defect repair and functional restoration were carried out with PMMF in department of Surgery. Due to inaccurate contact information, two patients were lost to

follow-up and were therefore disqualified from observation. The observation also covered the remaining patients. Their median age was 60.4 years, and their ages varied from 40 to 70.

According to the 2002 UICC, 23 patients with malignant throat tumours were staged. The Table 1 shows the clinical data.

Table 1: Displays the clinical data.

Diseases	Cases	Tumor grading				N grading			Repair body parts
		T1	T2	T3	T4	N1	N2	N3	
Tonsil root cancer	1	0	0	0	1	0	1	0	1 case of oropharyngeal mucosal defect; 2 cases of tongue root defect; 2 cases of neck skin defect; 10 cases of hypopharyngeal mucosal defect; 1 case of oesophageal entrance defect
Laryngeal cancer	2	0	1	1	0	0	0	2	
Hypopharynx	2	0	0	0	2	1	1	0	
Local recurrence of laryngeal	11	0	4	5	2	1	9	10	
Hypopharyngeal carcinoma	7	- - - - -							

A proper operation pathway was used to remove the primary lesion, and 4 cases of ipsilateral modified neck dissection and 14 cases of bilateral modified neck dissection were carried out. This was done in accordance with the location and size of the primary tumour. The flap's size and form were selected based on the real faulty tissue, and the distance between the donor site and the recipient zone was determined in accordance. The pectoralis major muscle was removed from the flap under the periosteum surface after the skin and subcutaneous tissue were sliced with the muscle exposed. The pectoralis major fascia and the dermis were sutured intermittently, and the blunt dissection was divided between the pectoralis major muscle fascia and the pectoralis minor muscle. The musculocutaneous flap was then turned up from the inside to the outside. The thoracic acromion—the acromion of the arteries and veins—was then seen or touched, the position of the pedicle was established, the flap was lifted, the pectoralis major and minor muscles were completely separated, the thoracic muscle supply of the thoracic and thoracic peak arteries was directly examined, and the pectoralis major muscle was cut along both sides of the vascular pedicle until the lower edge. The damaged area was subsequently

treated with PMMF, a subcutaneous tunnel was created, and the faulty tissue was stitched.

Results

22 of the 23 patients in this cohort had musculocutaneous flap recoveries, while one suffered musculocutaneous flap necrosis. Three incidences of pharyngeal fistula in 11 patients with pharyngeal mucosal abnormalities were healed after changing a medical procedure. Necrosis of the musculocutaneous flap in one case. This patient had diabetes, lung Wegener granuloma, and hypopharyngeal cancer with the tumour in the posterior pharyngeal wall. During the procedure, we repaired the posterior pharyngeal wall using a musculocutaneous flap. However, pharyngeal fistula developed 7 days after surgery, and carotid rupture and subsequent neck infection followed by musculocutaneous flap necrosis and death occurred half a year later. One patient had a hypopharyngeal esophageal stricture that was treated, two patients had musculocutaneous flap surgeries from the hypopharyngeal esophageal entrance pathway, one patient had a nasogastric tube removed, and one patient had normal swallowing function again. After surgery, 2 patients with tongue root cancer experienced a minor cough that went away after 3 and 6 months, respectively. Seven

examples of cervical skin defects were fixed using PMMF, all healed.

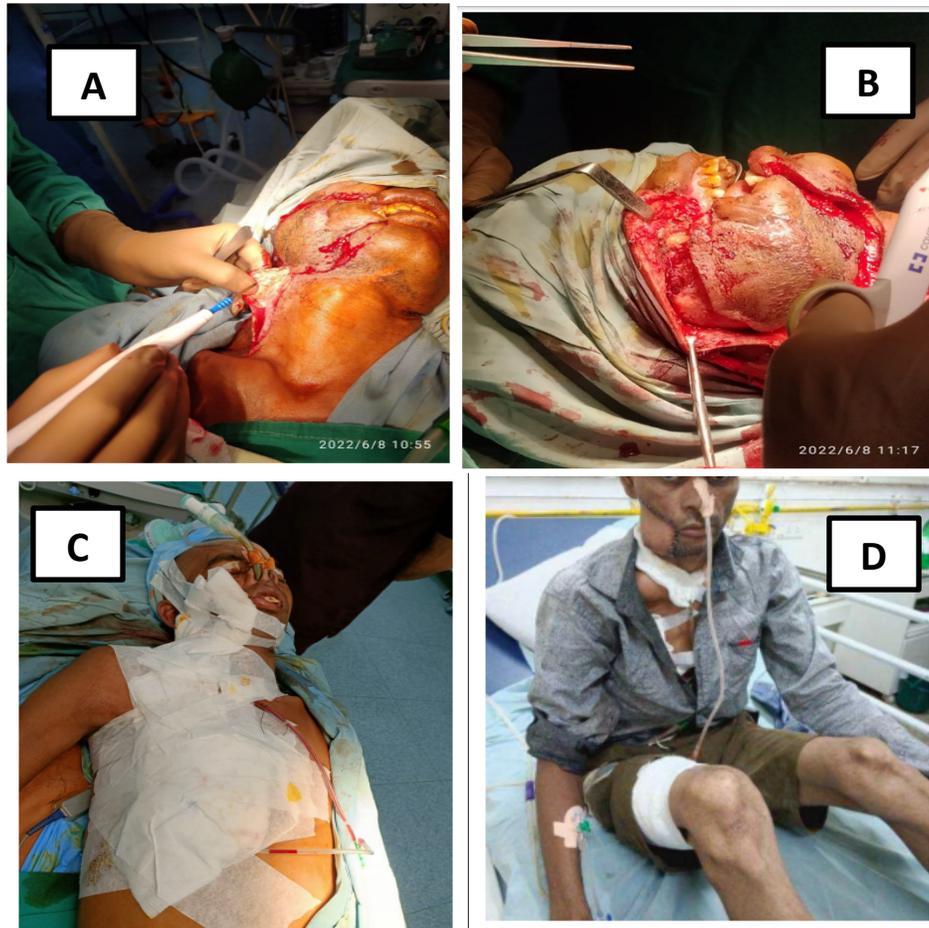


Figure 1: A & B are intraoperative pictures. C is Intra operative picture after completing surgery. D is post operative picture of Patient

The 23 patients were monitored until February 2022. One patient who had tonsillar carcinoma lived and is healthy. One of the two tongue root cancer patients died from a tumour recurrence, and the other patient recovered fully following surgery. The two cases of laryngeal carcinoma were monitored for 6 months, respectively. All patients survived. With regard to the 11 cases of hypopharyngeal cancer, 1 case was unreachable, 4 cases were fatal, 3 cases included the neck, and 1 case had a distant metastasis. According to our data, the three-year survival rate for hypopharyngeal

carcinoma is 5/9, and the five-year survival rate is 2/6 as from the follow up and records. In the seven cases of local recurrence of laryngeal and hypopharyngeal carcinoma, three cases had survived to this point after being monitored for 1, 2, and 3 years, respectively. The other four cases had been monitored for three years when they all passed away. Among all fatal instances, one perished from a carotid rupture brought on by a musculocutaneous flap, two perished from pulmonary stenosis, one from a local recurrence, three perished from systemic

failure, and two perished from distant metastases. (Fig 1 Shows pictures of operative and post operative procedures).

Discussion

Hueston and McConchie originally discussed the PMMF as a local flap for chest wall reconstruction in 1968 [4]. A composite musculoskeletal flap can be created using the PMMF, a multifunctional axial flap that can also carry a portion of the clavicle or ribs. As a result, it has a very broad range of applications. It is now understood to be the best donor site for replacing damaged head, neck, and oral tissues. After a salvage radical neck dissection, the PMMF is regarded as a "workhorse flap" for pharyngeal defect reconstruction and carotid axis protection. [5-10].

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However, it is frequently believed that the muscle pedicle's length is insufficient to correct the zygomatic or mandibular temporal region deficiency. Lumen stenosis, flap necrosis, and pharyngeal fistula are the three most frequent side effects following surgery of the pectoralis major myocutaneous flap. Malformations of the chest donorsite and malfunction of the upper limbs are also frequent. We enhanced the procedure for extracting skin flaps and performed analyses of variance on actual clinical situations.

Seven of the 23 patients had neck skin abnormalities repaired by PMMF, and all patients were healed in the initial stage. After the tumour was removed, there were significant tissue defects in the skin and subcutaneous tissue. Since the patient had undergone radiotherapy after the first postoperative procedure, the ability of the local tissue to mend was compromised. After being directly sutured, it is difficult to heal, and a pharyngeal fistula is quickly created. The PMMF can fill in the space created by the subcutaneous tissue defect and repair the skin

defect, increasing blood flow. The PMMF can fill the void created by the subcutaneous tissue defect and mend the skin defect, increasing blood flow. It lessens the effusion, safeguards the pharyngeal esophageal mucosa anastomosis, avoids incision infection, stops the development of pharyngeal fistula, and maintains the fullness of the neck as well. The PMMF is simpler to treat in the initial stages and has less problems.

It is simple to create a pharyngeal fistula when the PMMF treats mucosal abnormalities. Four incidences of pharyngeal fistula were found in the 11 patients who had mucosal defect correction. Due to the two separate tissues involved in the musculocutaneous flap—pharyngeal mucosa and skin—healing proceeds slowly, and a localised contracture around the flap develops. Infection results from the digestive fluid leaking through the mucosa.

We discovered that in order to prevent anastomotic stenosis when repairing the hypopharyngeal oesophagus with PMMF, it is required to stitch the esophageal mucosa first. In one patient, we made a longitudinal cut in the mucosa at the esophageal entrance and inserted the PMMF for an anastomosis. As a result, the swallowing function was recovered. Another patient received surgery using the PMMF technique to correct the hypopharynx. The patient needed to utilise a nasogastric tube because the oesophagus in the hypopharynx was restricted due to an esophageal defect. The PMMF contains a thick layer of tissue that can completely replace the gap left by the removal of the tongue root as well as provide enough coverage for the upper laryngeal mouth. This significantly lessens future post-meal coughing. There are two cases among this group of patients, as previously stated. Although these patients initially experienced a minor cough, after 3 months and 6 months, respectively, they both returned to normal [11].

The most serious issue with PMMF repair procedures is skin flap necrosis. The

musculocutaneous flap must have a healthy blood supply during the creation of the PMMF in order to avoid skin flap necrosis. According to Wang Tianqi *et al.*, the scabbard was more external and vertical than expected, and numerous chest and shoulder arteries of the chest muscle branch frequently connected with the shoulder. In order to retain more arterial branches and try to position the lateral thoracic artery, the pedicle of the PMMF should be correctly external when creating the PMMF. The sacral flaps and squeezing should be kept to a minimum during surgery because the pectoral muscle branch is still inside the vascular pedicle. In order to limit slippage between the flap and the muscle and prevent injury to the perforating vascular, the muscle fascia and the flap dermis should first be sutured numerous times. Second, to ensure that the musculocutaneous flap receives adequate blood supply, the flap should not be excessively broad and the subcutaneous tunnel should be sufficiently wide to avoid the vascular pedicle from being constricted. Last but not least, a negative pressure drainage tube needs to be inserted into the upper and lower fossae of the clavicle, respectively, and the negative pressure drainage needs to be kept at an efficient level. The goal is to avoid premature withdrawal, get rid of subcutaneous blood and effusion, and stop the pedicle from becoming necrotic from infection [6,12,14].

Due to the extensive usage of free flaps during the past 20 years, PMMF has been reduced to a supporting function in the reconstruction of head and neck abnormalities. Free skin flaps are seen to be the best option for the majority of significant head and neck abnormalities because of their greater adaptability, tissue matching, dependability, functional, and aesthetic advantages, as well as their low donor site morbidity. Free flaps cannot, however, totally take the place of PMMF as a one-stop remedy for head and neck reconstruction. For patients with primary or recurrent pharyngeal cancer following radiotherapy and chemotherapy, it has been observed that

PMMF has reliability and functional result improvements, and there are less serious side effects [15-22].

Conclusion

In short, the PMMF is extensively used to repair tissue damage following throat surgery due to its abundant muscle tissue and strong blood flow. It has a high rate of survival and is easy to use. It helps to increase patient survival rates, which raises the standard of care for patients. Patients with head and neck cancer who require large-volume soft-tissue flaps, need salvage repair, and are at high risk for free flaps can employ PMMF without danger.

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