

Multiple Grade IV Pressure Injuries in a Young Boy: A Look Into the Pathognomic and Management of Iliac Crest Pressure Injury

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ABSTRACT

Pressure injury (PI) not only exerts a physical burden on a patient's body but also adds to his mental and economic stress. We, hereby, present a case report of a 17-year-old boy, who sustained a cervical spine injury after a road traffic accident, 10 months back, and later developed multiple pressure injuries over the bilateral trochanter and the left ilium. We discuss the pathognomic of the occurrence of PI at unusual sites like the ilium and our management for coverage of such defects.

Key words: Cervical spine injury, Pressure injury, Iliac crest injury

Pressure injury (PI) not only exerts a physical burden on a patient's body but also adds to his mental and economic stress [1]. Chronically ill, bed-ridden and aged patients are always predisposed to the development of PI unless nursed with frequent position changes over an air mattress [2]. Every now and then, we come across young patients who develop PI, either due to insensate and powerless lower limbs or prolonged bed-ridden medical conditions. The temptation to close any pressure ulcer primarily should always be resisted [3].

We, hereby, present the case report of a 17-year-old boy, who sustained a cervical spine injury after a road traffic accident, 10 months back, and later developed multiple pressure injuries over the bilateral trochanter and the left ilium. We discuss the pathognomic of the occurrence of PI at unusual sites like the ilium, which is explainable by a new emerging concept of the cliff phenomenon and our management for coverage of such defects.

CASE REPORT

A 17-year-old boy, who sustained a cervical spine injury after a road traffic accident, 10 months back, came to our emergency with complaints of non-healing ulcers over both trochanteric areas and the left ilium for 6 months. He complained that the ulcers were initially small and have gradually increased to the present size. There was purulent discharge from the ulcers.


On general physical examination, his motor power in the upper limb was 5/5 and in the lower limb was 1/5. He had a loss of

pain sensations over bilateral lower limbs. On local examination, an ulcer measuring 6 × 6 cm with a 3 cm of undermining superiorly and inferiorly was present over the right trochanteric area (Fig. 1a). On the left side, one ulcer was present over the trochanteric area measuring 4 × 4 cm with no undermining, and one ulcer was present over the iliac crest (Fig. 1b).

The ulcer over the ilium was present 3 cm posterior inferior to anterior superior iliac spine (ASIS). It measured 4 × 2 cm with 2.0 cm undermining toward the leg and 1 cm toward the head. All routine evaluations were done and the patient's nutritional status was well maintained. His serum albumin was 4 mg/dl. The magnetic resonance imaging revealed no abnormality.

After preparing the wound with regular dressings, the ulcer excision and flap cover for the right side was done in the first sitting. In the lateral decubitus position, the trochanteric ulcer along with pseudobursa was excised and covered with a tensor fascia lata (TFL) V-Y advancement flap (Fig. 1c).

After 3 weeks, when the right side was well-healed, the left side trochanteric ulcer was excised and covered with a TFL flap (with hatched-shaped modification) in the lateral decubitus position. In the same sitting, the patient was made supine and the iliac sore was excised along with pseudobursa. The underlying iliac crest was nibbled and the bony prominence was smoothed. A defect of 4 cm length, 3 cm width, and 3 cm depth toward the lower limb was created. Taking the proximal edge of the defect (which was toward ASIS) as a pivot point and the radius of the defect as 4 cm, a rotation flap was marked with a radius of 6 cm. The blood supply of this flap was based on the random supply

Access this article online	
Received - 24 March 2022 Initial Review - 12 April 2022 Accepted - 11 June 2022	Quick Response code 
DOI: 10.32677/ijcr.v8i6.3404	

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Figure 1: (a) Pre-operative image showing right trochanteric pressure injury; (b) shows V-Y TFL flap for the defect; (c) shows pre-operative image showing both left trochanteric and left iliac crest pressure injuries; (d) shows TFL flap (hatched modification and groin rotation flap

from the superficial circumflex iliac artery. The flap was raised in the suprafascial plane and rotated to cover the defect (Fig. 1d).

The donor area was primarily closed. The flap settled very well and the drains were removed in ten days. The patient was discharged and advised against weight-bearing on the operated site for the next 4 weeks. Figure 2 shows the outcome at 9 months with no recurrence.

DISCUSSION

The national pressure ulcer advisory committee gave the terminology of PI (Table 1) for previously known pressure ulcers [4]. Although the etiology of these pressure injuries has been attributed to the prolonged presence of sustained pressure over the skin of bony prominences [5], this fails to explain different pressure ulcer deformities at various anatomical locations. It was observed that pressure ulcer deformity has a deeper undermining in the trochanteric area than in the sacrum or heel, etc. The difference in the physical properties of these ulcers can be attributed to variation in the dermis and subcutaneous tissues along with the age of the patient [6]. We noticed in our case, that the iliac ulcer deformity resembles trochanteric ulcer deformity more than sacral.

Takahashi *et al.*, in their study in 2017, depicted that the shape and position of the bone, relative external forces, and mobility of soft tissue, play a significant role in the extent of formation of pressure ulcer deformity [7]. They also demonstrated the concept of bilayer pressure ulcer, where damage occurs in different layers of tissue, not just over the bone, due to the difference in the distribution of relative external pressure, in areas with mobile



Figure 2: Well-healed operated site scars at 9 months

Table 1: Pressure injury classification

Stage	Condition of skin/tissue
1	Skin erythema which may be lightly pigmented or darkly pigmented or non blanchable or with edema
2	Partial thickness skin loss with exposed dermis
3	Full-thickness skin loss
4	Full-thickness skin and underlying tissue loss
Unstageable	Obscured full-thickness skin and tissue loss
Deep tissue pressure injury	Persistent non blanchable deep red, maroon, or purple discoloration

skin over narrow bones (such as ilium and coccyx). In our case, we noticed undermining in the superior and inferior direction of the ilium pressure ulcer (as also in the right trochanteric ulcer). Takahashi *et al.*, in 2015, attributed the etiology of undermining in such deformities to the cliff phenomenon [8]. Cliff phenomenon explains that around mobile locations such as ilium and trochanter and the traction forces cause more damage in the subcutaneous areas around bone than to the edge of the bone itself, whereas, on the flat surface of a bone like sacrum, the undermining does not extend beyond bony prominences. He demonstrated that by reducing these traction forces with counter-strapping and adequate positioning, the undermining of the ulcer decreased.

Although the patient was not explained about surgical management for such defects, we believe that the principle for all pressure ulcer surgery should always remain the same. We must do adequate debridement, excise all pseudo bursa, remove the bony prominence, and cover the defect with a robust flap [9]. In unusual sites like the ilium, the flap not only gives a cushion over the bony edge but also acts as a counter-strapping force for decreasing and preventing subcutaneous damage and undermining. In view of the need of the use of TFL for trochanteric sore on the same side, we preferred the groin area for rotation flap harvest. This flap was sturdy and robust to cover the defect of the ilium and the donor defect was closed primarily. A similar defect, where an implant over the iliac crest was exposed, was covered by a Limberg flap [10]. Adequate pressure relief from the operated site and frequent side changes are important post-operative guidelines to prevent the recurrence of sores especially in a patient with

reduced power and sensations [11]. Nevertheless, the friction, sheering, and traction forces should be minimized, along with adequate nursing care and air mattress, for long-term benefits in these patients [11].

CONCLUSION

We report this case to highlight the pathognomic of the development of PI at unusual sites like the ilium. The shape of the bone and mobility of the surrounding soft-tissue determines the relative distribution of external forces, which can cause different pressure ulcer deformities. We recommend frequent side changes, air mattresses, and adequate nursing care in paraplegic patients to avoid the recurrence of pressure injuries.

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Funding: None; Conflicts of Interest: None Stated.

How to cite this article: Shah S, Mittal RK, Garg R, Singh K, Gautam S. Multiple Grade IV Pressure Injuries in a Young Boy: A Look into the Pathognomic and Management of Iliac Crest Pressure Injury. *Indian J Case Reports*. 2022;8(6):185-187.