CERVICOPECTORAL ROTATION FLAP FOR PRIMARY CLOSURE OF LATERAL FACE AND NECK DEFECTS

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ABSTRACT : *Objective: To recount our experience with the cervicopectoral flap (clavipectoral flap, herein after referred to as CPF) for reconstruction of large lateral cervicofacial defects in fifteen patients, which has been underutilized and has not received due recognition in world literature pertaining to reconstructive surgery.*

Study Design : Retrospective case review

Setting : Tertiary care regional cancer referral center.

Patients : Those with lateral cervicofacial defects resulting from extirpative cancer surgical resection.

Results : A 100% 'take rate' was observed at the primary defect. In 7% there was full thickness distal loss that was successfully managed by split thickness skin grafting. Three cases (20%) showed superficial epidermolysis, which healed by full epithelization within three weeks.

Conclusion : This flap provides satisfactory primary closure of surface defects that do not extend beyond an arbitrary line extending from the angle of mouth to tragus and posteriorly beyond the mastoid.

Key Words : *Cervicopectoral, Flap, Defect, Reconstruction.*

INTRODUCTION

Earliest references to use of CPF for lateral face and neck reconstruction appeared in the late 1960. The advantages of this flap are readily evident and are as follows:

1. Reliable one stage procedure.
2. Provides a wide exposure for satisfactory clearance of tumor.
3. Excellent color match and cervical contour and location of scar.
4. Ability to close donor area primarily.
5. Use of single incision for raising the flap, as well as performing extirpative surgery, for example an incision for parotidectomy can be incorporated into the incision for raising the flap. Also as it follows contour of the neck, it can be utilized for neck dissection.
6. Pectoralis major myocutaneous flap can be designed and harvested at the same sitting to enhance resurfacing composite defects beyond the zygoma.

This flap has been considered by some authors to be a modification of Bakamjian's deltopectoral flap [1]. Conceptually it is a rotation flap, which is medially based with a wide chest origin and a narrow cervical component. The chest component is more like an axial flap based on perforators of internal mammary artery. The distal cervical

skin is most likely a random portion dependent on arterialised deltopectoral segment, as well as on dermal and subdermal plexus of the anterior neck and face vessels. The broad base seems to impart a wide range of mobility to the flap enabling tensionless suturing. Thus this flap readily lends itself for reconstruction of the surface defects of the lateral face and neck by virtue of its broad base.

METHODS

A generous margin is given around the tumor periphery before designing the incision. Usually 3-5 cm margin is taken in those lesions that involve the skin. The incision is made from the lower border of the excision to sweep in a curve around the ear lobule back to the hair line behind

Fig. I : Cervicopectoral Flap Design

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Fig. II : Flap elevation in subplatysmal plane

Fig. III : Flap rotated into defect

the ear along the cervical hairline to run 2 cm behind the anterior border of the trapezius. This broad curvilinear incision extends then along the acromioclavicular point and along the lateral edge of pectoralis muscle. The inferior border is at 3 cm from the male nipple or in the third intercostal space to include second internal mammary artery (Bakamjian's artery) (fig. I). Elevation of the flap in a subplatysmal plane in the neck, continuing inferiorly superficial to the anterior pectoral fascia in the upper chest, allows wide arc of rotation in addition to ensuring viability of the skin, as the platysma provides strength and vascularity to the flap (fig. II). During elevation, care is taken to preserve marginal mandibular and spinal accessory nerves. The flap has a broad pedicle from submental region to medial aspect of the third intercostal space. The flap is then mobilised and rotated into the defect (fig. III). This medially based pedicle enhances arc of rotation and flap transposition; however, if this modification does not permit full coverage of facial defect or if there is composite defect viz, post temporal bone resection, then concomitant

Fig. IV : Tumor location in the neck

Fig. V : Defect after tumor resection

pectoralis major myocutaneous flap will permit complete resurfacing along with CPF. The anterior dogear is excised primarily and a triangle can be removed in the axillary fold to facilitate the primary closure and prevent dogear deformity. The flap is sutured in two layers over suction drain to drain the parotid and neck. The patient is nursed in head elevation and neck flexed. The head may also be rotated ipsilaterally and fixed with stay suture to avoid tension on suture line. Sutures are removed usually on the 10- 14th postoperative day.

RESULTS

Fifteen cases of cervicofacial reconstruction following oncological resection were performed utilizing cervicopectoral rotation flap. Six were females and nine males. Most of the defects were located in the upper and middle third of the neck and parotid region (fig.IV). In this study patients had surface defects measuring on an average 20 sqcm following excision of the skin involved by the tumor (fig. V). Details are presented in table I. In

Table-I : Defect Description

Location of the Defect	Primary lesion	Defect Dimensions	
		MEAN	RANGE
Lateral face 6 cases	Parotid with skin involvement (4). Dermato fibrosarcoma lateral face and parotid area (1). Lateral tempotral bone resection(1).	18 sqcm	9-20sqcm
Lateral face and upper neck 8 cases	Fungating metastatic neck nodes of unknown origin involving level 1 and 2 (8)	22 sqcm	10-26 sqcm
Upper and Mid neck 1 case	Papillary carcinoma of thyroid with level 2 and 3 fungating neck nodes	24 sqcm	10-28 sqcm

all the cases flap was successfully mobilised and donor defect closed primarily (fig. VI) except in one case where concomitant pectoralis major myocutaneous flap was used. In one case (7%), there was full thickness distal loss that was successfully managed by split thickness skin grafting. Three cases (20%) showed superficial epidermolysis, which healed by full epithelization within three weeks without delaying recovery or commencement of postoperative adjuvant radiotherapy. Rest of the flaps showed no complications. We have observed that this flap provides satisfactory primary closure of surface defects that do not extend beyond an arbitrary line extending from the angle of mouth to tragus and posteriorly beyond the mastoid. No loss of flaps due to infection or hematoma were recorded. We have, however, noticed in one case (7%) mild to moderate lymphorrhea from chest wound that traverse breast tissue in female patients.

DISCUSSION

Large lateral cervicofacial defects following cancer extirpative surgery remains a reconstructive challenge. One has to reconsider appropriate primary closure preferably in a single stage that retains normal contour of the neck, has good color match and functionality, especially with reference to avoiding ectropion and incompetence of the

Fig. VI : Final closure following flap mobilization

Fig. VII : Blood supply to cervicopectoral flap: FA Facial Artery, SA Submental Artery, PA Post auricular artery, OCC A Occipital Artery, STA Superior Thyroid Artery, SCA Superficial Cervical Artery, TCA Transverse Cervical Artery, SCL Subclavian Artery, TCT Thyrocervical Trunk.

oral sphincter[1]. Towards this end, local rotation flap and skin grafting are probably not ideal except for very small defects[1]. While musculocutaneous flaps are suitable, they are too bulky and require separate chest incision, consume additional time and are cumbersome in females[1,2]. Fasciocutaneous flaps like deltopectoral are two-staged procedure[2]. Free flaps are technically demanding and are not feasible at every center owing to limited expertise. Thus CPF rotation flap has now come to be widely used for resurfacing neck and lateral face defects following cancer resection. CPF is a combination of random and axial pattern flap[1]. The broad infraclavicular pedicle flap is based on the internal mammary perforators that result in easy maneuverability and robust vascularity of the flap[1]. The proximal part of the flap receives blood supply from anastomotic branches of the external carotid and subclavian arteries. Meticulous anatomical dissection of the anterolateral neck

has revealed that platysma and overlying skin are supplied from direct cutaneous arteries measuring 0.5 mm in diameter which are branches of postaural and occipital arteries supplying the upper lateral areas of the neck, facial and submental arteries supplying the upper medial areas and transverse cervical in the lower lateral aspect of the neck [3] (figure. 7). These vessels traverse the undersurface of platysma to provide blood flow to the overlying skin. These vessels are normally interrupted during elevation of the flap, but they survive due to excellent anastomosis from contralateral vessel, and the broad based pedicle supplied by the internal mammary perforators. Medially based flap as against laterally based is favourable as the skin along the midline is pliable and readily allows tension free rotation[1]. If the incision is placed close to or over the anterior border of trapezius, a contracture band results distorting the neck contour. Hence an incision two cm posterior to the anterior border of trapezius is favoured. Dogears are excised primarily as the flap is most often sutured without tension. For the same reason complications such as ectropion and oral incompetence are rare. The incision designed for elevation of the flap is compatible with good surgical exposure aimed at resection of the tumor from the cervicofacial regions, as well for neck dissection. Submental access may not be satisfactory as compared to radical neck dissection incision, but adequate clearance can be achieved. Principles of oncological clearance are not violated. Potentially it violates chest skin normally used for deltopectoral flap but we never had an occasion to use deltopectoral flap secondarily as the flap had shown good survival. Pectoralis major myocutaneous flap furthermore can be used concomitantly for resurfacing defects beyond zygoma and for composite defects.

We have used this flap in fourteen consecutive cases for resurfacing lateral face and upper neck following oncologically satisfactory resection of the head and neck primaries. Of the fifteen, six were females and nine males. Six patients had lateral facial defects, four following resection of the parotid tumor with skin involvement, one patient had resection of large dermatofibrosarcoma of lateral face and parotid area, and one patient after lateral temporal bone resection. Eight patients presented with

upper neck fungating metastatic neck nodes. The 'take rate' in these cases was nearly 100 % with thirteen out of fourteen showing complete 'take'. One case showed full thickness tip necrosis requiring split thickness skin grafting. Four cases showed superficial necrosis that healed by epithelization. We have found that resurfacing is most satisfactory in those defects that lie below a line connecting angle of mouth to tragus. In those defects that lie beyond this line and posteriorly beyond the mastoid, distal necrosis was encountered frequently. We also advocate concomitant pectoralis major myocutaneous flap for resurfacing upper lateral facial defects involving the zygomatic area and composite defects where CPF alone may not suffice.

CONCLUSION

A medially based CPF rotation flap is an ideal reconstructive measure for large cervicofacial defects as the flap is robust, reliable, easy to design, functional and aesthetically acceptable. Potentially it transgresses chest skin normally used for deltopectoral flap but we never had an occasion to use the deltopectoral flap secondarily as the flap has shown to be reliable. Pectoralis major myocutaneous flap, however can be used concomitantly as described.

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