Pectoralis Major Myocutaneous Flap in Head and Neck Reconstruction: An institute Experience in 200 Consecutive Cases

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Abstract: Introduction : Reconstruction of head and neck defects is a challenging task. That is very important to restore form and function of appearance, speech, swallowing. In 200 patients we have analyzed different aspects following soft tissue reconstruction in respect to reliability of flap versus restoration of form and function. Methods: We retrospectively analyzed 200 patients that received Pectoralis Major Myocutaneous flap (PMMC) as a form of reconstruction, from 2011 to 2018, performed at GCS Medical College and Hospital, Ahmedabad. The total of 200 (n=200) PMMC flap reconstructions were performed. Results: 200 patients were reviewed for study. Most tumors were advanced (T3 or T4a) lesion. 198 reconstructions were done as a primary procedure, and 2 were salvage procedure. PMMC flap was used to cover only mucosal defect in 154 patients, skin and mucosal in 46 patients. Flap related complications were classified. None of the patients had total flap necrosis. 20 patients had infections which resolved by conservative management. Minor complications and donor site complications included fistulas (that were managed conservatively); wound dehiscence (not requiring additional surgery other than resuturing), local infections, seromas, and hematomas. Conclusion: PMMC flap is a workhourse flap with excellent reach to the oral cavity and face and neck region. With limited expertise and resources it is still a primary choice. It lacks in the bulk available after a time period. [Shah G Natl J Integr Res Med, 2019; 10(4):66-69]

Key Words: Reconstruction, Head and Neck Surgery, PMMC flap

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Introduction: Oral cancers are one of the most common cancers in Indian population. The primary treatment for head neck cancers is surgery. Even though microvascular free flaps are considered as gold standard it requires resources and training. popularity of microvascular flaps are increasing due to their availability of complex and composite tissue transfer i.e., bone, muscle, nerve, skin, mucosa. Reliability, versatility, and ease of harvest have been the hallmarks of the PMMC flap[1]. Established uses include reconstruction of oral cavity and oropharyngeal defects, lateral mandibular defects, skull base and temporal bone defects, orbitomaxillary defects, and cutaneous defects of the cheek, neck, and chin[2].

Due to easy learning curve and robust vascularity PMMC flap is workhorse at many centers[3]. PMMC flap may be used for variety of situations for orofacial reconstruction from marginal mandibulectomy to extensive bite resections. The first use of PMMC was described way back in 1947 for cardiothoracic defects. It is still an unmatched option even after 40 yrs of its description by Arian et al. Patients with advanced head neck malignancy, systemically compromised patients and post radiation patients this holds principle mode of reconstruction[4]. At our center head and neck malignancy constitute a major disease bulk in adult population with most patients reporting in advanced stage. We present a retrospective analysis of 200 patients that received PMMC flap as a mode of reconstruction from year 2011 to 2018.

Patients and Method : We retrospectively analyzed patients who have undergone resection surgery for head neck cancer and reconstructed with PMMC flap. All these patients were operated at GCS medical college and hospital from 2011 to 2018.

All patients were subjected to routine investigations for general anesthesia. Informed consent was taken from all patients for future necessity for scientific research. Out of all patients that were operated; 200 patient's follow-up data could be traced.

Total 200 patients who underwent PMMC reconstruction were incorporated in the study (n=200). Data were analyzed with regard to clinical representation, tumor stage, postoperative complication rates. Ipsilateral PMMC flap was used for reconstruction in 198 patients, in 2 patients contra lateral PMMC was harvested.

Technique of harvesting PMMC: The surface marking of the vascular pedicle were made by drawing midline and paramedian line. Then

another line is made from the ipsilateral acromion to the xiphisternum and other line vertically from the midpoint of clavicle to intersect first line perpendicularly. The skin paddle was designed so that it comes along course of descending branch of thoracoacromial artery. During the elevation the care is taken not to undercut the skin paddle but rather to bevel it, so as to include as many perforators as possible.

The skin paddle was sutured to the underlying pectoralis muscle to minimize the risk of shearing injury to myocutaneous perforators. The plane of dissection between pectoralis minor and major muscle with its vascular pedicle was found by dissecting the lateral border of pectoralis major muscle.

Once in the plane we could easily free the pectoralis major, with its vascular pedicle from the pectoralis minor muscle. The pectoralis major muscle was divided lateral to the pedicle while keeping the pedicle in view, thereby freeing it from the humerus. A portion of clavicular fibers was divided to include only neurovascular pedicel and its adventitia, eliminating the supraclavicular hump. The flap was now passed into the neck through subcutaneous tunnel created superficial to the clavicle. The tunnel was made wide enough to permit easy delivery of the flap into the neck without compression. Suturing of the flap was done with 3-0 vicryl interrupted sutures, suction drains were placed. The donor site was always closed primarily which may require extensive mobilization of fasciocutaneous flaps.

Results : We reviewed retrospectively 200 patients. These patients were classified as per TNM stage of the disease. Most tumors were advanced (T3 or T4a) lesion.

Figure 1 shows that out of 200 patients 130 patients were classified in stage IV, 40 patients were in stage III, and 30 patients were in stage I or II. Need for PMMC reconstruction is mostly needed for advanced cases. Figure 2 shows that in majority of patients (198), same side of muscle was harvested; 2 patients needed contra-lateral flap due to unavailability of same side muscle or previous history of surgery. 198 reconstructions were done as a primary procedure, and 2 were salvage procedure. Figure 3 shows separate list of complications associated with number of patients.

Figure 1: Classification based on stage I-IV

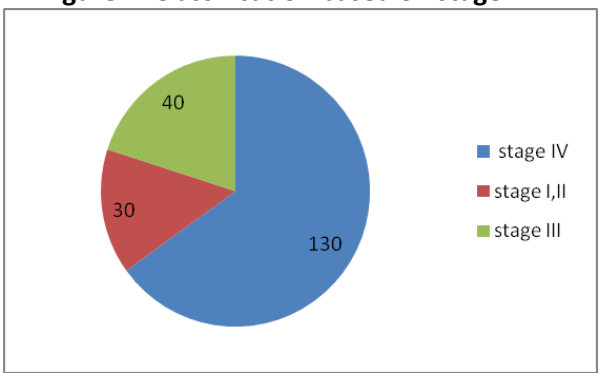

Figure 2: Devision of Case as per flap

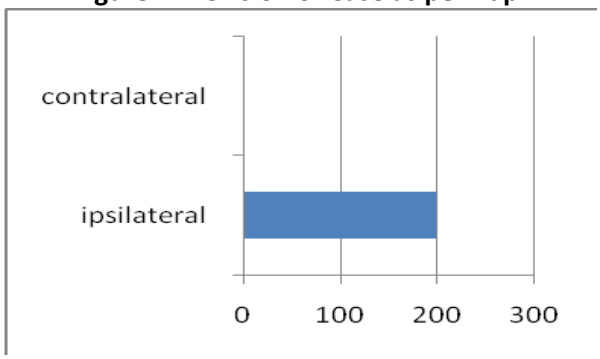

Figure 3: List of complications

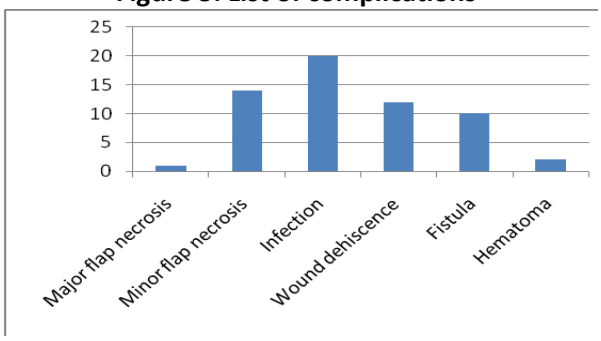

Table 1 shows type of reconstruction and its relation with stages. PMMC flap was used to cover only mucosal defects in 154 patients and mucosal and skin defects in 46 patients.

Type of reconstruction	Stage I,II	Stage III	Stage IV	Total
Single paddle mucosa or skin	30	40	84	154
Bipaddle mucosa and skin			46	46

Discussion : PMMC flap is the important tool in armamentarium of head neck surgeon specially where there is high load and limited resources[5]. The flap has short learning curve[6]. The reliability of the pedicled flaps is far better than free flaps. Single team can work so logistic issues are also solved. There is no need to change position of the patient. For salvage procedures and following free flap failure pedicled flaps are the choice of

reconstruction. In patients with history of radiation therapy or chemotherapy due to unreliable recipient vessels pedicled flaps is most reliable option[5,7]. Patients unable to sustain long surgery also makes them suitable candidate for pedicled flaps. In patients with inadequate recipient vessels and less feasibility of microvascular surgery pedicled flaps are the first choice. Pedicled flaps are used in combination with free flaps to reconstruct complex defects where tissue deficit is greater[7,8].

PMMC flap has comparatively less complications rates compared to other flaps due to constant anatomical supply and better arc of rotation. The available literature on PMMC flap showed varying range and rate of complications. That varies from 17 to 63%[9,10,11,12]. In our series complication rate of 20% is observed with 6% occurrence with minor flap necrosis. In our series, we did not observe total flap necrosis or major flap loss; which may be contributed to good soft tissue handling. Our results are comparable to those in the literature. The major advantage of PMMC flap is survival. Even in hands of experienced microvascular surgeon, flap success is never 100%. Free flaps follow all or none law most of the times. Failure shall necessitate further surgical intervention, psychological and economical trauma to the patient.

The factors contributing to flap loss may be: Use of electrocautery versus knife, preservation versus removal of clavicular attachment of pectoralis major, planning of random portion of skin paddle out of the muscle, inclusion of rectus sheath[8,13]. Each one of them has advantages and disadvantages. Good electrocautery and lesser time contact with the tissues will decrease heat production and may give similar results. Preservation of clavicular head will give hump over the clavicle but will have less chances of pedicle torsion. Random portion of flap is designed should be raised with ractus sheath. Rikimaru et al.[14], pointed out that positioning the skin paddle just medial to the nipple along 4th 5th and 6th intercostals spaces will encompass perforators arising from intercostals branches of internal thorasic artery. As main flow through internal thorasic artery is interrupted after elevating flap thus totally axial pattern flap may be raised by following this anatomic direction. Below the 7th rib blood supply comes from cataneous branches of superior epigastric artery. So, when portion of distal skin is included that becomes axial pattern flap with random distal paddle.

The pitfall described by Cunha Gomeset al[15,16]., relates to the lateral pectoral nerve. Sometimes it runs above or in close relation with the pectoral pedicle. After raising the flap it may taut and may strangulate the pedicle if not sacrificed. We divide this nerve in most of the cases so this phenomenon is not observed in our cases.

In our series hematoma developed in 2 patients. On exploration major bleeders could not be identified. These patients were on antiplatelete drugs before surgery and it was stopped 72 hours prior surgery. Fistula was seen in 10 patients. 2 of them needed resuturing and rests were managed by conservative method. The most difficult area to clean is anterior tripointer; that area is difficult to access and leads to salivary stagnation. Patients with poor oral hygiene are potential candidates. In patients that have undergone marginal mandibulectomy and PMMC; extra care was taken so that vascular compromise does not occur.

Conclusion: There is no suitable alternative to PMMC lap if we compare versatility, easy learning curve and consistent design of pedicle. In our experience, we have observed minimal complication rate with no total flap necrosis. Free flaps are the first choice for many patients at our center still we recommend PMMC as a first choice in large number of patients considering medical complications, bad quality of vessels. It is the workhourse flap with limited resources and heavy patient load for head and neck reconstruction.

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