

Case Report

Unusual pattern of partial failure of preexpanded free parascapular flap for neck reconstruction

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Received August 30, 2018; Accepted October 8, 2018; Epub October 20, 2018; Published October 30, 2018

Abstract: The present article focuses on a relatively rare condition of a partial necrosis of free microvascular flap in a patient with severe postburn contracture of the neck region, subjected to reconstructive microsurgery. Reconstructive microsurgical staged procedure was undertaken to correct the scar contracture and restore the aesthetic unit. Substantial partial flap necrosis, requiring secondary surgery, was observed in the early postoperative period. Surprisingly only the distal 1/3 of the skin island of the parascapular flap survived. Final reconstruction of the neck reconstruction was accomplished by means of full thickness skin graft over the area of partially necrotic flap. Good final result was achieved. Overall treatment course is discussed in the light of the current trends.

Keywords: Free flap, partial failure, parascapular, reconstructive options

Introduction

Free tissue transfer is sophisticated and highly demanding surgical method of treatment for difficult soft tissue and compound defects with various etiology. Microvascular free flaps are highly reliable with overall flap success rate of over 95% worldwide in expert hands [1, 2]. Traditionally major free flap complications, including total and partial flap loss are accounted to technical error, as result of inexperience mainly during the learning curve period in microsurgery and other variable factors [2, 3].

When a substantial part of flap necrosis occurs, requiring a secondary surgery to accomplish reconstruction, it's always recommended to have an escape plan. Free flap reconstruction of the neck region is a good alternative in post burn patients with severe scar contracture. Preexpanded fasciocutaneous free fasciocutaneous flaps from back region provide ample amount of tissue to accomplish single unit reconstruction [4]. Our preference for neck reconstruction is to scapular and parascapular region, where in addition skin of good colour match is available. In case of significant partial flap necrosis, surgical treatment is complicated. Solution options are between a second free

flap in a difficult setting, or free full-thickness skin graft, with arguably similar result.

Free parascapular flap [5] is a good choice due to its characteristics like long vascular pedicle with vessels of reasonable calibre for anastomoses, and low donor site morbidity, with practically no functional loss. The straightforward dissections while harvesting the flap is also an advantage. The purpose of the present study is to share our experience with partial free flap necrosis, its characteristics, consequences and coping strategy to overcome them.

Case description

16 y.o. female with severe scar contracture in the neck region (**Figure 1A, 1B**) consequent to burn accident appeared for primary consultation after several unsuccessful reconstructive surgery attempts. Patient was planned for microsurgical reconstruction with preexpanded parascapular free flap. First stage involved insertion of 500 cc expander. On outpatient basis expander was filled up to its working volume (**Figure 1C**). Second stage, five months later, involved expander removal; harvesting of parascapular flap (**Figure 1D**), measuring 20×15 sm, in lateral decubitus position; scar

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Figure 1. Picture of patient: A, B. Severe post-burn scar contracture of neck region; C, D. Preexpanded free parascapular flap before and after harvesting; E, F. Evolution of partial free flap necrosis at day 14 and day 70; G, H. Late postoperative result at 2 years.

excision and flap inset, with patient lying on her back. Flap was well vascularized after performing end to end anastomoses with 10/0 monofilament suture of circumflex scapular artery to facial artery and the two committant circumflex scapular veins to facial vein. The venous anastomoses were done in a "Y" fashion. Aspiration drains were inserted under the flap and at the donor site. There were no signs of vascular insufficiency of the flap on physical examination performed on one hour basis for the first couple of days.

About 72 hours after the free tissue transfer, flap gradually showed signs of venous insufficiency, became stagnated with darker skin color. Revision surgery was undertaken the same day. Small hematoma was evacuated around the anastomoses. Nourishing artery was further dissected distal to the anastomosis to the point it entered the flap. Arterial anas-

tomosis was evaluated as patient with good pulsations distally. Venous anastomoses were found occluded, and were redone. Flap circulation was restored back to normal. Anticoagulant treatment following surgical revision included Heparin i.v. perfusion for one week. Roughly, a bit more than 1/3 of the skin surface of the flap survived, unexpectedly the part most distal to anastomoses (**Figure 1E, 1F**).

Next, surgical removal of the necrotic skin was done and underlying subcutaneous fat tissue of the flap was found healthy. VAC therapy was applied for a couple of weeks. At the mean time expander was applied in posterior neck region. Patient was discharged from hospital and wound dressings were changed 1-2 times per week and expander was filled every 7-10 days. Third stage, three months after the initial flap transfer, the residual skin defect was covered with full thickness skin graft harvested from the expanded skin under the occipital hairline.

One year later minor scar correction surgery was done to improve the aesthetic appearance.

Result

Final outcome in presented case was evaluated as very good in terms of aesthetic restoration of the problematic area. Patient was very satisfied with the result. Autologous reconstruction of the neck region in that case was achieved, through additional surgical procedures consequent to partial necrosis of the transferred free flap. Whole treatment was substantially prolonged (by 4 months). Late postoperative result at one year is demonstrated on (**Figure 1G, 1H**).

Discussion

Free tissue transfer alone or in combination with traditional plastic surgery techniques has

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definitely become a useful tool for treatment of postburn defects and scars [6-8] in selected anatomical regions. The flaps used are often prefabricated or preexpanded [4, 8]. At present there is no unified description of partial flap loss in terms of relatively how much of the flap volume or surface is lost. To our opinion as a partial flap failure should be considered any loss of the flap skin island that requires additional surgery to achieve wound healing. That usually accounts for between 10% and 30% of skin surface depending on the size of the flap. Another issue worth a comment is the pattern of the flap loss. In the case presented we encounter a skin survival of 1/3 of flap surface located most distal to the nourishing pedicle. A possible explanation is that during revision surgery, while liberating the arterial and venous pedicles deep into the flap some microperforators were eliminated. Therefore microcirculation of the flap closer to the anastomotic side was apparently permanently damaged and eventually led to partial flap loss.

Full thickness skin graft technique is a useful tool for treatment of scar contractures in all regions of the body including neck region [9]. In our patient, final coverage of the defect was accomplished with preexpanded durable skin graft with good colour match. Although a single unit reconstruction was the initial goal, we managed to achieve very satisfactory result with combination of microsurgical reconstruction, traditional skin graft and local plasty procedures. Another useful alternative for single unit reconstruction in case of post-burn neck contracture is the island preexpanded parascapular flap [10]. In any case a good aesthetic final outcome is dependent on observing the aesthetic subunits in anterior neck region and especially the cervicomenal angle [9].

As far as partial free flap loss pattern is in focus, further investigation and observations are required to evaluate it, but it is certain that it does not necessarily follow the rules of partial pedicle flap failure, engaging exclusively the distal part.

Disclosure of conflict of interest

None.

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