Management of total circumferential degloving injury of lower leg with immediate flap cover and skin grafting by graft derived from degloved skin: A case report

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Abstract
Degloving soft tissue injuries of lower limb are serious and debilitating condition. Deciding on the most appropriate treatment is often difficult. Mismanagement of these cases will increase morbidity and mortality often leading to amputation of the lower limb. Every case management has to be individualised according to severity of injury, associated other injuries, time of presentation and general condition of the patient. Here we describe a case of total circumferential degloving injury of lower leg managed with immediate surgery by debridement, gastronemiue flap cover of proximal tibia and split thickness skin graft of whole of left lower leg from the graft taken from degloved skin.

Key words: Degloving injury, skin graft

Introduction
Degloving injuries involve shearing of the skin from the underlying tissue due to differential gliding in response to the tangential force applied to the surface of the body leading to disruption of all the blood vessels connected to skin. The flap of degloved skin has precarious blood supply making it almost impossible for the flap to survive. Degloving injuries of the lower limb are common in road traffic accidents especially run-over injuries. These may be associated with underlying long bone fractures along with different degree of injury to vessels and nerves.

Four patterns of degloving injuries are being described
1. Abrasion/avulsion
2. Non circumferntial degloving
3. Circumferential single plane degloving
4. Circumferential multiplane degloving

These pattern occurs either in isolation or occasionally in combination. Resutting of degloved skin can be successful only in non-circumferntial (pattern-2) cases.

Case report
Sixty five year old male farmer with no known comorbidities was run over by a tempo goods carrier (four wheeler) and sustained circumferential degloving injury to left lower leg. After first aid at a primary health center and then a visit to a general hospital he was referred to us. He reached us after 3 hours of injury. At presentation he was hemodynamically stable. There described. It includes 1. Excision of degloved skin (debridement) and secondary skin grafting at later date. 2. Immediate full/split thickness skin graft derived from degloved skin flap or other parts of the body. 3. Cryopreserved split thickness skin graft harvested from degloved flap. 4. Artificial dermal replacement and vacuum assisted closure. 5. Coverage by degloved flap after defatting along with negative pressure wound therapy.

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was circumferential degloving of the left lower leg skin deep to subcutaneous fat plane extending from proximal ankle to the knee with exposed shin of tibia and gastronemius muscle (Figure 1&2). After initial evaluation and resuscitation he was taken up for emergency surgery within five hours of injury. Debridement of the left lower leg was done which was grossly infested with mud and gross. Wound washed thoroughly with normal saline. Gastronemius muscle flap transposed to cover the proximal tibia. Excised degloved skin flap washed thoroughly. Split thickness skin graft harvested from the degloved skin and used to cover the circumferential raw area over the left lower leg from ankle to knee (Figure 3&4). Compression dressing and POP slab immobilisation of the left leg done for two weeks, later compression dressing continued for two more weeks with night splint. All the wounds healed well by one month and patient was able to walk normally as before. After one month scar massage and elastic crepe bandage were advised. He developed edema in post operative period which was managed with elastic crepe bandage. Scar massage and compression garments continued for six months. Patient followed up for six months, no major problems reported in the affected limb (Figure 5).
Discussion

There is no clear guidelines for the treatment of degloving injury.\textsuperscript{4} Management depends on pattern and severity of degloving injury, associated bone and other injuries, time of presentation and general condition at the time of presentation. Immediate reconstruction of the lower limb can be considered if the patient is stable, with no other major injuries and presented early. Immediate reconstruction reduces chances of secondary infection, reduces number of surgeries, promotes early recovery, and rehabilitation of the patient. In our case since the patient presented to us immediately in a stable condition and not associated with any other bony and vascular injuries. He was considered for immediate reconstruction with skin graft harvested from degloved skin flap after debridement of the wound. Otherwise if patient condition is not stable and wound condition is not suitable for grafting then skin graft can be harvested from the degloved flap and cold stored for later use when patient is stable and wound is suitable for skin graft uptake.\textsuperscript{5} Reattachment of the degloved skin grafts with vacuum sealing drainage technique is also been used instead of traditional compression dressing method. But comparative studies show both techniques are equally effective.\textsuperscript{5} When patient presents later skin grafts cannot be harvested from degloved skin flaps as they will be necrosed. Studies have shown that early Plastic surgery evaluation and management of such injuries are associated with lesser number of surgeries, shorter hospital stay and better outcome.\textsuperscript{5}

Conclusion

Management of degloving injury should be planned depending on extent and pattern of injury, time of presentation and general condition of the patient. When presented early in a case of circumferential degloving of lower limb, immediate surgery with debridement and primary coverage with split thickness skin graft should always be considered.

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References