

Superior Acetabular Fracture: A Rare Variant Involving Both Anterior and Posterior Walls

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Learning Point of the Article:

Superior acetabular fractures are rare variants that require CT-based assessment and tailored surgical approaches.

Abstract

Introduction: Superior acetabular fractures are extremely rare and poorly covered by existing classifications.

Case Report: A 52-year-old male presented 2½ weeks after a road traffic accident with a superior acetabular fracture involving the roof, iliac wing, and both walls. He was treated through an iliofemoral approach with ASIS osteotomy, reduction using a Schanz pin, and fixation with two cannulated screws. At 6 months, he showed excellent function (Merle d'Aubigné score 17).

Conclusion: Superior acetabular fractures are rare variants requiring computed tomography-based assessment. The iliofemoral approach provides good exposure and favorable outcomes.

Keywords: Acetabular fracture, superior fracture, iliofemoral approach, computed tomography, fracture classification.

Introduction

Acetabulum fractures, classified by Letournel and Judet [1, 2], are renowned for their reproducibility Beaulé et al. [3] and pivotal role in surgical decision-making Laude et al., [4]; Matta, [5]. Upper fractures, a rarity in this classification, were notably absent in 403 cases per Duquenois and Senegas [6], and only 2 cases were documented among 940 by Letournel and Judet [2]. These fractures, which detach the acetabular roof and part of the anterior iliac wing from the posterior wall, challenge traditional categorization as posterosuperior fractures Letournel and Judet, [2]. This unique observation underscores the surgical complexities posed by such infrequently described acetabular fractures.

Case Report

Mr. S., aged 52, was found lying beside the road in an inebriated manner, and was referred from multiple centres, leading to a 2½ week delay in treatment. X-rays showed a superior type fracture of the right acetabulum (Fig. 1), according to Letournel and Judet [2], detaching the acetabular roof and the adjoining part of the iliac wing while respecting the continuity of the pelvic ring (Fig. 2). Besides this elementary displaced lesion, it was observed that the anterior, posterior and medial wall was part of the line (Fig. 3) with it being continuous with the voluminous upper fragment. Computed tomography (CT) showed separation of the anterior wall of the cranial fragment by a slightly displaced split line (Fig. 4 and 5). In addition, the patient had an

Author's Photo Gallery



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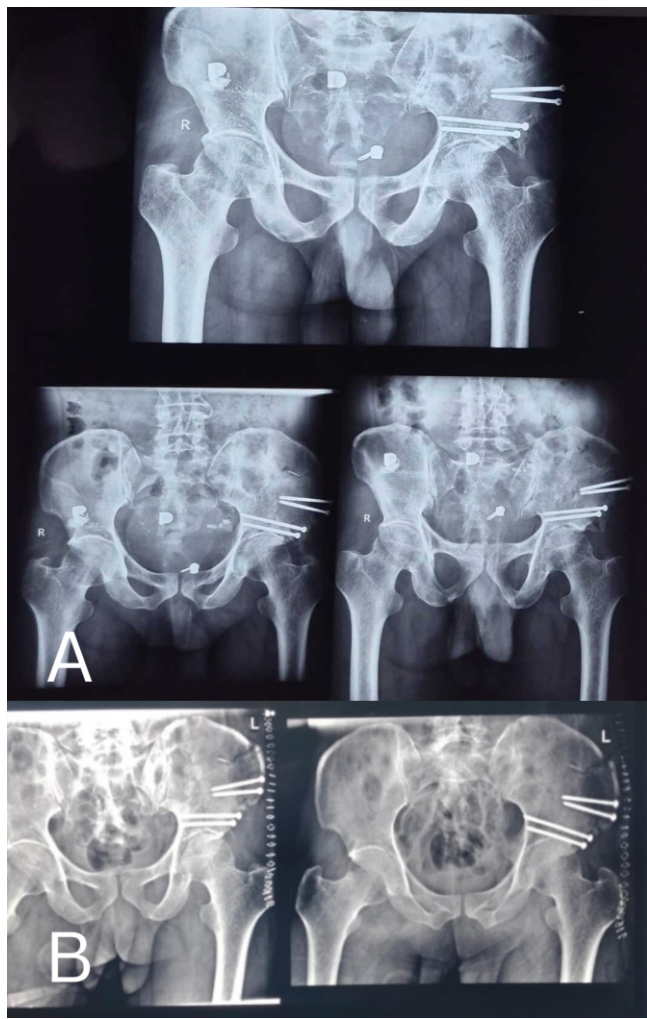


Figure 1: (A) Three months post-operative X-ray of the pelvis (B) Immediate post-operative X-ray of the pelvis.

non-displaced C1 fracture, which was not associated with any neurodeficit and was conserved. To better control the reduction of all the features, particularly of the anterior wall, an enlarged iliofemoral approach according to Judet and Letournel [1] was

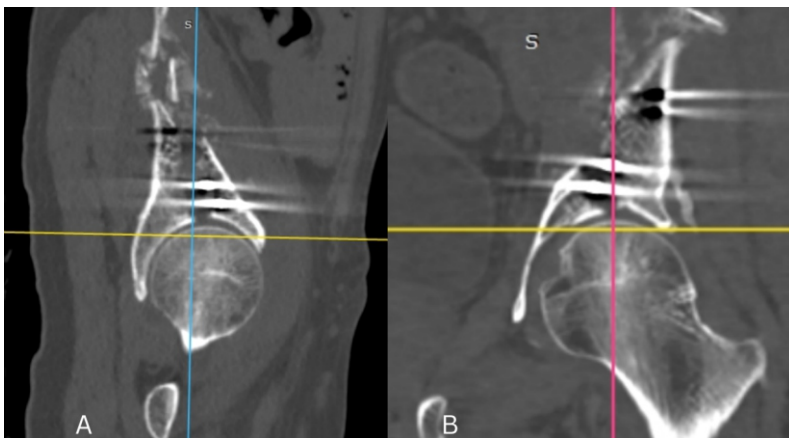


Figure 2: Post-operative computed tomography scan of fracture (A) Sagittal view (B) Coronal view.

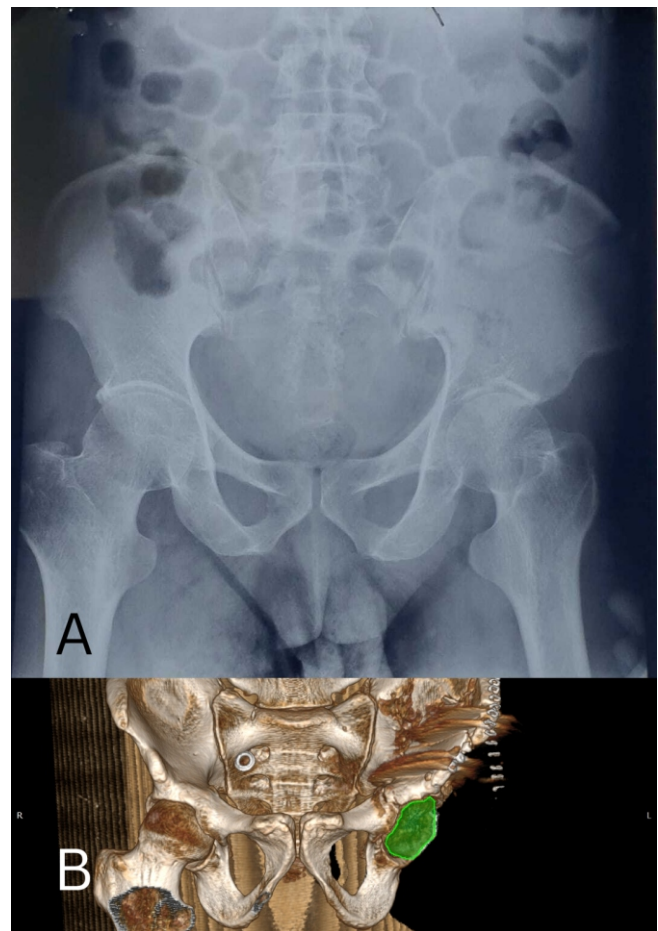


Figure 3: (A) Pre-operative antero-posterior X-ray of the acetabulum showing a superior type fracture of the right acetabulum (B) post operative 3D reconstruction of the pelvis showing superior fracture while respecting continuity of the pelvic ring.

performed with partial elevation of the iliacus. Anterior superior iliac spine osteotomy was done for better visualisation of the anterior column and wall and for garnering adequate angulation for osteosynthesis. The callus at the fracture line extending intraarticularly was removed, and reduction was achieved via pressure over the iliac blade and attachment of a Schanz pin to the iliac crest to use in a joystick manner. Osteosynthesis using two 4.5 mm fully threaded cannulated screws was performed with iliac blade fixation (Fig. 1). In the post-operative course, hip mobilization was started as soon as the pain subsided and continued at the patient's residence. No ossification prophylaxis was performed apart from abundant washing of the wound with isotonic serum throughout the procedure. At 6 months after the trauma, the Merle d'Aubigné functional score was, a reliable predictor of hip function, [7] was 17.

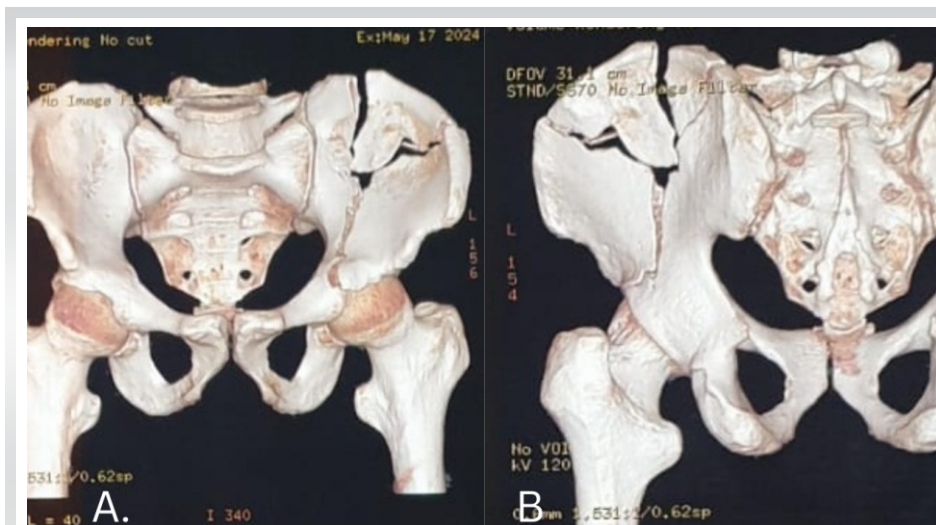


Figure 4: 3D model reconstruction of superior acetabular fracture (A) Anterior view (B) Posterior view.

Discussion

Superior fractures of the acetabulum are exceptionally rare and pose a unique challenge in classification within the Letournel and Judet's framework, which traditionally categorizes fractures into five elementary and five complex types [1, 2]. These fractures do not neatly fit into these defined categories, constituting a distinct entity due to their specific anatomical characteristics.

Letournel and Judet identified a subgroup among posterior acetabular fractures known as postero-superior fractures, which anatomically detach the upper sector of the acetabulum, including the roof, while typically leaving the lower part of the posterior wall intact [2]. They described cases where extension of the fracture line to the upper sector of the acetabulum was present, detached along with the anterior part of the iliac wing, yet respecting the innominate line [2]. This classification highlights the unique detachment pattern of these fractures compared to fractures of the posterior wall [2]. These fractures, involving detachment of the roof and variable engagement of the posterior wall, are akin to a variant of the pure upper fractures reported by Letournel and Judet [2]. The AO classification (Tile classification), which generally categorizes them as type A1 due to posterior wall involvement, does not fully capture the nuanced detachment of the upper acetabulum [8]. Letournel and Judet's classification offers a more precise description, facilitating accurate clinical depiction and reproducibility in therapeutic decision-making, particularly in choosing the optimal surgical approach [3,4]. For

fractures involving the upper acetabulum while respecting the posterior wall, an ilioinguinal approach is typically recommended to preserve muscle integrity [2]. However, in cases where the posterior wall is extensively detached, as observed, a dual approach or iliofemoral approach may be necessary for comprehensive fracture reduction and stable fixation [9]. In the clinical scenario presented, despite initial concerns about potential complications such as ectopic ossification associated with the iliofemoral approach, this surgical method was selected to ensure precise reduction and facilitate early post-operative recovery without notable

adverse effects [10, 11]. While the iliofemoral approach has drawn criticism for its potential overexposure and associated risks, it proved effective in achieving optimal reduction and enabling swift rehabilitation [12]. A similar fracture was described by Berton et al, but with only a posterior wall extension without an anterior wall involvement [13].

Conclusion

Superior acetabulum fractures present challenges in both classification and surgical management, underscoring the importance of a classification system that accurately reflects their anatomical complexity for improved treatment planning and patient outcomes.

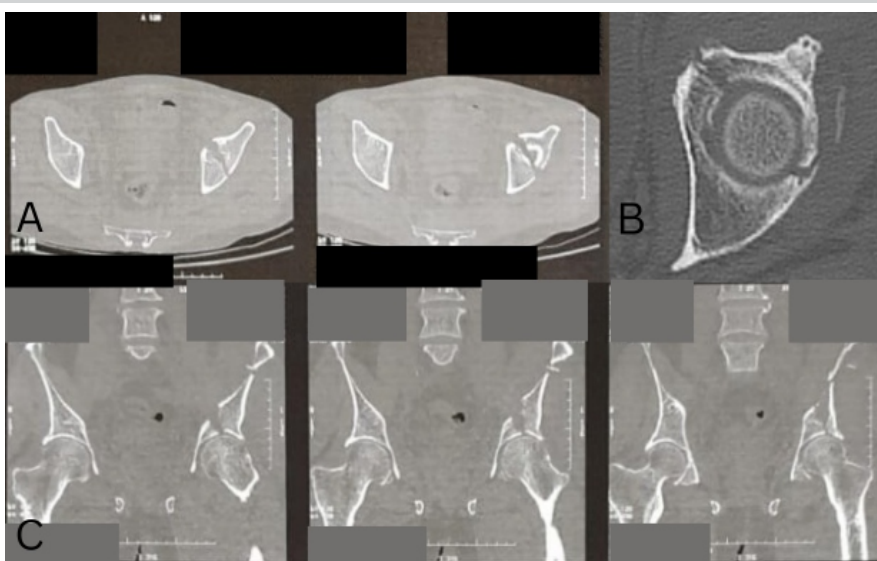


Figure 5: Pre-operative computed tomography scan (A) Sagittal view (B) Axial view (C) Coronal view.

Clinical Message

Superior acetabular fractures are rare and easily missed in standard classifications. Pre-operative CT defines the fracture, and a tailored iliofemoral approach enables precise reduction and favorable functional recovery.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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