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From Pelvis to Skull: A Rare Case of Floating Hip and Occipital Condyle Fracture in a Motor Vehicle Collision

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Abstract

High-energy trauma can mask severe internal injuries beneath subtle external signs, emphasizing the need for detailed imaging and timely multidisciplinary management. We present the case of a 37- year-old male involved in a motor vehicle collision without seatbelt use, who sustained a right occipital condyle fracture identified on CT scan, and left-sided femoral shaft and non-displaced acetabular fractures detected by plain radiographs. An avulsion fracture of the left anterior inferior iliac spine was also noted. The femoral fracture was managed with intramedullary nailing, while the acetabular fracture was treated using a percutaneous Lumbo-Pelvic Corridor 2 screw. The occipital condyle fracture was managed conservatively with a cervical collar. Laboratory tests were notable for a decreased haemoglobin and red blood cell count consistent with bleeding; no intra-abdominal or thoracic injuries were seen on the FAST scan. This case underscores the importance of comprehensive imaging and early coordinated management in polytrauma to reduce complications and preserve long-term function.

Keywords: Orthopedic, MVC, Femoral shaft, Fracture, Occipital condyle . Lc2, Trauma

Introduction

High-speed motor vehicle collisions (MVCs), particularly in unrestrained occupants, are associated with high rates of multisystem trauma and complex orthopedic injuries [1]. Among these, femoral shaft fractures are common indicators of high-energy impact. When fully displaced, they carry a substantial risk of hemorrhage, fat embolism, and prolonged immobility [2]. In trauma patients, femoral fractures often occur with other skeletal or visceral injuries, increasing overall morbidity and complicating early management [3].

Concomitant fractures of the femur and pelvis, often termed a "floating hip" are relatively rare but clinically significant. These injuries typically result from a direct axial load transmitted through the femur into the pelvis and acetabulum [4]. In a retrospective series, Elbakoury et al. noted a high complication rate and reduced long-term function in patients with ipsilateral femoral shaft and acetabular fractures, with common outcomes including post-traumatic arthritis and sciatic nerve involvement [5]. The presence of an anterior inferior iliac spine (AIIS) avulsion fracture in adults is uncommon, more often seen in adolescents, and further supports a high-force mechanism [6].

Adding to the complexity of this case is the presence of a right occipital condyle fracture (OCF). These injuries are rare, historically diagnosed in fatal trauma or missed entirely in survivors until the advent of modern CT imaging [7]. OCFs can be unstable and potentially associated with lower cranial nerve deficits or cervicomedullary compromise. However, when identified early and managed appropriately, especially in the absence of neurologic symptoms, many OCFs heal well with conservative treatment [8].

While each of these injuries has been individually described in the literature, the combination of a fully displaced femoral shaft fracture, ipsilateral pelvic fractures (acetabular and AIIS), and an occipital condyle fracture is exceedingly rare. To our knowledge, no published case has described this exact injury constellation. This case emphasizes the importance of comprehensive trauma imaging, rapid injury recognition, and multidisciplinary coordination to optimize outcomes in complex polytrauma scenarios.

Case Presentation

A 37-year-old male presented to the emergency department following a motor vehicle collision (MVC). He was the driver of the vehicle, which was traveling at moderate speed and experienced a side-impact collision. The patient was unrestrained at the time of the crash. On arrival, he was alert but confused (GCS 14/15) and complained of severe pain localized to the left thigh and pelvis. A laceration was noted on the forehead, and there was moderate signs of active bleeding which required 1 unit of blood transfusion CBC seen in (Table1) . He denied any associated symptoms, and there was no known relevant past medical or surgical history. Initial pain management included ketamine, paracetamol, and tranexamic acid.

Primary Survey:

Airway (A): Intact; the patient was speaking clearly. No tenderness over the midline of the neck. A cervical collar was placed pre-emptively.

Breathing (B): Bilateral air entry was equal with symmetrical chest expansion.

Circulation (C): Moderate internal bleeding with minimal abrasions. The pelvis was stable on examination. Vitals were stable.

Disability (D): Glasgow Coma Scale was 14/15. The patient was confused but showed no focal neurologic deficits.

Exposure (E): No limb deformities were initially noted. Log roll revealed no spinal tenderness.

A focused bedside EFAST (Extended Focused Assessment with Sonography for Trauma) scan revealed no free intra-abdominal fluid or evidence of pneumothorax or hemothorax. Cardiac, RUQ, LUQ, pelvic, and pulmonary views were all unremarkable.

Non-contrast CT of the head shows a non-displaced fracture of the left occipital condyle. No associated skull base fractures are seen(Figure 1 and 2). There is no evidence of intracranial hemorrhage, mass effect, or midline shift. The brain parenchyma shows preserved gray-white differentiation, and the ventricles and basal cisterns are within normal limits. No orbital, sinus, or mastoid abnormalities are identified. The cervicomedullary junction appears preserved on the available images. Findings are further evaluation with MRI was preformed to assess for associated ligamentous neurological injuries which was negative.

Table 1: Hemoglobin was dropping quickly before transfusing the patient (86 g/L) due to trauma-related blood loss. Blood transfusion was given, leading to a steady improvement until the HGB normalized

CBC	BEFORE DISCHARGE	2 DAYS POST TRANSFUSION	BEFORE TRANSFUSION
WBC	17.90 x10^9/L	7.26 x10^9/L	5.53 x10^9/L
RBC	4.35 x10^12/L	3.72 x10^12/L	2.83 x10^12/L
Hgb	133 g/L	115 g/L	86 g/L
Hct	0.391 L/L	0.328 L/L	0.263 L/L
MCV	89.9 fL	88.1 fL	93.1 fL
MCH	30.6 pg	30.9 pg	30.4 pg
MCHC	340 g/L	351 g/L	327 g/L
Platelet	306 x10^9/L	319 x10^9/L	293 x10^9/L
RDW-CV	0.145	0.146	0.116
PDW	11.2 fL	11.2 fL	11.0 fL
MPV	10.2 fL	10.1 fL	11.0 fL

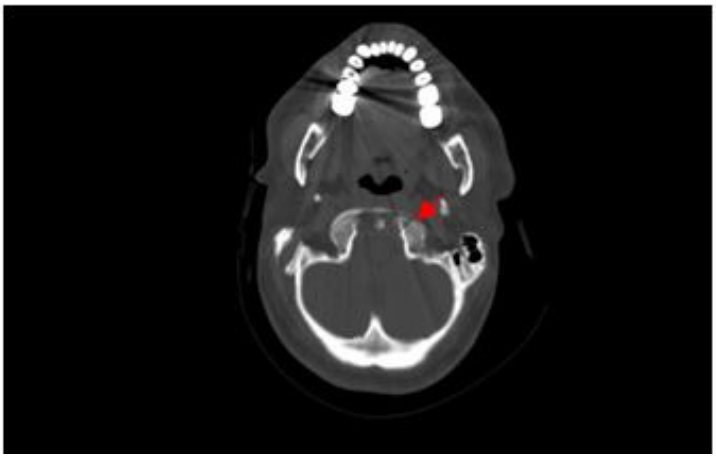

Figure 1: Non contrast head CT (axial view) showing A left sided occipital condyle fracture.

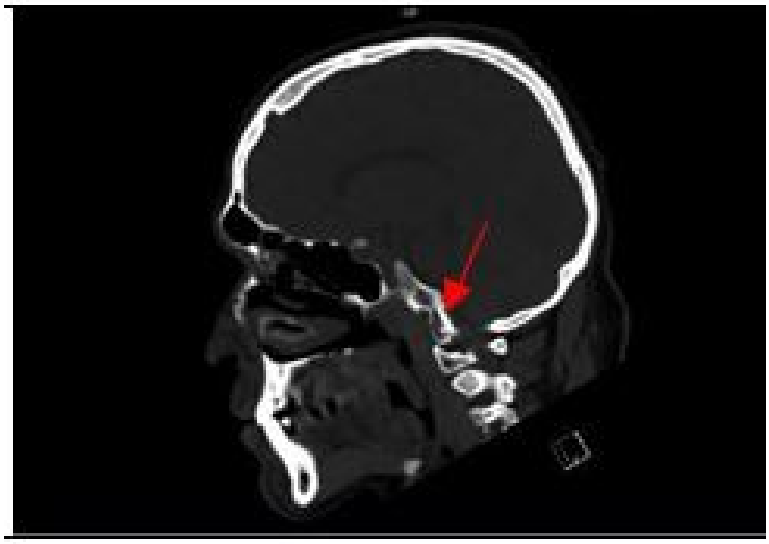

Figure 2: Non contrast head CT (sagittal view) Showing the same fracture in figure 1.

The patient left occipital condyle fracture was managed conservatively using a cervical collar without surgical intervention. This approach was chosen because the fracture was non-displaced and the MRI sowed no evidence of craniocervical instability or neurological deficit. Occipital condylar fractures classification and management according to Muller et al [9]. Shown in Table 2.

Mueller et al. classification	Location of the Fracture	Treatment
Type 1	Unilateral OCF without AOD	Conservative treatment for 6 weeks with nonrigid orthosis (cervical collar)
Type 2	Bilateral OCF without AOD	Conservative treatment for 6 weeks with nonrigid orthosis (cervical collar) or more rigid external immobilization in a halo-vest device
Type 3	Unilateral or bilateral OCF with AOD	Surgical treatment with occipito-cervical fixation

OCF = occipital condyle fracture; AOD = atlanto-occipital dislocation

The patient sustained a fully displaced midshaft femoral fracture that is shown in (Figure 3) and an associated acetabular fracture shown in (Figure 5) , both of which necessitated surgical correction due to instability, risk of nonunion, and functional compromise. According to widely accepted orthopedic guidelines, displaced femoral shaft fractures require operative fixation—typically with intramedullary nailing. To allow early mobilization, reduce complications, and ensure proper alignment and healing [10] which is a surgery that our patient underwent and the fracture femur was aligned back to its normal position. The post operative X-RAY of the left femur is seen in figure (4) . Similarly, acetabular fractures, particularly those involving weight-bearing surfaces or resulting in joint incongruity, are strong indications for surgical stabilization to prevent post-traumatic arthritis and restore hip function [11,12]. The patient acetabular fracture was stabilized using an LC2 percutaneous screw, a minimally invasive technique suitable for his condition (Figure 6). In contrast, the patient's avulsion fracture of the left anterior inferior iliac spine (AIIS) was minimally displaced and did not compromise pelvic stability or cause significant functional limitation. Based on current literature, non-operative treatment with rest, analgesia, and gradual mobilization is recommended for most iliac spine avulsion fractures, especially when displacement is less than 2–3 cm [13,14]. Surgical fixation is generally reserved for cases involving high-demand athletes, large displacement, or failure of conservative treatment [5].

Postoperative recovery has been satisfactory. Pain is well controlled with regular analgesics, and the patient was prescribed oxycodone 5mg for breakthrough pain as needed. He is planned for discharge with non-weightbearing mobilization of the left lower limb as per the physiotherapy team , continue the use of thromboprophylaxis (enoxaparin 40mg). A clinical review was scheduled in two weeks of time.

Figure 3: Pre-operative anteroposterior radiograph of the left femur showing a displaced midshaft fracture of the femur

Figure 4: Post-operative radiograph of the left femur after intermedullary nailing

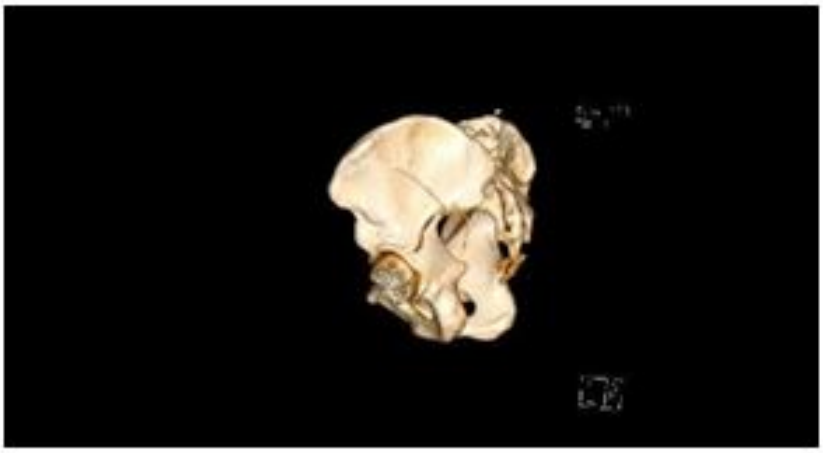

Figure 5: This is a 3D reconstructed CT image of the pelvis, clearly demonstrating a left-sided acetabular fracture

Figure 6: This is an anteroposterior (AP) pelvic X-ray showing internal fixation of a left acetabular fracture. The image demonstrates multiple LC2 (lumbopelvic corridor 2) screws and a reconstruction plate used to stabilize the posterior column and iliac wing

Discussion

This case represents an uncommon constellation of injuries resulting from a high-speed motor vehicle collision involving an unrestrained driver: a fully displaced femoral shaft fracture, ipsilateral acetabular and anterior inferior iliac spine (AIIS) fractures, and a concomitant occipital condyle fracture (OCF). While each of these injuries individually signifies substantial force and trauma, their synchronous presentation in a single patient is exceedingly rare and, to our knowledge, unreported in the current literature.

Unlike most polytrauma cases where multisystem injuries may overwhelm initial assessments and lead to missed diagnoses, this patient benefitted from thorough imaging and a systematic trauma evaluation. Studies have emphasized that missed injuries remain a major concern in polytrauma, especially when multiple distractions, altered mental status, or competing priorities obscure full assessment [1,3,7]. In contrast, in our case, no injuries were missed, likely due to strict adherence to ATLS protocols, early application of full-body trauma CT scanning, and coordination among trauma, orthopaedic, and neurosurgical teams.

Management of this patient spanned the full spectrum of trauma care: from conservative treatment of the OCF which are frequently underdiagnosed, with studies indicating that up to 50% of cases may be missed when relying solely on conventional radiographs [15] - given its stability and absence of neurologic deficits [7,8]—to minimally invasive monitoring of the nondisplaced AIIS fracture [13,14], to definitive open reduction and internal fixation (ORIF) of the displaced femoral shaft fracture [2,10]. This multi-modality approach underscores the necessity of tailoring interventions not just to injury type, but also to the patient's neurologic status, hemodynamic stability, and long-term functional goals. Importantly, throughout this trajectory, the patient's hemodynamic stability remained central to decision-making.

In alignment with findings from the PROMMTT study, which demonstrated improved survival with early initiation of transfusion based on clinical judgment rather than delayed response to laboratory thresholds [PROMMTT, 2013], this case supports the practice of initiating blood product administration when physiologic indicators suggest evolving shock or ongoing blood loss. Waiting for hemoglobin values to drop may miss the critical window for effective intervention in trauma care. In our case, early clinical decision-making guided transfusion support even before lab-confirmed anemia, exemplifying a proactive and outcome-oriented approach to trauma resuscitation. This multi-modality, physiology-guided approach reflects the evolving principles of trauma care-where timing, coordination, and clinical insight may be just as important as the injuries themselves in determining outcomes [16].

Conclusion

This case highlights the significance of recognizing and promptly managing rare, high-energy injury patterns that span multiple anatomical regions. The unique combination of a fully displaced femoral shaft fracture, ipsilateral acetabular and AIIS fractures, and an occipital condyle fracture in a single patient underscores the need for comprehensive trauma imaging and meticulous clinical evaluation. Unlike many polytrauma scenarios where injuries are commonly missed, early identification and a multidisciplinary approach enabled a tailored treatment plan ranging from conservative to surgical interventions-ultimately resulting in a favourable outcome.

Future cases with similar complex presentations can benefit from this structured approach: early whole-body imaging, injury-specific management strategies, and close interdepartmental collaboration. Documenting such rare constellations not only contributes to the literature but also enhances awareness, preparedness, and clinical decision-making in high-stakes trauma care.

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