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## CASE REPORT

**Paediatric perineal injury following explosive blast:  
A Case Report****Nwashilli NJ\*, Arekhandia AI**

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**Summary**

Perineal injury in children is uncommon. Injuries range from minor perineal skin laceration to severe injury to the genitourinary tract, anorectal region and the pelvic bone. The mechanisms of injury are usually attributed to blunt trauma, penetrating injuries like impalement injury, or sexual abuse. Perineal injury resulting from explosive blast in children is rare. The management depends on the time and mode of presentation and examination findings. Early presentation (a few hours after injury) with 1st or 2nd-degree perineal injury may benefit from debridement with primary repair of soft tissues and/or sphincters. Late presentation (days after injury) with 3rd or 4th-degree injury will require diverting colostomy or urinary diversion and wound drainage. This is a report of an unusual case of severe perineal injury in a child following explosive blast sustained while squatting close to packed explosives that got detonated. The perineal injury was initially managed with colostomy and wound drainage. The colostomy was closed after the wound had healed with good faecal continence achieved and without perineal soft tissue or anal sphincteric repair. It is concluded that severe isolated paediatric explosive blast perineal injury is rare but is amenable to surgical care.

*Keywords: Childhood, Perineal injury, Paediatric trauma, Explosive blast.*

**Introduction**

The perineum consists of that part of the trunk of the body caudal to the pelvic diaphragm (levator ani and coccygeus). [1] A line joining the anterior parts of the ischial tuberosities divides this diamond-shaped area into a larger posterior anal region and a smaller anterior urogenital region. [1] The anal region contains the anal canal and the ischioanal fossae while the urogenital region contains the external genitalia.

Perineal injury is uncommon in children. Its incidence is 4-6% among injured children of any aetiology. [2] Injuries may range from a

minor perineal laceration to severe injuries involving the genitourinary tract, anorectal sphincters and the pelvic bone. Furthermore, the perineum is protected by the bony pelvis. Perineal injuries are usually due to blunt trauma, impalement injury, or following sexual abuse. Other causes include direct injury from a road traffic accident, firearm injury and blast explosion. Blunt trauma accounts for 8-10% of perineal trauma. [3] Impalement injuries are relatively uncommon and are usually caused by accidental falls on an object. [4] Injury to the perineum in children from a blast is rare. [5] This is because perineal blast injuries occur in situations of war, conflicts or in post conflicts regions where

children are exposed to explosive remnants of war (ERW), unexploded devices, land mines, military shelling and aerial bombardments, improvised explosive devices (IEDs) and suicide bombing. [6] Children are usually not actively involved in wars hence, such injuries occur in them by accident. The problems or complications arising from perineal injuries include wound infection (21.9%), wound disruption (9.4%), anorectal incontinence (16%), urethral stricture and vaginal stenosis. [7]

We report an unusual case of severe perineal injury in a child following an explosive blast sustained while squatting close to a pack of explosives that got inadvertently detonated.

## Case Description

A 4-year old boy sustained an injury to his perineum from a local explosive blast while playing with his elder brother. The explosives were arranged and packed waiting for detonation as part of the funfair at a burial ceremony. The elder brother lit fire to the gunpowder lined to the explosives. It exploded and hit the patient in the trunk while in a squatting position. He bled profusely from the wound. There was no loss of consciousness and no bleeding from craniofacial orifices. The reviews of other systems were normal at presentation.

General examination revealed a boy in severe pain distress, conscious (Glasgow Coma Score of 15), pale, dehydrated, afebrile, anicteric, not cyanosed and with no pedal oedema. His pulse rate was 130 beats/minute (Normal: 80-120 beats/minute), respiratory rate was 36 cycles/min (Normal: 22-32 cycles/minute), body temperature was 37°C (Normal: 36.6-37.2°C), oxygen saturation (SPO<sub>2</sub>) of 97% and the haematocrit was 23% (Normal: 32-42%). There was an extensive deep wound in the buttocks, natal cleft and anus with devitalized tissues and debris, bruises in the right inner

thigh, and partial thickness burn on the trunk (Figure 1). There was no haematuria or blood at the tip of the phallus.

The child was resuscitated with intravenous fluids and transfused with two units of whole blood over 48 hours while monitoring the haemodynamics. Parenteral analgesics, antibiotics (Ceftriaxone and Metronidazole), intramuscular Tetanus toxoid 0.5mls stat and intramuscular Human Tetanus Immunoglobulin (HTIG) 250IU stat were administered. A 2-way size 10 Foley's urethral catheter was inserted to monitor urine output.

Examination under general anaesthesia (EUA) was carried out after obtaining informed consent from the parents. The findings included a large perineal crater with the devitalized surrounding skin and exposed pelvic bone, exposed rectum with the lax anal sphincter, superficial burns on the scrotum with oedematous phallus and 10% diffuse partial-thickness burn on both thighs (Figure 2). The perineal crater was debrided and irrigated copiously with Normal saline and honey dressing was applied. A Hartmann's colostomy was constructed to divert faeces away from the wound. Post-operatively, the wound was dressed daily with Normal saline and honey. On the fifth day postoperatively, the child became pyrexia (body temperature 38°C). The wound swab did not yield any organism on bacteriological culture but the urine culture yielded *Klebsiella* spp. sensitive to only Imipenem. Thereafter, the child was treated with intravenous infusion of Imipenem at 500mg q8 hours for seven days (at a dose of 60mg/kg/day) and the infection resolved. The wound granulated contracted and sealed with minimal scar and ulcer (Figures 3 and 4).

Digital rectal examination showed good anal sphincteric tone. The colostomy was closed after two months with good faecal continence. Faecal continence was re-assessed after six months and the caregiver (mother) confirmed that the child was not soiling his clothes and always called for attention whenever he

wanted to defaecate. Additionally, a digital rectal examination with the little finger revealed good finger grip, which showed good

function of the anal sphincter. The child is on long-term follow up for monitoring of anal sphincteric function.



**Figure 1: Extensive deep wound in the buttocks, natal cleft and anus with devitalized tissues and debris packed with gauze, and bruises in the right inner thigh.**

## Discussion

The usual aetiologies of perineal injury include road traffic accident, accidental fall from a height, impalement injury and blunt trauma. [7] Kaplanoglu *et al.* described the mechanisms as straddle (falling or sitting on the perineal area with the legs open), non-straddle (trauma, like ball or stone to the perineum), laceration due to fall or external factor and post-coital trauma in their study on the mechanism and treatment of genital injuries in paediatric and adolescent girls. [8] This differs from the injury reported in the index child in this case of blast explosion which is rare. In developed countries, sexual abuse and firearms injury accounted for the majority of

cases, [9,10] while road traffic accident was reported in 10% of cases. [9]

Perineal injury occurs more commonly among boys than in girls. [11] This is due to aggressive play and more strenuous activities by boys which can lead to injury as the index child was a boy. The perineal injury sustained by the child was classified as severe. Severe perineal injury is a third or fourth-degree perineal injury. A third-degree perineal injury is an injury to the perineum involving the anal sphincters while a fourth-degree injury involves the anal sphincters, the anal mucosa and the urogenital structures. [12] The injury in the index case involved the anal mucosa and the sphincter.



Figure 2: Large perineal crater with the devitalized surrounding skin and exposed pelvic bone, exposed rectum with the lax anal sphincter, superficial burns on the scrotum with edematous phallus and diffuse partial-thickness burn on both thighs after cleaning and debridement.



Figure 3: Healing and granulating wound 6 weeks post-injury and a colostomy covered with an improvised bag.

Paediatric perineal injury is rare. [5] Edwards *et al.* in their study of 4,983 blast injury among civilian patients in Afghanistan and Iraq; in this cohort, 25% were children younger than

15 years and also reported that injuries in children were more likely to occur in the head and neck and less likely in the bony pelvis (perineum) and extremities. [13] This is

corroborated by the findings in other studies. [6, 7] Blast injuries tend to affect multiple parts of the body.

Examination under general anaesthesia is recommended in perineal injury to avoid underestimation of the severity of the injury as well as the probability of missed injuries. [7] The absence of obvious external injury does

not preclude genitourinary tract injury or rectal injury especially with impalement mechanism. This index child had an examination under general anaesthesia and the findings helped to categorize the injury as a severe perineal injury with gross contamination which informed the decision to carry out colostomy alone without attempting any primary repair at presentation.



**Figure 4:** The contracted, completely sealed wound with minimal ulcer and scar 10 weeks post-injury

There is no standard management for perineal injury in children. [7] Current management options in children are similar to those in adults and entail primary repair of the sphincter and/or all soft tissue injuries without colostomy in extraperitoneal partial-thickness anorectal injury, sphincter injury and minimal contaminations; primary repair of the sphincter, vagina, urethra and soft tissue injuries with colostomy in full-thickness anorectal and sphincter injury or combined anorectal and vaginal injury; and faecal diversion, urinary diversion, wound drainage

without repair in combined anorectal, sphincter, urethral and vaginal injuries. [7]

The index child had colostomy with daily wound care. This is similar to Hashish's report on the management of five cases of severe perineal injury in children out of 32 cases of perineal injury. Two of the patients had combined anorectal and sphincter injury, another two had combined anorectal and urethral injury while one patient had combined anorectal and vaginal injury. Faecal diversion (colostomy), urinary diversion and

wound drainage without repair were the management options adopted with a good outcome. The outcome in the index child was good and the patient survived. Edwards *et al.* in their study of 4983 children presenting with blast injuries reported a mortality rate of 8%.<sup>[13]</sup> However, Thompson *et al.* reported mortality over double that of Edwards *et al.* (18%).<sup>[14]</sup> This was attributed to operational tempo and increasing use of improvised explosive devices.

## Conclusion

Perineal injury in children following a blast explosion is rare. Colostomy without soft tissue/sphincteric repair in severe perineal injury is sufficient to divert faeces away from the wound and facilitate secondary wound healing in addition to other treatment modalities with a good outcome. Though this treatment option was adopted for the index case, other treatment options in perineal injury depend on the time of presentation and the degree of perineal injury. It is recommended that explosives or detonatable materials should be kept away from the reach of children. Children should always be under the close watch or observation by a responsible adult especially when they are playing.

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