Surgery: Current Research

Lau et al., Surgery Curr Res 2017, 7:1
DOI: 10.4172/2161-1076.1000284

Case Report OMICS International

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 Plastic Reconstructive and Aesthetic 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 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. 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. We utilized negative pressure wound therapy as a temporary wound dressing to facilitate wound healing. We opted for a diverting colostomy to minimize infective complications as our patient sustained an extensive perineal injury adjacent to the anus. The patient was nursed on a differential air-loss mattress to minimize pressure necrosis. Delayed wound closure was performed on day 8 of injury after full demarcation has occurred.

Conclusion: We managed a specific presentation of an open perineal degloving injury which achieved a favorable outcome. With our approach, we were able to minimize tissue loss, minimize septic complications and reduce patient's morbidity.

Keywords: Perineal injury; Degloving injury; Perineal trauma

Introduction

Degloving injuries are a result of rotational forces that stretches the skin and subcutaneous tissue causing their avulsion from the deeper less mobile musculoskeletal structures. They are commonly caused by motor vehicle and industrial accidents [1]. Degloving injuries of the perineum are related to high-energy trauma. Fractures to the lower extremities and pelvis along with injuries to the genitourinary system, anorectal and intra-abdominal organs are commonly involved [2]. A multidisciplinary team consisting of surgeons from Plastic, General (i.e., trauma and colorectal), Orthopedic and Urology surgery is needed in the management of such injuries [2]. This case report, documents the management of an open perineal degloving injury (Table 1). It is written in accordance with the CARE guidelines [3].

Case Presentation

Our patient, a 22 year old male, was a pedestrian involved in a motor vehicle accident. He 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 sustained an extensive degloving injury involving his perineum (Figure 1).

Clinical findings and diagnostic assessment

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 and 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 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 was 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.

***Corresponding author:** Jane Lim, Division of Plastic Reconstructive and Aesthetic Surgery, Department of Surgery, National University Health System, 1E Kent Ridge Rd, Singapore 119074, Tel: (65) 6772 5555; E-mail: cfslimj@nus.edu.sg

Received November 15, 2016; **Accepted** January 05, 2017; **Published** January 12, 2017

Citation: Lau J, Lim X, Chen OW, Lin YY, Lim J, et al. (2017) A Case Report of Traumatic Perineal Degloving Injury. Surgery Curr Res 7: 284. doi: 10.4172/2161-1076.1000284

Event	Details	Date
Presentation to the emergency department	Examination under anesthesia. Creation of de-functioning sigmoid loopcolostomy	7th June 2015
Closure of perinial degloving injury	Serial washouts anddebridement were performed till complete skin closure was achieved	7-15th June 2015
Discharge from hospital		19th June 2015
Clinic follow-ups	Dressing change during clinic follow-up till completewound healing was achieved	22 June-31st July 2015
Colostomy reversal	Uneventful loop sigmoid colostomy closure	4th September 2015

Table 1: Timeline of events.

Figure 1: Initial appearance of the patients perineal degloving injury when examined under anesthesia.

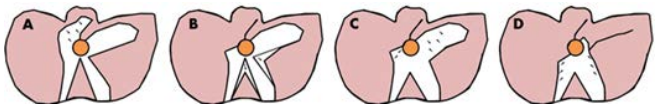

Figure 2: (A) Closure of anterior perineal laceration on post-injury day 1, (B) Debridement of necrotic tips, (C) Closure of anterior border of left degloved segment on post-injury day 4, (D) V-Y closure of sacral degloved segment on post-injury day 7.

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

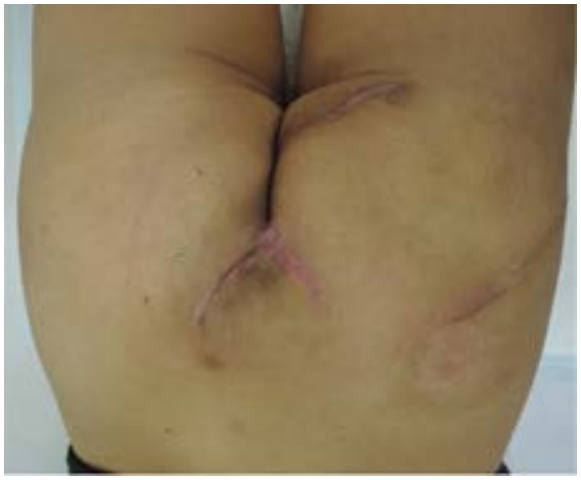

Figure 4: Perinial degloving injury on post- injury day 45.

Therapeutic 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 punctate 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 positon in a V-Y fashion to ensure a tension free repair (Figure 2D). Complete closure was achieved in 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]. The mechanism involves large rotational forces such as a spinning tire causing traumatic avulsion of the skin and subcutaneous tissue from underlying musculoskeletal structures [1]. While the avulsed skin flap may initially appears viable, it is not reflective of the true extent of the injury. 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 [4]. This 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 [4]. Hence, if primary reattachment is attempted, these flaps often have high rates of

flap necrosis that can progress to severe wound infection [5].

Perineal degloving injury involves avulsed perineal skin and subcutaneous tissues which can extend anteriorly into the lower quadrant of the abdomen, posteriorly into the perianal space and laterally into the buttocks and thighs [6]. Perineal trauma can be complicated by lower extremities and pelvic fractures, genitourinary injuries, anorectal lacerations and intra-abdominal injuries [2]. Perineal soft tissue injuries with open pelvic fracture can be classified based on Fu's classification [7]. Our patient sustained a Type C1 perineal injury as his wound involved the soft tissues in both the anterior perineal triangle area (urogenital zone) and the posterior triangle area (anal zone). No urethral or anorectal injuries were present. He also sustained a concomitant open pelvic fracture, which was a stable, Type A pelvic fracture (Tile Classification).

The indications for fecal diversion in patients with open pelvic fractures are recommended based on the presence of transmural rectal lacerations and the location and extent of the associated soft tissue injury [8]. In the absence of transmural rectal lacerations, the fashioning of a diverting colostomy is not proven to decrease infective complications [9]. This is also advocated by Fu who recommends that fecal diversion is not mandatory for patients without anorectal injuries (i.e., Type B1, C1 and C2 perineal injury) [7]. In our patient, we had opted for a prophylactic diverting colostomy as he had sustained an extensive perineal soft tissue injury, involving degloved segments in multiple planes, located adjacent to the anus (Figure 1). His injury, which is located within Faringer zone 1, (i.e., anteriorly between the pubic tubercle, extending parallel to the inguinal creases and continuing posteriorly over the sacrum) is at high risk of wound sepsis from fecal contamination [10].

In terms of soft tissue managements, our principles were to minimize tissue loss and minimize wound contamination. Sequential irrigation and debridement coupled with the use of NPWT as a temporary wound dressing helped facilitate wound healing in a clean environment [11]. Prior to NPWT application, it is important to ensure that hemostasis within the wound bed is secured. With direct negative pressure, there is a risk of damage to friable vessels within the perineal wound bed which can lead to bleeding. The output from the NPWT has to be closely monitored. NPWT protects the wound via a polyurethane foam which is sealed airtight by a polyvinyl foil [12]. A high negative pressure applied allows for continuous drainage of the exudative fluids from the wound bed [13,14]. 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 [12,14].

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 mmHg. 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 was most pronounced after 24 hours with the distal tips of the flaps most affected. From our experience, the extent of necrosis tapers over days with demarcation established by day five to seven post-injury. The wound bed should be clean with minimal exudate prior to reconstruction of the degloved skin flaps. In our patient, as tissue viability was in doubt at day 5, we continued to perform debridement and staged closure. Complete wound closure was performed 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.

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 and should not be generalized. We chose to fashion a prophylactic diverting colostomy for our patient as he had an extensive perineal wound adjacent to his anus. We successfully managed his perineal degloving injury with serial debridement coupled with temporary wound dressing utilizing NPWT prior to reconstruction. This approach minimizes tissue loss, minimizes septic complications and reduces patient's morbidity.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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