

Short Communications

Simultaneous reconstruction of large skin and mucosal defect following head and neck surgery with a single skin paddle pectoralis major myocutaneous flap

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Abstract

The pectoralis major myocutaneous (PMMC) flap is commonly used for head and neck reconstruction especially in impoverished nations. PMMC is a sturdy pedicled flap with relatively fewer complications, the learning curve is short and no specialized training in microvascular surgery is needed in order to use this flap. In a defect that requires a large skin and mucosal lining the authors routinely use either a bi-paddle PMMC or a combination of PMMC (for the mucosal lining) and a delto-pectoral flap (for the skin defect). It is indisputable that free tissue transfer is a better way of reconstruction for the majority of most such defects. Unfortunately, not all patients can be offered this form of reconstruction due to the cost, time, expertise and infrastructural constraints in high volume centres such as ours. Bi-paddling of PMMC is hazardous in obese males and most female patients. In such patients the skin defect is reconstructed usually by the delto-pectoral (DP) flap but this, for obvious reasons, is less welcomed by the patients. The authors suggest a technique wherein mucosal lining is created by the myofascial lining (inner surface) of the flap and the skin defect is reconstructed by the skin paddle of the single paddle PMMC. It should be considered wherever a DP flap is unacceptable, or bi-paddling or free tissue transfer is not possible.

Key words: Surgical Flaps; Pectoralis Muscle; Head and Neck Neoplasms

Introduction

The pectoralis major myocutaneous (PMMC) flap is commonly used for head and neck reconstruction in impoverished nations. This is a sturdy pedicled flap that results in relatively fewer complications. The learning curve is small and therefore no specialized training in microvascular surgery is needed. The pectoralis major flap is based on the pectoral branch of the thoraco-acromial artery and its associated veins. This vessel does not enter the muscle immediately but runs in a downward and medial direction over its deep surface. Along its course it gives off several branches that enter the muscle. The lateral thoracic vessels also contribute to the blood supply of the muscle but these need to be divided when raising the flap for head and neck reconstruction. The skin paddle over the pectoral muscle is usually marked medially and a little below the nipple in males but, if required, the skin paddle may safely extend 2–3 cm beyond the lower edge of the pectoralis major muscle.

This flap alone or in conjunction with other flaps (mostly delto-pectoral flaps) is commonly utilized by us in this hospital for adequate reconstruction in advanced oral cancer patients with large skin and mucosal loss. It is indisputable that free tissue transfer is a better way of

reconstruction in most of these cancer cases. Unfortunately, not all patients in the authors' centre can be offered this form of reconstruction due to the cost, time, expertise and infrastructural constraints. Despite the advantages mentioned, the PMMC flap has its own limitations i.e. bulk of muscle, restricted arc of rotation. In addition, it is not suitable for complex reconstruction, it is technically difficult in females and may cause shoulder dysfunction.

A prospective study of PMMC flaps in the authors' centre reported that nearly one quarter of patients developed varying degrees of flap necrosis, of which only three per cent had total flap loss. Flap necrosis was significantly lower in the purely myocutaneous flaps vis-à-vis the bipedicled and osteo-myocutaneous flaps. Female gender, primary tongue cancer, subtotal or total glossectomy, bipedicled flaps, prior chemotherapy/radiotherapy, and diabetes emerged as a significant factor for flap necrosis on multivariate analysis.¹

The skin paddle of a PMMC flap is supplied by the perforating vessels from the muscle that traverse through the intervening fat and breast tissue. A bi-paddle PMMC requires division of the skin and subcutaneous tissue (up to the muscle) in order to create two skin paddles. These

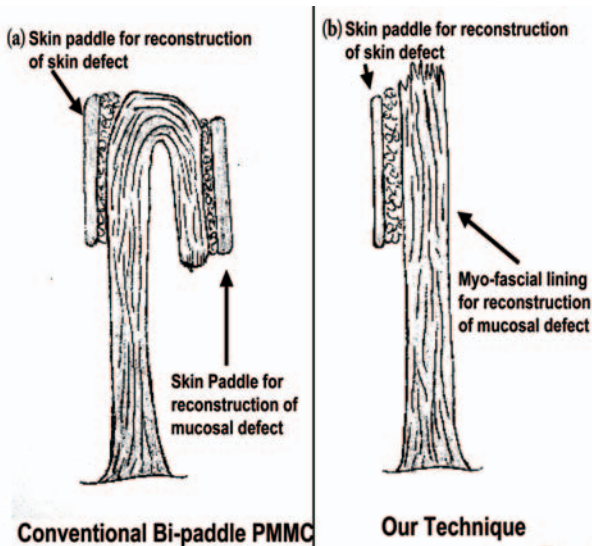


FIG. 1

The sketch marked 'A' schematically shows the bi-paddling of PMMC. This allows the mucosal and skin defects to be reconstructed with the same flap. The sketch marked 'B' shows a standard PMMC flap where the skin pedicle is used for the skin defect and mucosal defect is reconstructed with the inner surface of the muscle alone.

two paddles are separately utilized for skin and mucosal defects respectively at same sitting (Figure 1). The bi-paddle flap has a higher chance of flap related morbidity than the single paddle flap.^{1,2,3} Although possible in average Indian males, bi-paddling of the PMMC flap is hazardous in obese males and most female patients due to the thick fat and breast tissue underlying the skin paddle. A single paddle PMMC is feasible even in obese males and most females with moderately sized breasts. In such patients the skin defect is reconstructed usually by a delto-pectoral flap in our hospital. The delto-pectoral flap is an axial flap which is less welcomed by the patient because it requires two surgeries, it is socially unacceptable (the patient has to live with a skin bridge for three weeks), restricts head movement, and it causes a scar in the infra-clavicular area,

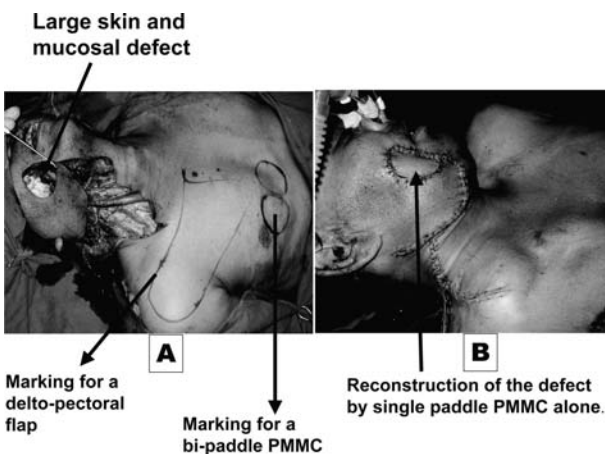


FIG. 2

'A' shows a large skin and mucosal defect following a composite resection. Free flap could not be offered, bi-paddling of PMMC was not possible and the patient had refused a delto-pectoral flap for reconstruction. 'B' shows how a single paddle PMMC flap was utilized for adequate reconstruction of this defect.

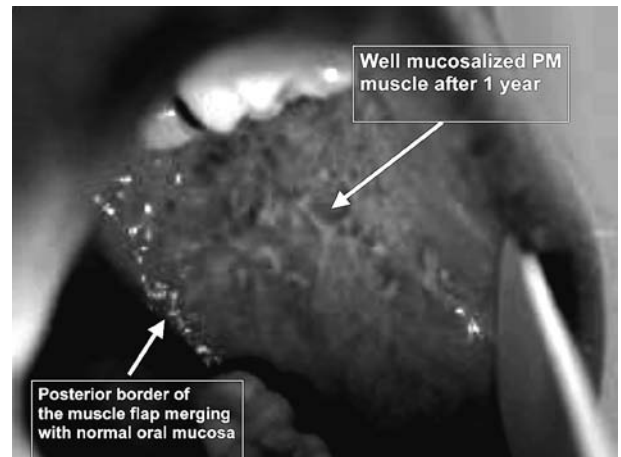


FIG. 3

Intra-oral photograph of a well mucosalized pectoralis major myocutaneous flap. The mucosal defect in this patient was reconstructed by the myofascial part of the flap. (PM = pectoralis major.)

and the adjuvant treatment by radiation therapy may be delayed in some patients.

In a situation where there is extensive loss of the skin, as well the mucosa, following oral, oropharyngeal, laryngeal and hypopharyngeal cancer, the best way to reconstruct this defect is by free tissue transfer. In case free tissue transfer is not possible, there are two options – PMMC for the mucosal defect and a DP flap or a bi-paddle PMMC for the skin defect. DP is usually unacceptable to both surgeons and patients. A bi-paddle PMMC is preferred because it is a one time procedure that allows early recovery, early discharge from hospital and timely institution of adjuvant treatment. The bi-paddling is hazardous in females and obese males.^{1,2,3} In addition, bi-paddling can end up with unacceptable bulk at the recipient site. Bi-paddling may not be possible if the defect is too big because there is a limit to the size of the skin paddle over the muscle. The authors suggest a technique where a single paddle PMMC alone can be used to reconstruct the mucosal as well as the skin defect. The skin defect is reconstructed with the skin pedicle and the mucosal defect is reconstructed by the inner surface i.e. the myofascial layer of the flap (Figure 1).

Method

The skin paddle is marked according to the size of the skin defect alone. Once the skin paddle over the pectoralis major muscle is marked, a line is drawn joining the outer edge of the skin flap extending to the apex of the anterior axillary skin fold or mid-clavicular point or a sub-mammary crease⁴ to elevate the flap (Figure 2).

The surgeon cuts along the marked incision until the pectoralis major muscle fibres are seen. The marked skin paddle is also incised. A few interrupted sutures are taken between the dermis of the skin paddle and the superficial fibres of the pectoralis major muscle to prevent shearing of the fine feeder vessels.

The skin flap is raised to expose the entire pectoralis major muscle leaving the skin paddle on the muscle. Muscle is divided on either side of the vessel with extreme caution, to avoid any vascular injury, and the flap is raised in the conventional way.

The mucosal margin is stitched to the free edge of the muscle and wherever free edge of the muscle is not available, mucosa should be stitched to the superficial muscle fibres of the flap.

The flap is pulled into the neck and rotated in such a way that the skin paddle faces outwards. Ensuring that there is no kinking or compression of the vascular bundle, the skin paddle of the PMMC is stitched into the cutaneous defect. (Figure 2)

Vacuum drains are put in place, the breast is repositioned and the skin is closed with a few interrupted subcuticular approximating sutures.

These patients require active jaw physiotherapy from the first post-operative day to avoid trismus.

- **Pectoralis major myocutaneous flaps are commonly used for head and neck reconstruction especially in developing countries. These flaps may be combined with a delto-pectoral flap in order to close skin defects**
- **Unfortunately not all patients are either suitable for this combined treatment or due to constraints of cost and time can be offered it**
- **The authors propose a simplified technique which provides both skin and mucosal lining from a single paddle pectoralis major myocutaneous flap**

Conclusion

The technique described offers similar cosmetic advantages to the DP flap (Figure 3). It is a single stage procedure that allows for early discharge, it is less prone to complications, less cumbersome for the patients and does

not delay the adjuvant treatment. It should be considered wherever a DP flap is unacceptable, and bi-paddling or free tissue transfer is not possible.

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Dr P Chaturvedi takes responsibility for the integrity of the content of the paper.

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