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Preservation of Aesthetics of Breast in Pectoralis Major Myocutaneous Flap Donor Site in Females

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Abstract

Background and Objectives In females, raising a pectoralis major myocutaneous flap is challenging and primary closure of flap donor site causes breast deformity with medial displacement of nipple areola complex. To avoid this distortion, a new method of donor site closure is devised.

Methods A parasternal skin paddle which has better vascularity is planned while doing a pectoralis major myocutaneous flap in females and a lateral flap planned along the lateral breast curve is used to cover the donor site. The lateral flap donor site is primarily closed. This prevents medial displacement of nipple areola complex.

Results A total of 47 patients underwent donor site flap closure technique. Minor complications in form of marginal necrosis near the tip of the flap were observed in 10.6 % patients. The donor breast of all these PMMC flaps had good contour and aesthetic positioning of nipple areola complex.

Conclusion Donor site morbidity with respect to breast distortion has not been studied so far in case of females so our study stands unique in this aspect. Using this technique of planning PMMC in females ensures a skin paddle of better vascularity and restores the breast aesthetics.

Keywords Bipaddled PMMC flap · Oral cancer · Buccal mucosa cancer · Reconstruction · PMMC in females

Introduction

Pectoralis major myocutaneous flap (PMMC) has been the work horse in head and neck reconstruction. Even with the world wide use of free flaps for head and neck reconstruction, PMMC is often resorted to due to time, cost and infrastructural constraints. It has the advantage of constant vascular anatomy, adequate reach to oro-pharyngeal defects, technical ease, less time consuming, and provides muscle cover to exposed major vessels in neck after neck dissection [1, 2]. It still holds the position of “work-horse” in head and neck reconstruction in developing countries and in selected complicated cases [3–5].

In case of females, the skin paddle needs to be specially designed to make it more reliable and the presence of breast in the flap donor site makes the flap bulky. The primary closure of the donor site distorts the breast leading to donor site morbidity.

To improve the reliability of the flap, a parasternal skin paddle is planned and to overcome the distortion in the breast, the donor site is closed with another flap elevated from lateral aspect of breast.

Materials and Methods

All female patients who underwent excision of malignancy of oral cavity with segmental mandibulectomy and modified radical neck dissection and in whom reconstruction with pectoralis major myocutaneous flap is planned were taken up for study (Table 1). Informed consent was obtained from all patients before the surgery. The ethical clearance for the

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Table 1 Distribution of the patients with respect of their diagnosis

Diagnosis ^a	No. of patients
Extensive buccal mucosa SCC	16
Buccal mucosa SCC with skin involvement	12
Buccal mucosa SCC with lower gingivobuccal sulcus and lower alveolar involvement	10
Lower alveolus SCC with skin involvement	09

SCC squamous cell carcinoma

^a All patients had trismus

study was taken by Rajiv Gandhi Cancer Institute and Research Centre Institutional Review Board (IRB).

The skin paddle is planned in the parasternal area [6] as low as possible to enable its reach to the intra-oral defect. This paddle has the advantage of good blood supply and is less bulky [7, 8]. The average size of the used in the present study has been larger (mean size—6 cm × 10 cm) than commonly used as all were advanced cases sometimes requiring double paddles for both lining and cover.

The incision over the breast is planned around the nipple areola complex in such a way that it follows the Wise pattern (W) reduction mammoplasty. The medial segment of the 'W' includes myocutaneous element of the flap and the lateral segment is the one which will be the flap to cover the donor site defect (Figs. 1, 2). While elevating the flap, the myocutaneous element can overlie the distal most pectoralis major muscle fibres but the muscle paddle serving as its pedicle should include third and fourth intercostal perforators [7]. This means that the arborisation of the vessels inside the muscle paddle has intact communicating arch of vessels from the main pedicle so as to keep the most distal of the muscle and myocutaneous segment well vascularised. However it does

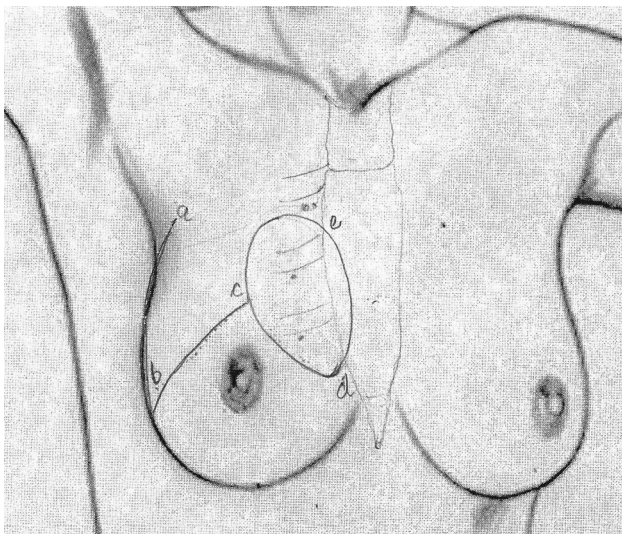


Fig. 1 Parasternal skin paddle of PMMC flap (*cde*) planned over 3rd and 4th intercostal perforators and lateral fasciocutaneous breast flap (*abc*) based on 2nd intercostal perforator



Fig. 2 Planning of flap and breast donor site incision

not imply that the skin paddle has to overlie the 3rd and 4th intercostals perforators always. The reach of the flap usually is not an issue because the thickness of the breast tissue in the myocutaneous element adds to the length of the pedicle.

The subcutaneous tunnel is made over the clavicle for the flap to reach the neck, preserving the supply of second intercostal perforator. The flap that is used to cover the donor defect is based on this perforator and extends along the lateral curve of the breast.

The PMMC flap is raised and is passed into the defect via the tunnel over the clavicle. The lateral flap is transposed into the medial defect to close the donor site (Fig. 3). The lateral flap donor site is closed primarily and the suture line falls into the natural lateral breast crease.

The advantage of this type of closure prevents medial displacement of the nipple-areola complex which would occur if the donor site is primarily closed (Fig. 4).

Results

A total of 47 female patients were subjected to PMMC flap donor site closure by this method and followed up from January 2010 to April 2013 (40 months) for head and neck reconstruction.

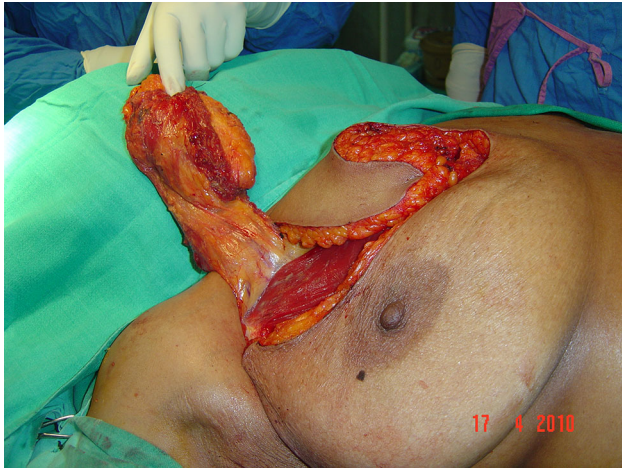


Fig. 3 Pectoralis major myocutaneous flap elevated and lateral flap is transposed into the medial defect



Fig. 4 Final result after skin closure

All were advanced malignancies taken up for wide local excision of the lesion with segmental mandibulectomy and neck dissection without bone reconstruction. The age of the patients ranged from 37 to 81 years (mean—57 years). Thirty-one patients had co-morbidities like diabetes mellitus, hypertension, chronic renal failure, morbid obesity and hypothyroidism. Fifteen patients had large breasts, 22 had moderate sized breasts and 10 had small breasts.

The complications observed in PMMC flap are shown in Table 2. Three patients (6.3 %) had partial necrosis at the margin of the PMMC skin paddle and one patient (2.1 %) had complete necrosis of skin paddle with preserved muscle.

The donor site closure with the lateral breast flap had minor complications in five patients (10.6 %) in form of marginal necrosis near the tip of the flap (Table 3).

Table 2 Complications in pectoralis major myocutaneous flap Site

PMMC flap complications	No. of patients (%)
Major	4 (8.5 %)
Partial flap loss	3 (6.3 %)
Total flap loss	1 (2.1 %)
Minor ^a	4 (8.5 %)
Hematoma	1 (2.1 %)
Wound dehiscence	2 (4.2 %)
Wound infection	1 (2.1 %)
Seroma	2 (4.2 %)

PMMC pectoralis major myocutaneous flap

^a One patient had more than one complications

The donor breast of all these PMMC flaps had good contour and aesthetic positioning of nipple areola complex as compared to the opposite side, although the donor breast size was observed to be smaller than the opposite breast.

Discussion

Ariyan was the first to describe pectoralis major myocutaneous flap where the skin paddle was designed overlying the pectoralis major muscle based on thoracoacromial vessels [1]. When the skin paddle is placed too low in the area overlying the rectus abdominis muscle in men or in the inframammary crease in females (Sir Thomas Gillard approach), the blood supply to the skin paddle becomes unreliable [9–12]. Various authors have described designing the skin paddle in females from parasternal region such as to include minimal amount of breast tissue, better blood supply and little distortion of breast [7, 8, 13, 14]. When extrapolated to taking a large flap from this region as is required in advanced cases, for reconstruction, leads to gross donor site morbidity. To prevent this disfigurement and restore the cleavage, the donor defect needs to be addressed.

Table 3 Pectoralis major myocutaneous flap donor site complications

Donor site complications ^a	No. of patients (%)
Partial flap necrosis	3 (6.3 %)
Seroma	1 (2.1 %)
Hematoma	1 (2.1 %)
Wound dehiscence	0 (0 %)
Wound infection	2 (4.2 %)
Total	5 (10.6 %)

^a One patient had more than one complications

Application of oncoplastic techniques in breast conservation surgery (volume displacement and fasciocutaneous flaps) in order to preserve the aesthetics of the conserved breast stimulated us to look beyond simple closure while performing PMMC in females. This led us to develop a technique of closure of the defect in the breast using a local flap.

The flap planned for donor site cover is based on the second intercostal perforator curvilinear along the curvature of the lateral part of the breast at its perimeter.

While the lateral flap is transposed into the medial defect of the breast, the superior tip of the W incision is advanced superiorly along the lateral margin of this flap. This enables the closure of the defect in the lateral part of the breast. This is akin to mastopexy as is often done during reduction mammoplasty. The breast contour thus achieves a near normal appearance in spite of volume loss used up in the PMMC flap.

The issue of breast deformity caused after raising a PMMC flap in a female has not been addressed in the literature till date although much has been talked about the vascularity of skin paddle in females and its positioning [6, 13]. By using this method of planning and raising PMMC flap in females, we have a good vascularised skin paddle and an aesthetically pleasing donor breast.

Donor site morbidity with respect to breast distortion has not been studied so far in case of females so our study stands unique in this aspect.

Conclusion

Pectoralis major myocutaneous flap is still being used in today's era of free flaps, in locally advanced cases or in high risk cases where prolonged surgery is not warranted. Raising PMMC flap in females has been challenging and causes significant breast deformity after primary closure of donor site. Using this technique of planning PMMC in females ensures a skin paddle of better vascularity and restores the breast contour preventing donor site morbidity.

Compliance with Ethical Standards

Conflict of interest There is no conflict of interest.

Ethical standard All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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