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SUPRA CLAVICULAR ARTERY FLAP IN POST BURN NECK CONTRACTURES -TEN YEARS EXPERIENCE

Plastic Surgery

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ABSTRACT

Background: Anterior cervical contractures of the neck represent a great challenge for plastic and reconstructive surgeons. Necks can be reconstructed with a wide range of surgical techniques. The supraclavicular flap is easy to harvest without the need for free tissue transfer. It provides a relatively large flap for neck resurfacing with tissue very similar to that of the neck. **Material and Methods:** This study was carried out in the Plastic Surgery Department of GMC Srinagar between from January 2009 to December 2019. It involved 35 patients, in whom supraclavicular artery flap was done to reconstruct neck defects following release of post burn neck contractures. **Results:** A total of 40 supraclavicular flaps were used for resurfacing neck defects after excision of post burn cicatrical tissues. The size of the flap varied from 16/6 to 24/10cm. We harvested flaps of various lengths according to the size of defects after excision of scar tissue. Flap length ranged from a minimum of 16 cm to a maximum of 24 cm. Mean length was 20.7 cm. The following complications occurred (7.5%): partial distal necrosis in 2 cases, and donor site graft loss in 1case. **Conclusion:** The supraclavicular artery island flap is a thin, malleable fasciocutaneous flap that is easily and rapidly harvested, with a reliable pedicle and minimal donor site morbidity. It constitutes an alternative to local flaps, while providing equivalent functional results.

KEYWORDS

Supraclavicular Flap, Post-burn Neck Contracture, Pedicled Supraclavicular Artery Flap, Fasciocutaneous Flap.

INTRODUCTION

Cervical contractures are a major problem in burns involving chest, neck and face. The anterior neck skin is thin, and prone to develop contractures. The anterior neck is a very difficult area to reconstruct because the neck connects the head to the body with multidirectional and complex motility. Therefore, post-burn neck contractures represent a great challenge for plastic and reconstructive surgeons. Anterior cervical contractures are characterized by restrictions in range of neck motion, especially extension[1]. Physical and aesthetic abnormalities resulting from this type of distortion can cause extreme depression. Moreover, patients require reliable local, regional or free flaps to reconstruct both form and function[2]. Local flaps are often of inadequate size, while regional muscle flaps (e.g., pectoralis major, deltopectoral, trapezius, and latissimus flaps) are both bulky and often associated with significant donor-site morbidity. Microsurgical free flaps (e.g., forearm, anterolateral thigh, parascapular, and abdominal flaps) are ideal but require technical expertise and increased operative time. The supraclavicular artery is a branch of the transverse cervical artery. Less frequently, the supraclavicular artery may arise from the suprascapular artery, which may be smaller[3]. The venous drainage is usually via the accompanying transverse cervical vein. Initially described for skin resurfacing after burn/trauma scar contracture release, this thin, axial, fasciocutaneous flap can be harvested easily and quickly. Others have now successfully demonstrated its use in difficult facial/neck burn cases[4]. As the pedicled or islanded supraclavicular fasciocutaneous flap provides thin, pliable, well-vascularized tissue with an excellent match in terms of skin colour and texture, and is ideal for replacing external skin losses in neck reconstruction[5]. In the current study we aim to present our clinical experience of using the supraclavicular flap for neck reconstruction.

MATERIALAND METHODS

This study was carried out in the Plastic Surgery Department of GMC Srinagar between from January 2009 to December 2019. It involved 35 patients, in whom supraclavicular artery flap was done to reconstruct neck defects following release of post burn neck contractures.

RESULTS

From January 2009 to December 2019, supraclavicular flap was used in 35 patients for resurfacing neck region. The study involved 35 patients (30 females and 5 males). Mean age was 26.5 years (range 12-57 years). The prerequisite was that at least one supraclavicular region should be uninvolved. A total of 40 supraclavicular flaps were used for resurfacing neck defects after excision of post burn cicatrical tissues. Thirty unexpanded and eight expanded flaps were used. The flap was islanded on its fascial pedicle in thirty cases and pedicled flap was used in ten cases. Donor sites could be closed primarily after undermining in twelve flaps and covered with STSG in twenty eight flaps. In five patients bilateral flaps were used. The size of the flap varied from 16/6 to 24/10cm. We harvested flaps of various lengths according to the size of defects after excision of scar tissue. Flap length ranged from a minimum of 16 cm to a maximum of 24 cm. Mean length was 20.7 cm. The following complications occurred (7.5%): partial distal necrosis in 2 cases, and donor site graft loss in 1case.

DISCUSSION

Face is an important anatomic area of the body, which lends personality to an individual. Even a minor fascial deformity or scarring can lead to great psychological and social problems[1]. Unfortunately, these scars cannot be hidden by clothes. Facial burns are frequently managed by exposure method. Full thickness burns of the face were autografted following eschar separation. But now, the technique of early excision and grafting has been extended to burns of the face, an effort to reduce disfigurement.

Neck contractures should usually be dealt with prior to carrying out facial burn reconstruction because the extrinsic contractile forces from the neck cause facial deformities and can adversely affect the maturation of scars on the face. Patients with post-burn neck scar contractures usually exhibit severe restriction of neck movement and related deformities such as stiffness in the shoulders, compensatory kyphosis, lower lip ectropion, and incomplete oral occlusion with drooling of saliva[5]. Therefore, scar contractures and deformity in the neck region after burns represent a challenge with a unique set of problems for the reconstructive surgeon, compared with the rest of the body. Preventive methods to minimize cervical contractures during the acute period as burn scars and grafted areas contract include splinting, physical therapy, neck collars, and the use of a three quarter mattress to encourage neck extension.

The commonly used procedures for neck contractures after release are Z-*plasties* / or a combination of Z-*plasty* with skin graft or flaps. Flap is always a better choice when compared to skin graft. The appearance of skin graft is not good at all and the rate of recurrent contracture is high.

Reconstruction of the soft tissue defects of the head and neck is often complex and requires the use of local, regional or free flaps to ensure anatomical, functional and cosmetic rehabilitation. A thin, malleable

flap with a texture and colour similar to those of the recipient site is ideal for repair of head and neck defects. Local flaps would be ideally adapted, but their use is often compromised by previous surgery or radiotherapy. Very large regional myocutaneous flaps like Pectoralis Major (PMMC) are difficult to place in certain sites (e.g. oropharynx). Sacrifice of a muscle at the donor site is associated with morbidity. Free fasciocutaneous flaps (radial forearm flap, anterolateral thigh flap) provide thin, flexible, well vascularized tissue to cover large defects. However, not all patients are ideal for this long surgery, which requires an experienced multidisciplinary team. In these difficult cases, regional flaps remain the flap of choice and the supraclavicular artery flap is an ideal solution for these patients, as it is a reliable flap with a constant vascular pedicle. In a series of 349 supraclavicular artery flaps, the complete necrosis rate was 1.4% and the partial necrosis rate was 6.9%[6]. The supraclavicular flap is considered the 'workhorse' of local neck reconstruction flaps due to a number of reasons, namely quick and easy harvesting technique, close match as regards texture and colour of neck skin, a very wide arc of rotation and relatively long pedicle if designed as an island flap, allowing nearly all of the flap surface area to be settled in relatively large defects. Also, its pivot point is just adjacent to the neck, allowing more utilization of the whole flap surface area unlike other local flaps like deltopectoral or trapezius flaps. It has more simple surveillance after the procedure regarding free tissue transfer. Its donor site over the shoulder can be well hidden. In our study, flap length ranged from a minimum of 16 cm to a maximum of 24 cm, with a mean of 20.7 cm. This result is very similar to that of Loghmani et al. Their clinical series was on 18 patients with post-burn neck contracture. Maximum length was 24 cm and minimum was 16 cm, with a mean of 21.2 cm[7]. In 2012, Balackrishnan and Sivarajan conducted a series 16 of cases of supraclavicular flap for release of neck contractures. Mean length of their flaps as 22.7 cm[8]. In the current study, minimum width was 6 cm and maximum was 10 cm, with a mean width of 9.7. This coincides with a mean width of 10.1 cm in the Loghmani et al. study[7]. Survival rate in our study was 100%. Balakrishnan and Sivarajan reported a 100% survival rate,[8] whereas Loghmani et al. reported a 96.9% survival rate[7]. Sadu et al. in their study, suggested that when the flap can be settled well in the defect without tension, it is advisable to leave a cuff of soft tissue around the pedicle9. In our study complication rate was 7.5%. We reported partial distal necrosis in 2 cases (5%) and donor site graft loss in 1(2.5%) case. All our cases were managed conservatively, the flaps with partial distal necrosis were debrided and healed with dressings, patients with partial donor site graft loss was managed conservatively. Vinh et al.[10] reported 3.9% distal superficial necrosis, whereas Loghmani et al[7]. and Balakrishnan and Sivarajan[9] reported 6.3% (1 case) and 9.3% (3 cases) respectively.

Secondary procedures included those simple procedures done during follow up to obtain maximum results patients operated for PBC neck. Flap thinning was done in twenty patients, to improve cosmetic out come. Z-plasty was performed in five cases that developed a small contracture band at the edge of the flap. The procedure was simple and the cases were discharged the following day. Dog-ears were excised in four cases with pedicled flaps.

CONCLUSION

The supraclavicular artery island flap is safe, simple, reliable and versatile fasciocutaneous flap that is easily and rapidly harvested. It has a reliable vascular pedicle that can be even islanded with minimal donor site morbidity. It provides excellent functional and cosmetic results.

Post operative look after six months

Post operative view after one year

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