

Short Communication

Supraclavicular artery flaps for head and neck reconstruction: a prospective study

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ABSTRACT

Reconstruction of defects of the head and neck remains a challenge to the reconstructive surgeon. This is due to the complex anatomy of the region as well as the age and comorbidities of the patients, which prevent the use of free tissue transfer as the primary tool of reconstruction. The supraclavicular artery (SCA) island flap is a well vascularised tissue and provides a thin and pliable skin for cutaneous and mucosal defects of the head and neck region. Here, we had done this flap for eight patients with no major complications and hence, we concur that it is a safe, reliable and versatile reconstructive option for these defects. The study period was from January 2015 to June 2016 where we operated on 8 patients, 5 for post burn contracture neck and 3 for post oncologic resection. The flap was used as a pedicled fascio-cutaneous and was based on the transverse supraclavicular artery. Eight cases underwent supraclavicular artery flap of which 5 were males and 3 females. Mean defect size was 15×10 cm. All the donor sites were closed with a split skin graft. One patient had distal necrosis which was managed with debridement and secondary suturing. The supraclavicular artery flap is a thin, versatile, reliable and easy to harvest flap for reconstructing head and neck defects, with good cosmetic and functional outcome.

Keywords: Fascio-cutaneous, Head and neck defects, Reconstruction, Supraclavicular artery

INTRODUCTION

The objective of head and neck reconstruction is to give functional and aesthetic restoration of three-dimensional defects. Microvascular reconstructions have enabled surgeons to achieve these goals on these complex defects, but becomes troublesome in cases of repeated neck dissection or in salvage procedures of free flap failure.^{1,2} Also, the different skin colour and texture of the distant donor site do pose a challenge for reconstructive surgeon, in which case regional pedicled flaps can be used.³ The supraclavicular artery (SCA) flap has similar skin features and provides a thin and pliable skin paddle suitable for mucosal and skin defects of the head and

neck region following trauma, oncologic resection, burns and post burn contractures and medication or radiation-induced osteonecrosis.⁴⁻⁶

METHODS

This is a prospective study of 8 cases who underwent supraclavicular artery flap between January 2015 and June 2016. Cases included 5 post burn contracture and 3 were post oncologic resection. Out of the 5 post burn contracture cases, 2 were of primary contracture and 3 were of recurrent contracture. The skin island was designed to fit the resultant defect and was based on the supraclavicular vascular pedicle in all cases and almost

all donor sites were closed with split skin graft. All cases were followed up post-operatively from a minimum of 6 months to a maximum of 14 months.

Patient was placed in supine position with sand bags under shoulder and ipsilateral hand is extended. Pedicle of supraclavicular artery flap lies in the posterior triangle deep to the belly of the omohyoid parallel to the clavicle. The flap outline is marked posteriorly the upper border of trapezius (2 cm anterior to spine of scapula), anteriorly the inferior border of the clavicle and the lateral margin at the deltoid insertion (Figure 1).



Figure 1: Picture showing the flap markings.

White arrow - sternocleidomastoid muscle, yellow arrow - external jugular vein and red arrow - pivot point.

The defect is created and measured for flap dimensions (Figure 2). The flap is raised at a subfascial level just superficial to deltoid muscle by sharp knife dissection taking care of the pedicle which is visualized all along the anterior border at trapezius. The communicating perforators from the deltoid branch of the thoracoacromial axis and posterior circumflex humeral artery are sacrificed (Figure 3).



Figure 2: Picture showing the defect.

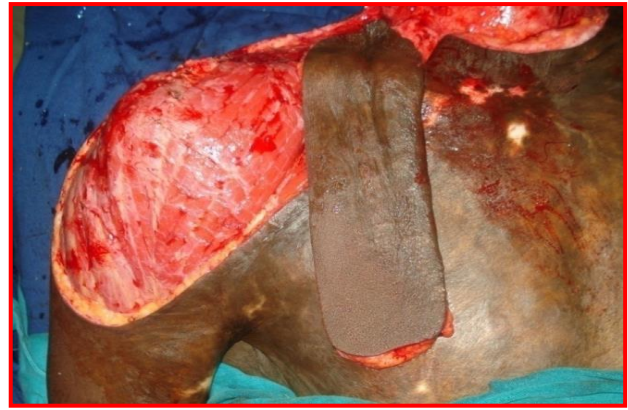


Figure 3: Picture after flap elevation.

Near the point of exit of the supraclavicular vessels, the dissection is done preserving a fascial pedicle of about 3-5 cm in width. The mobilized flap is then transposed into defect and the intervening skin is de-epithelized if required. The inset is done in two layers, subcutaneous with absorbable 3-0 polygalactin 910 (vicryl) and skin with nonabsorbable 3-0 nylon (ethilon) sutures. A suction drain was used to drain the flap. The donor defect was resurfaced with a split skin graft (Figure 4).



Figure 4: Photograph showing a well settled flap and donor site split skin graft.

RESULTS

Eight cases underwent supraclavicular artery flap between January 2015 and June 2016 of which 5 were males and 3 females. The age group varied from 35 to 69 years with a mean age of 53 years. The flap dimensions varied from 12x9 cm to 20x11 cm with a mean of 15x10 cm (Table 1). The mean harvesting time was 60 minutes (range 45-75 minutes) and in-setting time took an average of 25 minutes. There was complete flap survival in 7 patients and 1 patient who had distal third necrosis for which debridement and secondary suturing was done. There was flap edema for the initial 2 to 3 days which later resolved with no flap congestion. The donor areas of

all the patients healed well with no restriction in shoulder mobility. The average hospital stays ranged from 5 to 9 days. The photographs of the cases done are described below (Figures 5-12).

Table 1: Table showing the post excisional defect and the flap dimensions.

Intra-operative defect (cm)	Flap dimension (cm)
18x9	19x10
12x9	15x10
20x9	21x9
20x10	20x11
19x9	20x10
19x10	19x10



Figure 5: Patient 1 - pre- and post-operative picture, a case of post burn contracture neck.



Figure 6: Patient 2 - pre- and post-operative photographs, a case of post burn contracture neck.



Figure 7: Patient 3 - pre- and post-operative photographs, a case of post burn contracture neck.



Figure 8: Patient 4 - pre- and post-operative photographs, a case of post burn contracture neck.



Figure 9: Patient 5 - pre- and post-operative photographs, a case of post burn contracture neck.



Figure 10: Patient 6 - pre- and post-operative photographs, a case of post-surgical defect of left parotid region.



Figure 11: Patient 7 - pre- and post-operative photographs, a case of post-surgical defect of left post auricular region.

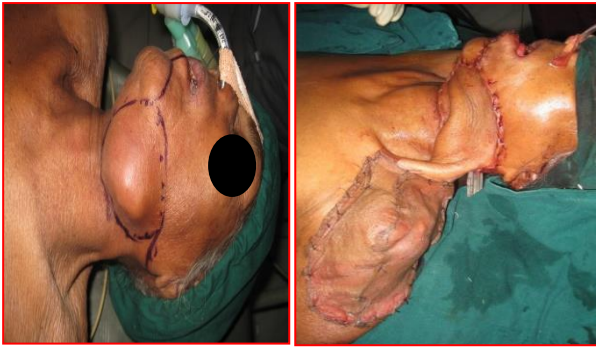


Figure 12: Patient 8 pre- and post-operative photographs, a case of malignancy left mandibular region.

DISCUSSION

In an article cited by Gillies in 1923, Toldt, an anatomist, was the first to identify and name the vessel arteria cervicalis superficialis which originated as a branch of thyrocervical trunk.⁷ Kazanjian and Converse, in 1949 performed the flap from the shoulder region (“Charretera” or acromial flap), where “Charretera” in Spanish meant the shoulder area of military personnel where honors are bestowed.⁸ In 1979, the first anatomical studies were performed by Mathes and Vasconez, who described the vascular territory and clinical applications in head and neck reconstruction and renamed as the cervicohumeral flap.⁹ The supraclavicular fascio-cutaneous island flap was introduced by Lamberty and Cormack in 1979. He described the supraclavicular artery as a perforator that arises from the transverse cervical artery in 93% of cases or from the suprascapular artery in 7% of cases.¹⁰ In the early 1990s, Pallua et al “rediscovered” this flap and popularized it by performing detailed anatomical studies of the vascularity of what is now known as the supraclavicular island flap.^{4,11,12} Chiu et al used this flap for variety of head and neck oncologic defects.¹³ The supraclavicular artery begins at middle or lateral third of clavicle area with an axial pattern and gradually alters into a random pattern after passing through the clavicle.¹⁴ Subfascial dissection is easy in the distal region, whereas in the proximal region, the origin of the supraclavicular artery and the vascular pedicle should be safeguarded. In cases of multiple neck surgeries where the sternocleidomastoid and external jugular vein have been sacrificed, the omohyoid muscle, which is superficial to transverse cervical artery, should be identified prior to pedicle dissection.^{15,16} The common donor site morbidities are minor which are dehiscence or seroma formation, found in less than 15% of cases.¹³ Hypertrophic scars might occur from huge tension along the donor site. If donor site defect is larger than 10 cm, a split thickness skin graft rather than extensive undermining should be considered to facilitate wound healing.^{5,15} Limitation of shoulder motion (abduction and external rotation) was found to be less than 20°, which is acceptable to daily living of patients.¹⁷

CONCLUSION

The supraclavicular artery flap is a thin, pliable, versatile, reliable, and easy to harvest axial pattern flap, with good cosmetic and functional outcome with a negligible and concealed donor site and allows for a single stage reconstruction of complex head and neck defects. It is an excellent alternative to regional and microvascular free flaps and should be made as one of the primary reconstructions of soft tissue defects in head and neck region.

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