



Case report

Case report of uneventful resurfacing of the dorsum of foot degloving injury using pedicled lateral supramalleolar flap

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ABSTRACT

Introduction and importance: Foot degloving injuries are serious problem and presented regularly to plastic surgery department. Proper identification of this condition followed by suitable reconstruction reduces disability and limb loss. This study highlights the effectiveness of a supramalleolar flap for covering a foot defect.

Case presentation: An 18 year- old man was involved in a road traffic accident and received trauma to his left foot which led to loss of the skin of the dorsum of his foot. He was referred to a plastic surgery unit after initial stabilization. After reassessment, he was diagnosed as a left dorsum foot degloving injury. Then he underwent multiple sessions of debridement followed by resurfacing of the foot using pedicled lateral supramalleolar flap. The flap covers the dorsum aspect of the left foot and the post-surgery period passed uneventfully.

Clinical discussion: The Lateral supra malleolar flap reaches distal defects, preserves a main limb neurovascular supply and is aesthetically acceptable. All these advantages, besides ease of harvest, make it more useful for cover of foot defects. Although it is not an ideal reconstructive method, when microvascular surgery is not applicable, this technique will cover foot defects.

Conclusion: We present this case because foot degloving injury is common but there is limited options for covering, although free flap is gold standard reconstructive tool but pedicled supramalleolar flap can reach final result similar to complex surgeries. Although complications exist in literature, benefits promote using this method.

1. Introduction

Lower limb tissue loss is a product of trauma, infection, malignancy or dermatological or vascular pathologies, and lost tissue may be just skin or composite tissue loss involving bone, tendons and neurovascular structures. Road traffic accident (RTA) considers the most etiology regarding trauma causing lower limb defects, and young males were affected predominantly [1].

Degloving injuries of the foot is a dilemma for both patients and surgeons, and cooperation between them is needed to overcome morbidity and disability. Reconstructive methods were recruited to cover the defects produced by such injuries with an appreciation of aesthetics. Conservative management such as negative pressure wound therapy can apply to these wounds, followed by resurfacing using skin grafts [2,3].

Advancing of reconstructive procedures has recently jumped to using microvascular surgery in the form of free flaps and revascularization of degloved skin, but old school methods such as pedicled flaps can successfully fill the defect [4,5]. The lateral supramalleolar flap is one of the available local options for foot coverage, with considerable rotation arc, aesthetic acceptance and devoid of need for microsurgical setup. Although congestion and necrosis are major withdrawal complications, it is still a useful reconstructive tool for the foot and ankle [6,7].

2. Case presentation

An 18-year-old man without previous comorbidities. He was presented to hospital after he was been involved in road traffic accident (RTA) while he rode a bike. After trauma, he was evacuated to a nearby primary health center, and examination showed a left foot wound

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without other obvious injuries. He underwent wound wash and dressing, then transferred to another city. It took 9 days to reach the hospital and regular wound dressing changes were ensured during this period. When he arrived at our hospital, he was evaluated through a comprehensive history followed by an examination alongside an x-ray.

On examination, the skin of the left dorsum foot was missing, the wound bed shows exposed extensor commones tendons of the toes, and the wound extends from the level of the mid of the metatarsals to just distal ankle and from the medial aspect of the foot to the lateral side (Fig. 1). While the X-ray excluded the presence of bone fractures. Also, a swab was taken from the wound bed for culture and sensitivity; it grew later *Saphelococcu auras* and was found to be sensitive to meropenem, which was given to the patient 1 g every 8 h intravenous for 10 days.

He underwent three sessions of debridement, the last one followed by a flap cover during the same surgery. Lateral supra malleolar fasciocutaneous flap is considered to cover the defect. In the operating room, after spinal anesthesia administration and wound exposed, all dead tissue was excised and the resulting defect was 12*8 cm. Then bountiful irrigation with gentamicin diluted in saline was applied to the wound. Later, the tourniquet was inflated, and a template of defect was created using sterile paper followed by marking of the flap, while the lower margin of the flap was 5 cm proximal to the inter malleolar line.

Anterior flap boarder was incised first down the subfascial plane, and the incision was extended distally to join the proximal wound edge and dissection was performed deeply on the subfascial plane. At this level, the anterior border of the flap was elevated to visualize septal perforators, then the posterior border was incised and dissection was carried out in a subfascial plane anterior to the inter-muscular septum and downward into the subperiosteal plane of the fibula. The superior flap incision was done and a superficial peroneal nerve was identified, then it was cut and buried between muscles, then the lateral intermuscular septum was then separated after ligation of the septal perforators leaving the lateral supramalleolar artery and one proximal perforator (Figs. 2, 3. At this point, the tourniquet was deflated to reassure vascularity of the flap and once this was confirmed, the flap was rotated to the defect (Fig. 4).



Fig. 2. Lateral supra-malleolar flap (left foot intraoperative).



Fig. 3. Flap application (left foot intraoperative).



Fig. 1. Pre-operative (left foot degloving injury).



Fig. 4. 3-weeks post-operative follow up.

Meshed split thickness graft was used to cover a raw area at the lateral foot beside the flap donor site. After the flap inset, multiple layers of dressing were used to close the wound and the posterior slab was applied to reduce sheering forces on the wound. The patient was discharged upon his request, but close follow-up was planned before discharge.

Three days later, toe movement commenced, followed by an ankle joint on day 7 and finally weight bearing after three weeks post-surgery. He was followed twice per week at an outpatient clinic, and the wound healed uneventfully (Fig. 5).

This work has been reported in line with SCARE criteria [8].



Fig. 5. Late result after wound healing was achieved.

3. Discussion

Injuries to the lower extremities remain a problem and can lead to disability if untreated, as the foot is a supporting mechanism for the body. Reconstruction of the feet must provide a stable skeleton, sensitive coverage and adorable shape to be aesthetically acceptable and fit shoes [9]. Degloving injuries range from skin avulsion to more complex wounds with bony, vascular and neural element loss, and the mechanism of trauma usually predicted severity of injury [1]. Our patient fulfilled principles of lower limb degloving injury as a young male, but fortunately enough the wound was not extended deep to involved skeleton and dynamic mechanism of the foot.

Conservative management such as negative pressure wound therapy, dermal substitutes and even simple dressing have proved to be effective in a minor degree of degloving injuries and can eliminate the necessity of complex reconstructive procedures. Although the skin graft can cover the dorsum of the foot, late contracture causes functional impairment and aesthetic disfigurement [10]. Unavailable equipment for negative pressure wound therapy beside exposed raw foot bone and tendon disqualified conservative management to be used in our patient, and proceeding to next reconstructive level is considered better.

Microsurgical methods have popularity over traditional pedicled flaps, but the condition of the patient, facility availability and surgeon's experience determine which procedures are used. Revascularization of degloved part has become achievable and this method is used to restore the heel pad [11]. While free tissue transfer such as free anterolateral thigh flap and other free flaps are the gold standard for reconstruction, and outcomes are reliable with less donor site morbidity [12].

Reconstruction of feet using pedical flaps still saves boats, especially

when there is lack of microsurgical training and suitable setup, although it is a reasonable way to preserve limb functionality. Reverse sural and lateral supra malleolar flaps are the most useful tools to resurface the dorsum of the foot. Both flaps provide a moderate bulk of tissue to fit the original lost tissue, are easy to perform, with less operation duration and hospital staying [7,13].

Lateral supra malleolar flap reaches distal defects, preserves a main limb neurovascular supply and all these advantages make it more useful than the sural flap. Also, additional procedures were not needed for flap division or thinning when considering supramalleolar flap. Moreover, complications were reported with sural flap more than supramalleolar flap, while functional outcome was higher in the letter. In our case, the supramalleolar flap matches the requirements to cover the dorsum of the foot [14–16]. As mentioned formally, flap necrosis either partially or completely and congestion are major complications. In our case, all these complications fortunately do not exist. Also, the aim of early rehabilitation is preservation of joint mobility and to enhance the patient psychologically.

4. Conclusion

Degloving injuries of the lower limb are common problems with a paucity of options for reconstruction. Although free tissue transfer solves these problems, it is not applicable sometimes. We report this case with a degloving dorsum of foot that was managed by a pedicled lateral supramalleolar flap without complications. Although this technique is old, it still works and results are acceptable.

Consent

Written consent was obtained by patient to involve in this work, and gives autonomous permission for publication includes photograph and a copy of consent available.

Ethical approval

Patient confidentiality maintained and data collected after full explanation of research project and aim of it, then written informed consent was obtained and this adherent to national ethical committee (NEC 11/2002), Khartoum, Sudan.

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Author contribution

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Research registration number

- 1.Name of the registry:
 - 2.Unique identifying number or registration ID:
 - 3.Hyperlink to your specific registration (must be publicly accessible and will be checked):
- No experiment involved human or animal subjects

Conflict of interest statement

No conflict of interest.

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