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Supraclavicular flap: Case report and review of literature

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Abstract

Supraclavicular island flap has a relatively thin skin island tissue and has an arc of rotation close to the head and neck region. Reconstructive procedures of oral cavity, laryngopharyngeal region and cutaneous region of the face can be done with this flap. Patients who are not candidates for micro vascular flaps, this flap can be readily used in head and neck reconstructions. This flap also reserves pectoralis major and deltopectoral flaps as salvage with minimum morbidity.

Apart from distal flap necrosis and de-epithelization, no major failures have been noted in the literature. Also reconstruction adjuvants like, tissue expansion can be used to reconstruct larger defects.

Keywords: Supraclavicular flap, head and neck, reconstruction, oral cancer

Introduction

The reconstructive ladder in its uppermost steps consists of

1. Pedicled flaps
2. Microvascular flaps

For reconstruction of ablative defects in head and neck region several flaps have been advocated. The regional pedicled flaps include

1. Forehead flap
2. Nasolabial flap
3. Temporoparietal fascia flap
4. Platysma flap
5. Trapezius flap
6. Supraclavicular flap
7. Pectoralis major flap
8. Deltopectoral flap
9. Latissimus dorsi flap

The microvascular free flaps include:

1. Fibula osseomyocutaneous flap
2. Deep Circumflex Iliac Artery flap
3. Radial forearm flap
4. Scapular flap
5. Anterolateral thigh flap

Each of these flaps have their own merits and demerits. Pectoralis major flap first described by Ariyan, in 1979 ^[1], and is regarded as the workhorse of head and neck reconstruction as it provides reliable pedicle, adequate bulk, minimum morbidity.

The other local flaps such as forehead, Nasolabial and Temporoparietal flap provide reliable and local ease but are less in bulk, so cannot be used in larger oncologic defects.

Other above mentioned flaps such as Latissimus dorsi and trapezius flaps have not been used routinely and have historical significance.

The shoulder fasciocutaneous flap was initially described as a random flap by Kazanjian and Converse in 1949 ^[2]. Mathes and Vasconez, in 1978, studied the vascular anatomy of the shoulder area and named it the 'cervicothoracic' flap ^[3].

Lamberty was the first author to define the supraclavicular pedicle as the main source of vascularization of this flap [4]. In 1997, the supraclavicular artery flap was further modified to an island flap by Pallua *et al.* [5, 6]

The advantages of this flap includes, thin skin island tissue, reliable blood supply, minimum morbidity and less failure rates. As the skin paddle is relatively hairless, it can be used as lining flaps. This flap can be readily used in oral cavity, laryngopharyngeal and cutaneous reconstruction of head and neck region.

Also with the use of this flap, the regular workhorse flaps such as pectoralis major and deltopectoral flaps can be used as salvage flaps in case of flap failure.

Case Report

53 year old male patient reported to our institute with a complaint of loosening of teeth and pain in left mandibular posterior teeth region. He gave a history of dental extraction 3 months back in the same region. Patient had a history of tobacco chewing for the last 32 years and placement of quid in the same region. Patient also had poor oral hygiene. Patient did not have any co morbidities.

On examination, patient had missing second molar and ulceroproliferative growth originating from alveolus extending from third molar region to second premolar anteriorly. Extension of the lesion was seen upto the gingivobuccal sulcus laterally. No lingual extension was noted. (Fig. 1)

Submandibular lymphadenopathy was noted on the same side. Incisional biopsy proved to be well differentiated squamous cell carcinoma.

Contrast enhanced computed tomography images showed infiltration of mandibular body upto the marrow with enlarge level IB and II nodes.

Treatment plan to be undertaken for this patient was as follows:

- 1) Segmental resection of mandible (Fig. 2)
- 2) Extended supraomohyoid neck dissection (Fig. 3)
- 3) Reconstruction with supraclavicular flap (Fig. 4)

Incision taken for this case was, lower midline lip split with upper skin crease incision. Segmental resection of mandible was completed from canine to the ascending ramus.

Extended supraomohyoid neck dissection upto level IV was completed from the upper skin crease incision.

Supraclavicular flap was raised skin paddle was marked. Remainder of the flap was epithelized and tunneled below the sternocleidomastoid muscle and inset completed in the oral cavity.

Primary closure was achieved in the donor site and no. 14 Romovac drains were placed.

Patient recovered without any complications and was discharged on the 8th post-operative day.

Flap uptake was excellent in the follow up.

Discussion and Review of Literature

The advent of microvascular free tissue transfer has given reconstructive surgeons vast treatment options for reconstruction of head and neck defects. However, the success of free flaps in head and neck reconstruction depends on the presence and quality of the recipient vessels in the neck for microvascular anastomosis. The supraclavicular artery island flap can be used to reconstruct a variety of head and neck defects, allowing the reconstructive surgeons to circumvent

some of the problems inherent in vessel-depleted necks.

Given the proper conditions, the success rate of microvascular reconstruction has been reported to be about 96% [7].

In the reconstruction of head and neck cancer patients who have undergone previous neck dissections or radiotherapy, or both, the paucity of good caliber and quality vessels for microvascular anastomosis presents a real challenge for the microvascular surgeon.

Another major disadvantage of using distant tissues for head and neck reconstruction is the often striking differences in skin quality and texture between donor and recipient sites. A central idea in reconstructive surgery is that “like” tissue should be replaced with “like” tissue.

The supraclavicular skin has very similar texture and color to that of the face and neck. For these reasons, a flap harvested from this region will allow for coverage of many head and neck defects in vessel depleted necks, often with esthetic results superior to those of distant free flap donor sites.

The flap is based off an axial vessel branching from the thyrocervical trunk or transverse cervical artery. The color match, thinness, pliability, hair free skin parallels that of the head and neck region and provides a superior cosmetic outcome when compared to free tissue transfer flaps from such as the forearm, abdomen, or thigh. Harvesting the flap is time efficient and relatively simple due to its location adjacent to the neck and face. In addition, use of this flap as a pedicled flap permits easy identification and preservation of the supraclavicular nerves [8].

The supraclavicular artery flap has been used innovatively for different reconstructive needs. Epps *et al.* [9] used it to reconstruct defects after parotidectomy, with excellent results, and Chiu *et al.* [8] reported its use in the reconstruction of oropharyngeal post resection defects. Chen *et al.* [10] used the supraclavicular artery flap to reconstruct head and neck post oncologic resection defects in 24 patients over 1 year.

The potential disadvantages include:

1. Anatomic variations of the supraclavicular artery
2. Not suitable for large volume defects without expansion
3. Donor site scar on shoulder in women.
4. Distal flap necrosis

A review of the complications is mentioned below. (Table 1) The minor complications included partial flap and flap tip necrosis while major complications included total flap failure.

Figures and Tables



Fig 1



Fig 2



Fig 3



Fig 4



Fig 5

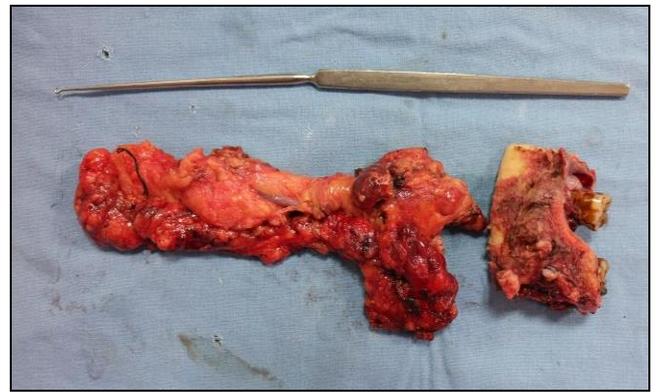


Fig 6

Complications encountered in supraclavicular flap in previous studies:

Author(s)	Clinical Cases	Minor	Major	Percentage
Vinh <i>et al.</i> (2007) ^[11]	32	3	1	13
Chen <i>et al.</i> (2010) ^[10]	24	1	1	8.3
Heitland and Pallua (2005) ^[12]	10	1	0	10
Chiu <i>et al.</i> (2009) ^[8]	18	1	1	11
Pallua and Wolter (2010) ^[13]	12	0	0	0
Pallua and Demir (2008) ^[14]	22	3	0	14
Di Benedetto (2005) ^[15]	25	1	0	4
Epps <i>et al.</i> (2011) ^[16]	10	0	0	0
Nthumba (2012) ^[17]	22	5	0	23

Partially adapted from Peter M. Nthumba. The supraclavicular flap. J Oral Maxillofac Surg 2012.

Conclusion

Supraclavicular flap has several advantages over the conventionally used flaps for head and neck reconstruction. With an axis of rotation close to the neck, flap positioning is easier with minimum morbidity. Also major complications are far less compared to other flaps.

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