

# Pectoralis Major Myocutaneous Flap Reconstruction in Head-and-Neck Malignancy – Experience from a Tertiary Care Center

D Amudhan<sup>1</sup>, K Kannan<sup>2</sup>

<sup>1</sup>Senior Assistant Professor, Department of Surgical Oncology, Government Thoothukudi Medical College, Thoothukudi, Tamil Nadu, India,  
<sup>2</sup>Senior Assistant Professor, Department of Plastic Surgery, Government Thoothukudi Medical College, Thoothukudi, Tamil Nadu, India

## Abstract

**Background:** The pectoralis major myocutaneous (PMMC) flap as a pedicle flap is still a reliable option to reconstruct the defects following major oncological resections of head-and-neck cancer. It is the workhorse in centers where the facilities for free tissue transfer are not available. Our aim is to assess the complications of PMMC flap reconstruction.

**Materials and Methods:** A retrospective analysis of records of 17 patients who underwent reconstruction with PMMC flap as a pedicle flap for head-and-neck malignancies from 2013 to 2019 in the Department of Surgical Oncology, Government Thoothukudi Medical College Hospital, Thoothukudi, was performed.

**Results:** Records of 17 patients who received PMMC flap were taken for analysis. Of those 17 patients, three were female. Of those 17 patients, 15 had oral cavity malignancy and 2 had malignant parotid tumors. PMMC was used to cover the mucosal defect in eight patients, skin defect in two patients, and both in seven patients as bipaddle flap. None of the patients had a total loss of flap, but one case of marginal necrosis and three cases of partial intraoral flap dehiscence were noted. Oral cavity defect accounts for 15 flaps and the remaining 2 were done to reconstruct the defect following resection of the malignant parotid tumor.

**Conclusion:** In centers without free tissue transfer facility, PMMC is still the gold standard flap in head-and-neck reconstruction. The morbidity is very minimal in experienced hands.

**Key words:** Head-and-neck cancer, Pectoralis major myocutaneous flap, Reconstruction

## INTRODUCTION

The pectoralis major myocutaneous (PMMC) flap has been considered as the versatile flap to reconstruct the defects following major oncological resections of head-and-neck malignancies since its inception by Ariyan.<sup>[1]</sup> The advantages of PMMC as a pedicle flap in head-and-neck reconstruction are due to its reliability, good vascularity, ease of harvest, closeness to defect, and bulk to cover exposed vessels in the neck, reduced operating time, and easy learning curve. Compared to free flaps, pedicle flaps significantly reduce

the cost and operating time. Hence, pedicle PMMC flap is still shining in the reconstructive armamentarium.

Complications such as seroma, flap dehiscence, and infection occurred in varying degrees in many series, but the total loss of flap is very rare.<sup>[2-6]</sup> Since these flaps are being used for major oncological resections, non-flap related complications can also occur in the post-operative period. Our aim is to assess the complications of PMMC flap reconstructions.

## MATERIALS AND METHODS

A retrospective analysis of case records of 17 patients who received PMMC flap in the Department of Surgical Oncology, Government Thoothukudi Medical College Hospital from 2013 to 2019 was performed. All surgeries were performed by a team of surgical oncologist and plastic surgeon. All patients were treated with curative intent after getting informed consent and are being followed up

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**Corresponding Author:** Dr. Amudhan, Department of Surgical Oncology, Government Thoothukudi Medical College, Thoothukudi, Tamil Nadu, India

regularly. The resection for the primary and the type of neck dissection is individualized.

### Surgical Technique

All major landmarks such as acromion, xiphoid process, and midclavicular point were marked first. Then, the course of the pedicle to PMMC flap was marked. For skin paddle, our flap design was such that the major part of the paddle will be located inferomedial to the nipple. The nipple will be excluded from the paddle as far as possible. If there was a necessity to extend the skin paddle inferiorly beyond muscle, rectus sheath will be included in the flap to minimize flap necrosis. After marking the skin paddle, the incision was deepened down to the fascia of pectoralis major muscle. Since the skin paddle of PMMC flap is supplied by perforating vessels from the muscle through the intervening fat and breast tissue, we routinely take tacking stitches between skin and muscle to avoid shearing of skin paddle. Then, flap will be elevated in the standard method.

Throughout the procedure, extreme care was taken to avoid injury to the pedicle. Our flap will be designed such that in future, deltopectoral flap (DP flap) can be used at any point of time. In the case of combined PMMC and DP flap, DP flap will be elevated first followed by PMMC flap. After the elevation of PMMC flap, it is generally passed into the neck superficial to the clavicle through a wide subcutaneous tunnel. The tunnel was made large enough to permit easy delivery of the flap into the neck without strangulating the vascular pedicle. The flap inset was done as per requirement. The neck wound was closed primarily and the donor area was either closed primarily or reconstructed with split skin graft (SSG). We always use suction drain after the closure of the neck wound and in the donor area if that donor area was closed primarily. Postoperatively, the positioning of the patient was given due importance in a way that it will not produce tension in the flap. Whenever we do hemimandibulectomy in composite resection, we routinely do tracheostomy after reconstruction.

All patients were given proper adjuvant therapy depending on our institutional protocol. Patients were being followed up monthly in the 1<sup>st</sup> year, 2 monthly in the 2<sup>nd</sup> year, 3 monthly in the 3<sup>rd</sup> year, 6 monthly for the 4<sup>th</sup> and 5<sup>th</sup> years, and yearly thereafter as per our department protocol. Follow-up included clinical examination at each visit, yearly chest X-ray, and other investigations as indicated.

## RESULTS

Records of 17 patients who received PMMC flap were taken for analysis. Of those 17 patients, 3 were female. Of those 17 patients, 15 had oral cavity malignancy and 2 had malignant parotid tumors. PMMC was used to cover the

mucosal defect in eight patients, skin defect in two patients, and both in seven patients as bipaddle flap. None of the patients had a total loss of flap, but one case of marginal necrosis and three cases of partial intraoral flap dehiscence were noted. Oral cavity defect accounts for 15 flaps and the remaining 2 were done to reconstruct the defect following resection of the malignant parotid tumor. Regarding the site, cheek lesion tops the list [Figure 1].

All 15 patients with oral cavity malignancy underwent composite resection. Except for one, hemimandibulectomy was done for the remaining 14 patients. One patient underwent marginal mandibulectomy and was then reconstructed with PMMC as bipaddle flap. Bone reconstruction was not done in our patients. The bulk of the PMMC flap was found to be excellent in filling the defect and covering the exposed neck vessels. Two patients in our series had malignant parotid tumors with significant amount of skin involvement. They required total conservative parotidectomy along with the removal of significant amount of skin. The defect following resection was then reconstructed with PMMC as a single paddle.

Type of flap, either PMMC alone or in combination with other flaps, is decided depending on the defect. In the case of PMMC, it was designed either as a single paddle or bipaddle depending on site and extent of the defect. In our series, PMMC was used as a single paddle in 10 cases, out of which one patient received DP flap in addition to PMMC flap. PMMC was done as bipaddle flap in seven patients. Complications were broken down into flap related and donor site related. We had one patient with marginal necrosis of flap and three patients with partial intraoral flap dehiscence. Intraoral flap dehiscence was noted in two female patients and one male patient. However, none required revision surgery and were managed conservatively. For the donor area, 4 patients received SSG and the remaining 13 patients were managed with primary closure. In the donor site, we had partial graft loss in two cases out of the four patients who received SSG in the donor area. Seroma occurred in one patient and wound infection in one patient [Figure 2].

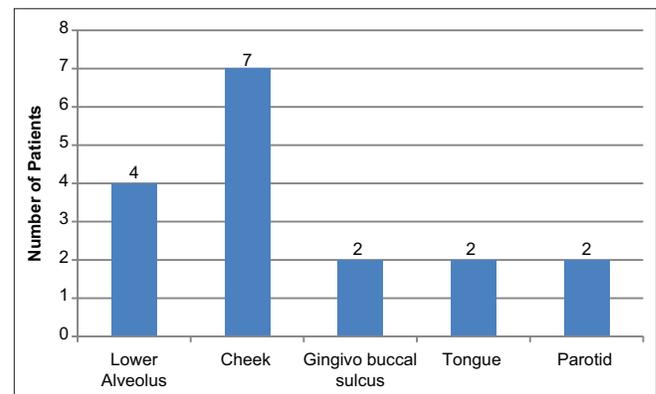


Figure 1: Site of disease reconstructed

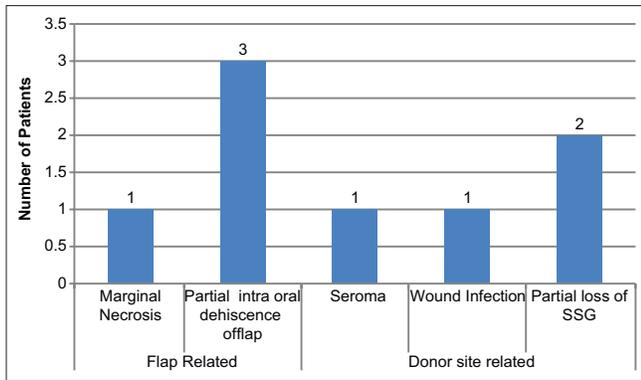


Figure 2: Distribution of complications

## DISCUSSION

Reconstruction of post-surgical defects in head-and-neck cancer brings a significant surgical challenge. Microvascular free flaps are considered as the first-line reconstructive option in this current era of technological advancement based on the esthetic advantage. However, the limitations in the free flap technique are increased operating time, high cost, expertise in the field of microvascular reconstruction, and higher anesthetic risk in patients with multiple comorbid conditions. On the other hand, pedicle flap has the advantage of overcoming almost all the limitations mentioned above. PMMC is the gold standard flap in head-and-neck reconstruction in developing countries where microvascular reconstruction facility is not available.

PMMC flap is based on the pectoral branch of the thoracoacromial artery. The disadvantage of using PMMC in the male patient is the hair growth in the oral cavity, but in the long run, this problem will be spontaneously resolved following mucosalization of the flap. In females, due to the bulkiness of flap, there may be a slight increase in complications. In our series, two of the three female patients developed intraoral flap dehiscence, but only one out of 14 male patients had flap dehiscence.

Kroll *et al.* have described in their series that the complication rates after PMMC flap reconstruction in female patients are greater.<sup>[7]</sup> This may be due to the interposition of breast

tissue between the muscle and the skin paddle. However, in a series by Jena *et al.*, they described that complications following PMMC flap in female patients were relatively lower when compared with that reported in other series. Statistical analysis to compare complication rates between men and women was not performed in their series.<sup>[8]</sup>

Total loss of PMMC flap was not found in many series.<sup>[3,4]</sup> In our series also, we have not encountered the total loss of flap. In general, the complications of PMMC flap reconstruction are not worrisome.

## CONCLUSION

PMMC flap still remains as a valuable reconstructive option in the head-and-neck malignancies. By following proper anatomical landmarks and basic principles of reconstruction, the chance of flap necrosis is negligible. In places, where free tissue transfer facilities are not available, the value of PMMC flap is unquestionable. With reliability, ease of harvest, low morbidity, and reduced operating time, PMMC is still a workhorse.

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