Original Article

Versatile Deltopectoral Flap - How to Take Maximum Benefit of This Flap

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ABSTRACT

Objective: To take the maximum benefits of the deltopectoral flap as a reconstructive option for defects in the head and neck region in the microvascular era.

Study Design: Retrospective / observational study

Place and Duration of Study: This study was conducted at the ENT Department, Al-Tibri Medical College & Hospital (Isra University Karachi Campus) from January 2016 to March 2017.

Materials and Methods: 21patients were included in this study, age range between 40 and 65. Patients were divided into two groups. A group with eight patients dealt with long arc of deltopectoral flap and group B thirteen patients with short arc.

Results: In A group out of eight one showed blackening of recipient site without smell, that blackening was just a superficial epidermis, deep part of the recipient site was healthy. Second showed complete necrosis of that part which was attached to recipient site. In group B, grafts remained healthy in all patients.

Conclusion: Results of group B patient were better because we made the arc of rotation smaller, that means recipient was not extended upto shoulder instead kept on chest and shifting it to recipient site with little tilt and flexion of neck.

Key Words: Deltopactoral flap, Vascularity, Short arc.

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INTRODUCTION

Head and neck surgeons are very much interested in using deltopectoral flap for repairing the defects which are usually the result of pathologies in this area of head and neck. Deltopectoral flap use skin, subcutaneous tissue, pectoralis major muscle as a part of it for cervical as well as neck reconstruction.

In 1917 Aymard was the first person who used deltopectoral flap for the reconstruction of nose. The popularity of this flap was on the peak in 1965 when Bakamjian used this flap for the reconstruction of pharynx, oesophagus and larynx. These were the cases who underwent pharyngolaryngectomy and pharyngo-oesophagectomy.[1-7].

DP flap is thin and pliable with excellent colour and texture matching with the head and neck area, because of its competent and reliable anatomy it is quickly and easily harvested.

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Deltopectoral flap has in axial pattern. This pattern is getting perforators from internal memory artery on its medial site with random on lateral side of it.

In detail the blood supply is coming from internal thoracic artery (internal memory artery) by its perforating branches which are five to six in number. The main contribution is from second and third perforators. The subclavian artery is a mother artery of internal thoracic artery. This take the path inferiorly in the rib cage with sternum on its lateral side. The perforating branches taking origion usually seven mm away from sternum usually in fifth and sixth intercostal spaces. The have diameter of 2.5 – 3.5 mm. The perforators of deltoid and acromial branches are prone to cut while elevating the flap.

The perforator arteries course laterally to supply pectoralis major muscle, they become cutaneous and curves laterally and supplies overlying skin. These perforating branches constitutes the major supply of deltopectoral flap and pectoral portion of cervico pectoral flap hence it is important to raise the flap in the plain deep to deltopecoralist fascia. As the blood supply is derived from medial and lateral so two different flaps can be constructed i.e. medial and lateral flaps.[10]

The second part of axillary artery give origion to acromiothoacic artery. There are four branches of this artery. The name of this branches are, pectoral, acromial, clavicular and deltoid. The name of the largest branch is pectoral branch which is a main tributary of this myocutaneous pectoral major flap. There is anastomosis of this with perforator branches of internal thorasic arteries.[11]

The design of deltopectoral flap is rectangular, its upper part is stretching from the sternum to the anterior region of deltoid which is 2 cm lateral to the edge of sternum. The take up of graft at the recipient site will increase if we shorten the area of rotation and highlight the versatility of this flap. The low incidences of complications are associated with its use.[6]

The flap length as to reach the defect without tension. It is sutured in placed, pedicle is tubed and remained for 2-3 week until neovascularization of the recipient site occurred. In second stage the pedicle is divided and returned to its place. The donor site is covered with split thickness skin graft and left there to be healedunder the process of secondary healing.[3-5]

The deltopectoral flap is a "workhorse" flap for head and neck reconstruction. In female patients, the scarring may also lead to breast asymmetry and nipple distortion. Distal flap necrosis is not uncommon if the skin paddle was extended too much into the deltoid region without a delay procedure. Three angiosomes are included, when we extend the flap towards deltoid region. Angiosomes are the arterial territories. These three territories have surgical importance. The first angiosome travel from the lateral border of sternum to very close area of deltopectoral groove. This is a perforator of internal mammary artery. The second angiosome is a vascular area between the lower border of clavicle to medial side of deltopectoral groove. This territory belong to the direct small cutaneous branch of thoraco acromial artery. Third angiosome is lying over the deltoid region and it is a territory of musculocutaneousperforaters of deltoid branch of thoraco acromial artery. As we are extending laterally the pressure gradient start playing its role. It will diminish if we are moving from medial to lateral side We can call it concept of angiosomes. The pressure gradient in first and second angiosomes is reliable but in third its reliability started diminishing if we move laterally and that means right over the deltoid muscle. This diminished gradient is responsible for ischaemic necrosis of the flap. So, extending the deltopectoral flap lateral to the deltopectoral groove will decrease the capacity of its authenticity. This surgical anatomy give idea to all intelligent head and neck surgeons to get maximum benefit of this famous flap.

MATERIALS AND METHODS

This a retrospective observational study and we have a medical record of twenty one patients who underwent for reconstruction with DP flap using long arc and short arc for patients of oral cancer at Al-Tibri Medical College, Isra University, Karachi Campus, from January 2016 to March 2017. All patients were male between 40 - 65 years. Patients were divided into two groups. A group with eight patients dealt with long arc of deltopectoral flap and group B with thirteen patients of short arc of rotation.

RESULTS

In group A one patient showed blackening of recipient site without smell, that blackening was just a superficial epidermis whereas the deeper part was healthy. Second patient complete necrosis of flap at recipient area. In group B patients graft remains healthy till the end.

DISCUSSION

DP flap is the most popular reconstruction material because of its easy accessibility, technical simplicity and large area of skin cover with a better colour and texture match with donor area. However, it limits the area of rotation with limitations of DP flap like clavicle above, delto pectoral groove laterally and 5th intera costal space below. To take the maximum benefits, we should be meticulous to surgery and handle the flap atraumatically, scalpel instead of diathermy to raise the flap, bipolar cautery for hemostasis, avoid injury to perforating arteries, avoid tension on the flap by using the short arc instead of long arc to avoid of gravitational gradients. However, we are limited in patients in which Internal mammary artery previously used for cabbage, surgery to anterior chest wall e.g. mastectomy, pace maker. In our study we used short arc in thirteen patients and long arc in eight patients and got the good results and quick recovery in short arc patients as compare to long arc patients.

International study showed medially based deltopectoral flap done in 53 cases. Out of which 41 flaps remain viable throughout and 12 cases suffer with minor marginal losses of little consequences.

Another international study showed the successful use of this lateral deltopectoral flap in an extended cervical and thoracic reconstruction after resection of a giant basal cell carcinoma demonstrates that it must be considered as an alternative technique, Lateral deltopectoral flap, a new and extended flap.[12]

Further international studies show 2 patients with invasive thyroid cancer, who underwent reconstructive surgery using a deltopectoral flap. Although thyroid cancer surgery with surrounding skin excision is a rare procedure, they found that the deltopectoral flap was useful and should be the first choice for patients undergoing reconstructive surgery.[13]

A National study where the majority of DP flaps were used to cover neck skin defect (63.0%). Other reconstructed defects included posterior pharyngeal wall (22.2%), facial skin defect (11.1%), and tracheal wall (3.7%). All donor sites were covered with partial thickness skin graft. Two patients developed partial flap necrosis at the tip and were managed conservatively with regular dressing. There was no complete flap failure. The overall flap survival rate was 96.3%. All donor site wounds healed uneventfully.

CONCLUSION

Results of group B patients were better because of smaller arc of rotation (not taking the recipient part towards shoulder rather keeping it on chest with little flexion of neck).

Author's Contribution:

Concept & Design of Study:	Jamil Memon
Drafting:	Ashfaque Hussain Rana
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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