



A Case Report of Traumatic Perineal Degloving Injury

Joel Lau, Xuxin Lim, Ong Wei Chen, Yap Yan Lin, Jane Lim* and Lim Thiam Chye

Department of Surgery, National University Health System, Singapore

Abstract

Introduction: Degloving injuries are most commonly caused by road traffic accidents and industrial accidents. They result from of a large rotational force, which avulses the skin and subcutaneous tissue from the underlying fascia. The majority of such injuries involve the lower extremities. Perineal degloving injury is uncommon and seldom reported in the literature.

Presentation of Case: In this case report, we present the case of a 22 year old male pedestrian involved in a motor vehicle accident. He sustained an open perineal degloving injury.

Discussion: The management of perineal degloving injuries involves resuscitation and early identification of bony fractures, urogenital or anorectal injuries. A multi-disciplinary team should be activated to aid in the management of such injuries. Multiple wound irrigation with staged debridement can salvage potentially viable degloved segments. The degloved skin flaps should be secured to the wound bed without tension for the first 5 days. Additionally, the patient should be nursed on a differential air-loss mattress. Delayed wound closure can be undertaken once full demarcation has occurred.

Conclusion: Careful serial excision of devitalized tissues prior to reconstruction minimizes tissue loss, minimizes septic complications and reduces patient's morbidity.

Keywords: Perineal Injury; Degloving Injury; Perineal Trauma; Case Report

Introduction

A degloving injury is a result of a rotational force that stretches the skin and subcutaneous tissue causing its avulsion from the deeper less mobile musculoskeletal structures. It is commonly caused by motor vehicle and industrial accidents [1]. Degloving injuries of the perineum are anatomically complex involving the urogenital, anorectal, pelvic and sacrococcygeal structures. A multidisciplinary team consisting of surgeons from Plastic, General (i.e. trauma and colorectal), Orthopedic and Urological surgery is needed in the management of such injuries. This case reports, documents the management of an open perineal degloving injury (Table 1). It is written in accordance with the CARE guidelines [2].

Case Presentation

Patient information

Our patient, a 22 year old male, was a pedestrian involved in a motor vehicle accident, who presented to the Emergency Medicine Department at the National University Hospital. His initial blood pressure was 119/66 mmHg, heart rate 110 beats per minutes and oxygen saturation 99% on oxygen delivered via nasal prong. He was alert with a Glasgow Coma Scale score of 14 (Eye 4, Verbal 4, Motor 6). He was found to have sustained extensive degloving injuries to his perineum.

Diagnostic assessment & clinical findings

Computer tomography (CT) scan of his abdomen and pelvis showed a comminuted fracture of the right hemi-sacrum with anterior displacement of the distal sacral fragment & coccyx. No pneumoperitoneum or hemoperitoneum was visible. Chest X-Ray showed no pneumothorax or rib fractures. X-Rays of his lower extremities showed no long bone fractures. CT scan of his brain and face revealed a scalp hematoma along the left occipital region, fracture of the maxillary alveolar process and fracture of the right zygomatic arch.

The patient underwent examination under anesthesia (EUA) in the supine lithotomy position (Figure 1). The tip of the coccyx was fractured and exposed. The anococcygeal body was avulsed. The anus, together with a cuff of perianal skin was displaced anteriorly. A 6 cm perineal laceration was present in the anterior, urogenital triangle exposing but not penetrating the underlying superficial

OPEN ACCESS

*Correspondence:

Jane Lim, Department of Surgery,
Division of Plastic Reconstructive and
Aesthetic Surgery, National University
Health System, 1E Kent Ridge Rd,
119074, Singapore, Tel: (65) 6772
5555;

E-mail: cfslimj@nus.edu.sg

Received Date: 11 Nov 2016

Accepted Date: 02 Jan 2017

Published Date: 25 Jan 2017

Citation:

Lau J, Lim X, Chen OW, Lin YY, Lim J,
Chye LT. A Case Report of Traumatic
Perineal Degloving Injury. *Clin Surg.*
2017; 2: 1286.

Copyright © 2017 Jane Lim. This is an
open access article distributed under
the Creative Commons Attribution
License, which permits unrestricted
use, distribution, and reproduction in
any medium, provided the original work
is properly cited.



Figure 1: Initial appearance of the patient's perineal degloving injury when examined under anesthesia.

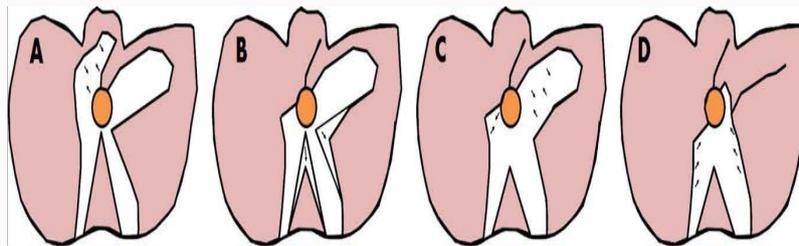


Figure 2: (A) Closure of anterior perineal laceration on post-injury day 1, (B) Debridement of necrotic tips, (C) Closure of anterior border of left degloved segment on post-injury day 4, (D) V-Y closure of sacral degloved segment on post-injury day 7.



Figure 3: Perineal degloving injury on post-injury day 1 (A) pre-op, (B) post-op with VAC dressing applied.

perineal (Colles') fascia. The laceration extended from the anal verge to the base of the scrotal sac. The degloved subcutaneous tissue flaps (i.e. left gluteal, right gluteal and sacral) exposed the underlying left and right *Gluteal maximus* muscle. The sacral degloved segments extended superiorly to 15 cm above the lumbar and sacral regions. The left degloving injury extended 15 cm laterally and the right 8 cm laterally in multiple planes. Deep to the *Gluteal maximus* muscle, the left superior gluteal artery was identified and preserved. The right superior gluteal artery was avulsed. Other cutaneous injuries include lacerations and abrasions over his face, trunks and limbs.

The integrity of the anorectal canal was confirmed by sigmoidoscopy. A de-functioning sigmoid loop colostomy was fashioned and the efferent colonic limb was washed out with normal saline. The degloved skin flaps were thoroughly irrigated and hemostasis secured. The wound bed was packed with gauze dressing and the degloved skin flaps were returned to the wound bed without tension, kinking or suturing. The patient was nursed on a differential air loss mattress to minimize pressure necrosis.

Intervention

Serial wound washouts and debridement were performed till

complete skin closure was achieved (Figure 2). On post-injury day 1, the anterior perineal laceration was sutured (Figure 2A). The tips (distal 5 mm) of the sacrum and left triangular gluteal skin flaps were found to be dusky with slow capillary refill time (Figure 3). The remainder of the flaps appeared well perfused. Negative pressure wound therapy (NPWT) with continuous pressure of 125 mmHg was applied over the wounds (Figure 3). By post-injury day 4, the tips (distal 10 mm) of the sacral and left triangular gluteal flaps were necrotic. Their apices were debrided until punctuate dermal bleeding was seen (Figure 2B). Staged wound closure commenced on the 4th post injury day. The anterior border of the left triangular gluteal flap was reduced to its anatomical position and sutured in place (Figure 2C). A portable NPWT dressing was applied. The patient was able to ambulate by day 4. The sacral degloved flap was repaired last. As there was too much tension to allow for anatomical reduction, the lateral tissues were advanced towards the midline position in a V-Y fashion to ensure a tension free repair (Figure 2D). Complete closure was achieved within 8 days.

Follow-up and outcome

The patient was seen in the outpatient colorectal and plastic clinic and assessed to have good sphincter tone and complete wound union in his perineum (Figure 4). He underwent an uneventful reversal of his loop colostomy 3 months after the initial injury.

Discussion

The nature of this injury was initially described by Slack in 1952 as a form of torsional injury [1]. He described the mechanism of shearing resulting from large rotational forces i.e. such as a spinning tire, causing traumatic avulsion of the skin and subcutaneous tissue from underlying musculoskeletal structures. While the avulsed skin flap may initially appear viable, it is not reflective of the true extent of the injury [2]. The skin contains a rich vascular plexus within the dermis that is supplied by perforators from underlying muscles and fascia. Thus, degloving injuries often result in loss of perforating musculo-cutaneous and fascio-cutaneous vessels. This



Figure 4: Perineal degloving injury on post-injury day 45.

compromises the arterial supply to the degloved tissue posing a threat to its viability. The venous drainage can be compromised resulting in subsequent venous congestion, increased vascular pressure across the dermal plexuses and ultimately flap necrosis [3]. Hence, if primary re-attachment is attempted, these flaps often have high rates of flap necrosis that can progress to severe wound infection [4].

An alternative proposition was radical excision and wound coverage with skin grafting [5]. Farmer proposed excision of all non-viable avulsed skin, defeating of the avulsed skin and utilizing that as a full thickness skin graft for coverage in a single stage procedure [5]. This allowed for optimal coverage of the denuded areas with minimal morbidity [4]. Early radical debridement is controversial as it can lead to unnecessary tissue loss. In addition, deciding the excision margins is difficult as there is no good method to assess viability of the avulsed flap in the acute trauma setting. Another alternative proposed involves serial examination of the degloved skin via dermal bleeding, capillary refill and color of skin. The necrotic tissue can then be debrided repeatedly with reconstruction performed once full demarcation has occurred.

For treatment of anatomically complex perineal wounds, the principles are to minimize tissue loss, and minimize wound contamination. Sequential irrigation and debridement coupled with the use of negative pressure wound therapy (NPWT) as a temporary wound dressing help facilitate wound healing in a clean environment [6]. NPWT protects the wound via polyurethane foam which is sealed airtight by a polyvinyl foil [7]. A high negative pressure applied allows for continuous drainage of the exudative fluids and necrotic tissue from the wound bed [8,9]. This enhances wound care management by reducing the need for frequent dressing change, reducing risk of urinary contamination and reducing bacterial counts in the wound [7,9].

From this case report, we documented the potential benefits of serial excision of devitalized tissue prior to reconstruction. We brought our patient to the operating theatre for a planned re-look on post-injury day 1 and ensured hemostasis of the wound bed before commencement of NPWT. The degloved skin flaps were secured to the wound bed without tension and the patient was nursed on a differential air-loss mattress. We used the NPWT (ActiV.A.C. Therapy Unit) at continuous negative pressure of 125 mm Hg. Our decision for the next re-look operation was clinically indicated based upon the NPWT output or at about five days post-injury. Demarcation of non-viable tissue is most pronounced after 24 hours with the distal tip of the flap most affected. From our experience, the extent of

necrosis tapers over the course of the next few days with demarcation established by day five to seven post-injury. The wound bed should be clean with minimal exudation prior to reconstruction of the degloved skin flap. In our patient, as tissue viability was in doubt at day 5, we continued to perform debridement and staged closure with complete wound closure achieved on day 8 post-injury. Based on the above treatment approach, we were able to achieve wound closure without the need for any skin grafting and without septic complications.

Our case report deals with a specific type of perineal degloving injury and our management strategy should not be generalized. Our patient did not sustained concomitant pelvic and lower extremities fractures, rectal injuries, genitalia injuries or injuries to the great vessels. These associated injuries which are common with perineal trauma would necessitate additional surgical procedures such as fracture stabilization, fecal and/or urinary diversion, testicular repair, bladder repair and great vessel repair [10]. In these scenarios, a multidisciplinary team consisting of surgeons from Plastic, General (i.e. trauma and colorectal), Orthopedic and Urological surgery would need to be involved.

Conclusion

The initial management of hemodynamic stabilization and evaluation of the extent of injuries should be carried out for all patients presenting with perineal trauma. Our approach deals with a specific presentation of an open perineal degloving injury which led to a favorable outcome. We document that degloving perineal injuries can be managed successfully with serial debridement coupled with temporary wound dressing utilizing NPWT. This approach minimizes tissue loss, minimizes septic complications and reduces patient's morbidity. With other injuries involved, an individualized, multi-disciplinary approach should be employed.

References

- Slack CC. Friction injuries following road accidents. *Br Med J.* 1952; 2: 262-264.
- Gagnier JJ, Kienle G, Altman DG, Moher D, Sox H, Riley D; CARE Group. The CARE guidelines: consensus-based clinical case reporting guideline development. *BMJ Case Rep.* 2013; 110: 603-608.
- De Korte N, Dwars BJ, van der Werff JF. Degloving injury of an extremity. Is primary closure obsolete? *J Trauma.* 2009; 67: E60-61.
- Kudsk KA, Sheldon GF, Walton RL. Degloving injuries of the extremities and torso. *J Trauma.* 1981; 21: 835-839.
- Farmer AW. Treatment of avulsed skin flaps. *Ann Surg.* 1939; 110: 951-999.
- Meara JG, Guo L, Smith JD, Pribaz JJ, Breuing KH, Orgill DP. Vacuum-assisted closure in the treatment of degloving injuries. *Ann Plast Surg.* 1999; 42: 589-594.
- Labler, Trentz O. The use of vacuum assisted closure (VAC) in soft tissue injuries after high energy pelvic trauma. *Langenbecks Arch Surg.* 2007; 392: 601-609.
- Schaffzin DM, Douglas JM, Stahl TJ, Smith LE. Vacuum-assisted closure of complex perineal wounds. *Dis Colon Rectum.* 2004; 47: 1745-1748.
- Hao S, Juan L, Xin W. Treatment of traumatically cutaneous necrosis of buttocks using vacuum sealing drainage combined with ileostomy. *Eur J Trauma Emerg Surg.* 2016; 42: 87-90.
- Petrone P, Inaba K, Wasserberg N, Teixeira PG, Sarkisyan G, Dubose JJ, et al. Perineal injuries at a large urban trauma center: injury patterns and outcomes. *Am Surg.* 2009; 75: 317-320.