



Use of Pedicle Groin Flap for Large Defect of Traumatic Hand and Forearm; A Case Report

Hamid Reza Abdollahpour^{1*}

¹*Department of Orthopaedic, Shiraz University of Medical Sciences, Shiraz, Iran.*

Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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Case Report

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ABSTRACT

The groin flap is currently considered one of the main strategies and surgical procedures for flap reconstruction and defect coverage. Traumatic skin defect of forearm and hand with exposed bone or tendon must be covered with a flap. Based on the surgeon preference and condition of the wound and patient, free flap or pedicle flap can be used. However, in a situation that vessels of recipient site have been damaged, use of free flap is contraindicated. We herein report a 27-year-old man with high energy trauma to the right upper extremity with large skin defect and vascular injury. He underwent pedicle groin flap after several times of irrigation and debridement with complete coverage. In the 1-year follow-up, he had favourable functional and cosmetic recovery. The pedicle groin flap can be a versatile and reliable flap to cover large traumatic skin defect with vascular injury.

Keywords: Pedicle flap; free flap; groin flap; traumatic defect; vascular injury.

1. INTRODUCTION

The groin flap is currently considered one of the main strategies and surgical procedures for flap

reconstruction and defect coverage. The technique was first described by MacGregor and Jackson in 1972 [1] who described successful free cutaneous flap coverage. Currently, the

*Corresponding author: E-mail: hamidreza873@yahoo.com;

technique is widely used for various indications and several changes have been applied to the primary technique [2,3]. There are several advantages of the groin flap including the good pliability, access to more relatively hairless skin, and an inconspicuous donor site. It can be used as either a pedicle or free flap and is a good choice for reconstruction in the extremities [4,5], perineum [6,7], trunk [8-10], head, and neck [11, 12]. The shortcomings of the groin flap include bulkiness, variations in the vascular anatomy, and a small, short pedicle [3].

The groin flap is based on the superficial circumflex iliac artery (SCIA) and could be used to cover the defect of the hand and forearm [3]. Although several studies have reported the use of groin flap for reconstruction of the hand and forearm defects [2,5,13,14], the experience is still a scarce and limited number of cases have been reported. We herein report our experience with the use of groin flap for coverage of large forearm and hand skin and muscle defect with exposed bone.

2. CASE PRESENTATION

A 27-year-old man, a victim of vehicle turn-over on the highway was transferred to our centre by the emergency service (EMS). On admission, he had a Glasgow Coma Scale (GCS) score of 15 with stable Vital signs. He was managed according to the Advanced Trauma Life Support (ATLS) guideline. Examination of the chest, abdomen, head and neck were normal during the second survey. The patient suffered from a crush injury on the volar aspect of right forearm and wrist which was severely contaminated with soil and sand particles (Fig. 1). The radiography of the affected forearm revealed a fracture of 2nd and 3rd metacarpal bones with volar dislocation of carpal bones. In wound exploration, radial pulse was absent and radial artery and flexor carpi radialis (FCR) tendon were disrupted (Fig. 2). The bulk of superficial flexor tendons were crushed but the continuity of the ulnar and median nerves and other tendons were normal. The patient received intravenous 1gr of cefazolin, 80 mg of Gentamycin and 1 million units of penicillin as an antibiotic prophylaxis. The antibiotic regimen included cefazolin and gentamycin during the hospital course. The wound was irrigated on a daily basis during the hospital course and was debrided every other day. During the intervals of the debridement and irrigation, the wound was covered with a

moisturized dressing. The radial artery was explored and was anastomosed meticulously under a surgical microscope. Fractures of metacarpal bones and dislocation of carpal bones were reduced and fixed. In last surgical procedure, skin defect were covered with pedicle groin flap (Fig. 3).

The operation was conducted under general anaesthesia, in the supine position. The flap was designed axially. Before designing the flap, we identified the branches of the SCIA using a 3- to 5-cm incision just inferior to the SCIA course in the middle portion of the anterior groin region. Usually, about 3 branches of the SCIA are found during dissection to the deep fascia level. Approximately 2 mm of surrounding soft tissue was preserved during the vascular pedicle dissection as cuff protection. After the flap was harvested and transferred, the donor wound was generally closed. To prevent unwanted stretch on the flap pedicle, an external fixator device was applied between the humerus and iliac crest. The pedicle of the flap was discontinued after 35 days of planting. In the 1-year follow-up, the flap was painless and there where an acceptable scar and skin tissue formation in the site of the flap. The muscle powers were 5/5 and the patient could easily handle heavy subjects. The elbow and hand range of motion was near normal and the hair growing was similar to the volar and dorsal aspects of the forearm and hand. There was no bulky flap and engorgement (Fig. 4).

3. DISCUSSION

The coverage of the large skin defects of the forearm and the hands is still a dilemma for the orthopaedic and hand surgeons. The groin flap has been previously described to be an effective management of these injuries and defects with favourable results [3,5,13,14]. In the current report, we have demonstrated that groin flap could be used for repair of the large forearm and hand defect with acceptable results [15]. Each type of flap has its positive and negative characteristics. Previously, Hsu et al. [15] used the SCIA perforator flap successfully to overcome most of the disadvantages of the free groin flap and to demonstrate many of its advantages, including concealment of the donor site scar, longer arterial pedicle, rare problems with flap "bulginess," less numbness at the donor site, and less time required for the flap dissection [15].



Fig. 1. Patient wound on arrival the emergency room that is full of Sand and Soil particle



Fig. 2. Crush injury of forearm extending to the wrist and thenar area



Fig. 3. The postoperative image of the groin flap for coverage of the hand and forearm of the patients. The anterior view (A) and the lateral view (B)



Fig. 4. The postoperative image of the patient's hand after coverage with the groin flap before (A) and after (B) curving the flap base

The disadvantages of the pedicle groin flap include; lack of good innervation, the large thickness in an obese patient, and the colour difference with receiver location [3]. Since the 1980s, with the development of free flaps, the attractiveness of the axial pedicle groin flap has fallen, but in cases where recipient area vessels have been damaged (such as trauma or irradiation), the use of free flap is contraindicated [2,3]. The disadvantages of free groin flap procedure include ;the longer duration than axial pedicle flap, the surgical procedure may be difficult and boring, risk of thrombosis and complete failure of flap, high risk of flap failure compared with pedicle flaps (10% to 30% failure rate for free flap), greater risk of reoperation after free flap procedure (about 25%), prolonged risk of vascular complications up to 10 days after surgery, especially in the first 24 hours [3]. Free flap surgery can be done in one stage procedure, but pedicle flap procedure needs a small surgical procedure for cut off the base. In this patient, due to vascular injury, the risk of free flap failure was very high, which is why the pedicle flaps were used.

4. CONCLUSION

In conclusion, using a pedicle groin flap is a reliable approach for coverage of the large traumatic upper limb defects along with the vascular injury. Surgeon experience and microdissection are the key factors in successful management. Larger series are required to determine the efficacy and safety.

CONSENT

The patients and his family who provided us with a consent to present his case.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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