

Pectoralis Major Muscle and Delto-Pectoral Side by Side Flap for Large Skin Defect in Neck-Initial Experience with a Modified Method

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Abstract

Free flaps are the first choice nowadays for reconstruction of large skin defect in the neck after Radical Neck Dissection. But few options are available after the failure of a free flap. Another free flap is an ideal option if possible but ruled out in our case because of non-availability of recipient's vessels. Local rotation flaps are next best option after free flaps to cover large skin defects in the neck. Pectoralis Major Muscle flap and Delto-pectoral flap have been used for long in the reconstruction of head and neck malignancies. In our case, both these flaps were inadequate singly in width to cover the skin defect. So we devised a unique strategy to cover the skin defect with these flaps in a way that both these flaps were used side by side to cover the half of skin defect. This technique has not been mentioned in literature before.

Keywords: Pectoralis Major and Delto-pectoral side by side flap; Pectoralis Major Muscle flap; Delto-pectoral flap; Reconstruction of skin defect in the neck

Introduction

Here it presents a case of large skin defect in the neck after extended Radical Neck Dissection (RND). It was a case of secondary neck with skin infiltration with unknown primary, post Neoadjuvant Chemotherapy. The patient had a partial response to Chemotherapy. Surgery (RND with reconstruction) was planned. Extended RND with excision of skin of neck was done followed by Antero-lateral Thigh (ALT) free flap reconstruction. Vascularity of ALT free flap was compromised after surgery. ALT free flap had to be debrided with the need to cover large skin defect in neck with another flap.

Case Report

This is a case of large skin defect in the neck after extended Radical Neck Dissection (RND). It showed a case of secondary neck with skin infiltration with unknown primary, post Neoadjuvant Chemotherapy.

Options available for reconstruction

Best option available for reconstruction in this scenario is another free flap (either ALT free flap from opposite leg or any other free flap) but could not be done in this case because of non-availability of good recipient vessels in the neck because of previous surgery. So the option of another free flap was ruled out. Although a second free flap is still feasible with anastomosis to vessels on the contralateral side of the neck.

Next, the best option available is local rotation flap with large cutaneous component. Options available are Latisimus Dorsi (LD) myocutaneous flap, Trapezius myocutaneous (TM) flap, Pectoralis Major myocutaneous (PMM) flap, Deltopectoral (DP) flap, etc.

LD myocutaneous flap is not a good option because although it provides a large muscle flap to cover the defect but has a limitation in the availability of size of skin paddle. A large skin paddle with bulky LD muscle flap will be difficult to deliver beneath the clavicle and also require split skin grafting (SSG) at back with difficulty in skin graft healing over back because of constant movement in that area. This surgery would have extended the field of surgery to back with associated difficulty in lying in prone position. Also in this case, LD myocutaneous flap will fall short of the upper end of skin defect.

A Trapezius myocutaneous flap is also a good option but ruled out in our case because of non-availability of vessels to trapezius muscle because of previous surgery. Other local rotation flaps like a scapular flap, supraclavicular flap in the vicinity are also ruled out because of the same reason.

A DP flap is an option but had a limitation of the size of skin (width) available. PMM Myocutaneous flap also had a limitation of the size of skin paddle available. PM Muscle only flap with SSG over raw surface could be applied but the width of Pectoralis Major Muscle was insufficient to cover the skin defect in our case.

How the case was managed

We decided to cover the defect with PMM+DP flap. Although both the flaps were good enough in length vertically to cover the defect, they were insufficient singly to cover the defect in width.

So we did a PMM+DP side by side flap wherein the PMM flap was used to cover the lateral half of skin defect and DP flap was used to cover the medial half of skin defect. The margins of both the flaps in the center were stitched by interrupted sutures to maintain negative suction in the wound. SSG was applied over the raw surface of PMM flap. The wound healed well with no complications (**Figure 1**).



Figure 1 (A) CECT scan before surgery (B) Intraoperative image after extended RND (after the first surgery) (C) Intraoperative image after reconstruction (after second surgery) and (D) Postoperative appearance.

Here, we found that PMM and DP flap had been a workforce of H&N reconstructive surgeries for ages and have been used singly or in combination for long. The various combinations of PMM flap used for reconstruction in H&N are – PMM flap, PMM Myocutaneous flap, Pectoralis Major Osteo-myocutaneous flap. The skin paddle of PMM has been used for either intraoral cover or for external cover of skin defect in the neck. The various combination of DP flap used for reconstruction in H&N is – DP skin flap alone for the cover of skin defect in the neck or in combination with PMM flap with PMM covering the intraoral defect and DP covering the neck skin defect.

But our reconstruction was unique in the sense that we have not found the use of PMM and DP flap side by side to cover a very large skin defect in the neck on review of the literature. The side by side PMM+DP flap is a good alternative for reconstruction of large neck skin defects because it avoids the surgeries and morbidities of the free flap on the thigh and of the back with LD myocutaneous flap.

Discussion

Since its introduction by Ariyan in 1979, the pectoralis major myocutaneous flap (PMMF) has been a workhorse flap for the reconstruction of the head and neck defects for long. Advantages of this flap include its easy harvest, abundant soft tissue volume, large skin paddle, relative versatility, considerable reliability, and short

operating time. However, its popularity in head and neck reconstruction decreased recently with the development of microvascular techniques and the wide use of free tissue transfers. Disadvantages of the PMMF include excessive bulk sometimes, thoracic wall deformity, partial necrosis of its skin paddle, functional impairment of the neck and shoulder and high incidence of complications. But it is still quite often used in developing countries with limited medical resources. Its role has shifted from a “workhorse flap” to a “salvage flap” in the era of free flaps. However, the role of the PMMF is irreplaceable, even though free flaps are more popular. It can safely be used not only as a “salvage flap” in cases with flap failure or complications (e.g. fistula and carotid rupture) but also as a primary procedure in patients who were predictably high risk candidates for a free flap, in situations where bulky flaps are needed (e.g. total glossectomy reconstruction), and in cases where simultaneous protection of the major vessels of the neck is necessary.

Baliarsing et al. in his review article has mentioned that for large skin defects in neck, options available for reconstruction are free ALT flap, pedicled LD myocutaneous flap, and PMMC flap [1]. ALT free flap is first choice followed by local myocutaneous flaps. He also mentioned that choice of reconstruction is based on defect size, requirement of type of tissue, function and appearance. Liu et al. [2] in his study evaluated the role of PMMC flap for H&N defects in the era of free flaps. With his modification in technique of harvesting the flap, he concluded that PMMFs can safely be used in head and neck cancer patients who need salvage reconstruction, who are high risk for free flaps, and who need large volume soft-tissue flaps.

Anand et al. [3] mentioned reconstruction of large lateral facial defects utilizing variations of the cervicopectoral rotation flap. This flap is reliable for moderate defects of the lower cheek below the line connecting the tragus and oral commissure but not suitable for very large skin defects. Hanasono [4] in his review article describe the impact of microsurgery in patients with advanced oral cavity cancers. They find that a large number of patients have been reconstructed with local pedicled or regional flaps despite the availability of free tissue transfer.

Nayak [5] described a technique of reconstruction of the composite defect of the cheek and neck with the use of Single stage reconstructions in head and neck surgery using deltopectoral and pectoralis major myocutaneous flaps. In his technique, after using PMMC flap for covering intra-oral defect, neck skin flap was used to cover cheek skin defect while DP flap was then used to cover neck skin defect. Makkar [6] in his study described the use of faciocervicopectoral flap for non-oncological cases of cheek reconstruction in gunshot and explosive injuries but defect in his study ranged from 3 cm to 5 cm and 3.5 cm to 7 cm in width and length respectively before debridement, with an increase in both dimensions by 0.5-1 cm after debridement. The mean defect size was 3.93 cm × 5.25 cm.

Kodaganur [7] described the use of scapular fasciocutaneous flap for reconstruction of the posterior neck. Skin defect was 12 × 12 cm. Though SSG, local rotation flaps and free flaps have been described for posterior neck skin defect, author found scapular fasciocutaneous flaps to be very useful because of proximity of defect to the flap and skin texture match. Chaudhary [8] described the Use of pectoralis major myocutaneous flap for resurfacing the soft tissue defects of head and neck. He found it to be very safe with all flaps surviving except 4 out of 62 and 3 orocutaneous fistulas which healed spontaneously.

Brusati [9] described his experience in 100 consecutive cases of the pectoralis major myocutaneous flap employed for reconstruction after surgical ablation of advanced malignant tumours in the head and neck. The results obtained show that primary healing took place in 74% of cases with a relatively low incidence of complications. The authors therefore confirm the reliability of the pectoralis major myocutaneous flap, which, owing to its rich blood supply, offers the possibility of providing large cutaneous islands. Ahmad [10] described his experience with Bipaddle pectoralis major myocutaneous flap in reconstructing full thickness defects of cheek. The size of the paddle in his study used for skin cover ranged from 4 × 4 cm to 9 × 8 cm. The modification adopted in bipaddling the flap was based on anatomical location of perforators to ensure good blood supply to both paddles of flap. One patient had complete loss of flap (2.12%) and sixteen patients had minor complications out of 47.

Conclusion

Various techniques and modifications of PMM and DP Flaps have been described in literature, all of which are useful in different situations and can be used for primary reconstruction as well as salvage. It is concluded that PMM and DP flaps are highly versatile and reliable flaps with excellent vascularity and large flap dimensions. They are easy to harvest, economical and with low complications rate and minimal donor site morbidity.

References

1. Baliarsing AS, Thorat TS, Gupta A, Bhat UA, Garg S, et al. (2013) Flap selection in head and neck cancer reconstruction. *Int J Otorhinolaryngol Clin* 5: 63-76.
2. Liu M, Liu W, Yang X, Guo H, Peng H, et al. (2017) Pectoralis major Myocutaneous flap for head and neck defects in the era of free flaps: Harvesting technique and indications. *Sci Rep* 7: 46256.
3. Anand AG, Amedee RG, Butcher RB (2008) Reconstruction of large lateral facial defects utilizing variations of the cervicopectoral rotation flap. *Ochsner J* 8: 186-190.
4. Hanasono MM (2014) Reconstructive surgery for head and neck cancer patients. *Adv Med* 2014: 1-28.
5. Nayak BB, Nilamani M (2012) Single stage reconstructions in head and neck surgery using deltopectoral and pectoralis major myocutaneous flaps. *Indian J Plast Surg* 45: 151-153.
6. Makkar RM (2013) The faciocervicopectoral flap for non-oncological cases of cheek reconstruction. *Ann R Coll Surg Engl* 95: 397-400.
7. Kodaganur G, Chandrashekar M, Kumar MV, Adwani A (1993) The scapular fasciocutaneous flap: A new flap for reconstruction of the posterior neck. *Br J Plast Surg* 46: 508-510.
8. Chaudhary R, Akhtar MS, Bariar LM, Khurram MF (2014) Use of pectoralis major myocutaneous flap for resurfacing the soft tissue defects of head and neck. *J Orofac Sci* 6: 88-93.
9. Brusati R, Collini M, Bozzetti A, Chiapasco M, Galioto S (1988) Pectoralis major myocutaneous flap. Experience in 100 consecutive cases. *J Craniomaxillofac Surg* 16: 35-39.
10. Ahmad QG, Navadgi S, Agarwal R, Kanhere H, Shetty KP, et al. (2006) Bipaddle pectoralis major myocutaneous flap in reconstructing full thickness defects of cheek: A review of 47 cases. *J Plast Reconstr Aesthet Surg* 59: 166-173.