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Femoral Head Fractures: Conservative or Surgical Treatment? About 2 Cases

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Abstract **Case Report**

Femoral head fractures are uncommon and invariably occur alongside hip dislocation. High-energy trauma is the sole cause, and diagnosis can be missed using only standard pelvic radiographs (anterior-posterior, lateral, ¾ alar and obturator views), a CT scan is often recommended for a precise diagnosis. Treating dislocated hips with femoral head parcelar fractures is challenging. This difficulty arises from selecting both the surgical approach and the management of the fracture fragments. Additionally, the risk of osteonecrosis and osteoarthritis compromises the long-term function of the hip. We report two cases of femoral head fracture associated with hip dislocation. The first was received surgical treatment, while the second was managed conservatively.

Keywords: Conservative, dislocation, emergency, femoral head fracture, reduction, surgery.

INTRODUCTION

A traumatic hip dislocation frequently occurs alongside a posterior acetabular wall fracture. Less commonly, it may be accompanied by a femoral head fracture. The latter was first described by Birkett in 1869 [1]. Treatment of this injury can involve a non-surgical approach like closed reduction, or a surgical procedure. Surgical options include open reduction and internal fixation of the femoral head fracture, or removal of the fractured fragment. Furthermore, concomitant femoral neck or acetabular fractures may require treatment [2].

We report two cases of femoral head fracture associated with hip dislocation. The first was received surgical treatment, while the second was managed conservatively.

CASE PRESENTATION

Case 1:

A 33-year-old man with no significant past medical history presented to the emergency department after 3 hours following a motor vehicle collision on the same day. He reported left hip pain and inability to bear weight. On examination, he was alert and oriented (Glasgow Coma Scale 15/15). Vital signs were normal (blood pressure 120/70 mmHg, respiratory rate 22 breaths per minute, heart rate 75 beats per minute). Physical examination revealed an abnormal position of the lower limb (vicious attitude). The hip was flexed, adducted and internally rotated. Fortunately, there were no signs of distal vascular-nerve deficit. Standard X-rays diagnosed a Pipkin IV posterior dislocation fracture of the left hip (figure 1). Reduction under general anesthesia was performed after 4 hours post-trauma. CT scan post-reduction showed associated femoral head fracture with posterior acetabular wall fracture (figure 2); utilizing the Pipkin and Chiron classifications, we determined the fracture to be a Pipkin IV, Chiron type 3.

We employed a posterolateral approach to gain exposure to the joint, a displaced femoral head fracture was identified. A large fragment and smaller articular debris were located in the non-weight-bearing zone. The major fragment of the femoral head was carefully manipulated back into anatomical position, restoring the articular surface. Two Herbert screws and two cancellous screws were used to fix the fragment with specific attention to avoiding screw protrusion (figure 3). The fragment of the posterior wall of the acetabulum is reduced, then fixed with 2 cancellous cannulated screws 4.0 mm; Then the hip joint was reduced. We tested the range of motion and joint stability.

A control X-ray was taken, showed good joint congruence with acceptable compression of the femoral head fragment (figure 4). Currently, the patient is doing well, and experiencing no pain. Regular follow-up will be maintained for the patient.

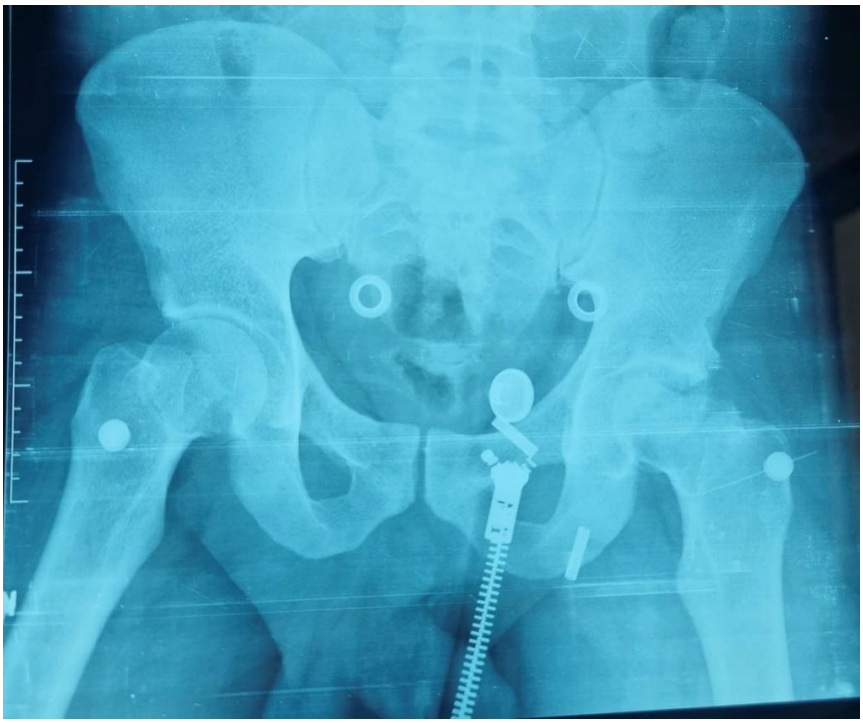

Fig. 1: Radiograph of the front pelvis showing a fracture of the femoral head after reduction

Fig. 2: CT images showing a femoral head fracture classified as Pipkin IV. A: axial sections B: 3D reconstruction

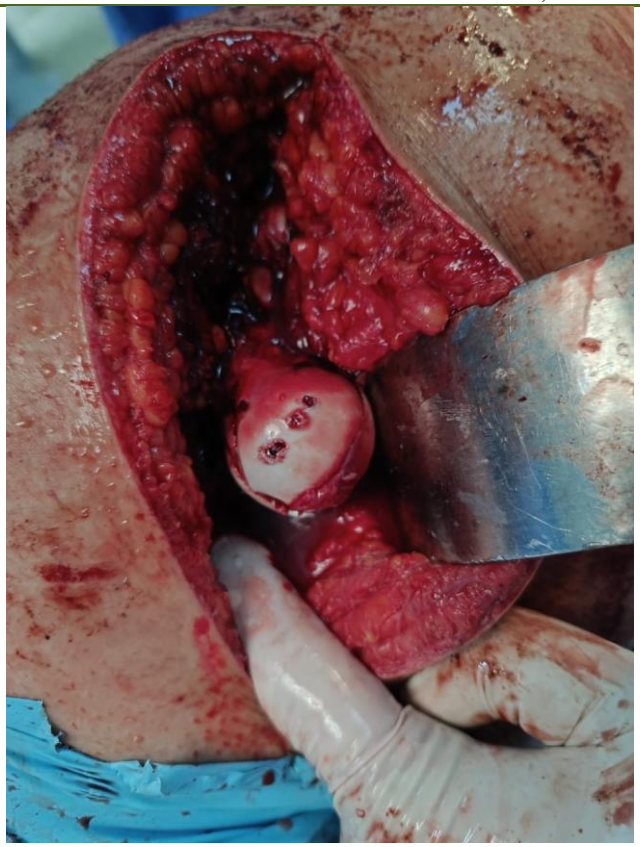

Fig. 3: Intraoperative image showing reduction and fixation of femoral head fracture with Herbert and cancellous screws

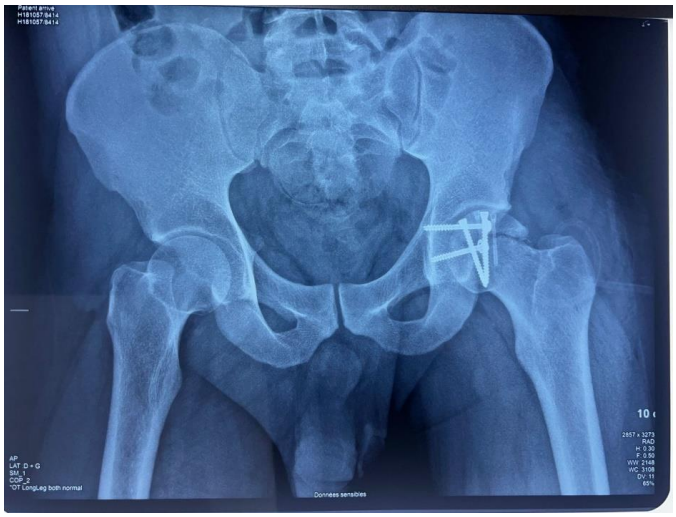

Figure 4: Control X-ray showing good joint congruence

Case 2:

A 29-year-old obese patient with a BMI of 32, referred to the emergency department following a high-energy trauma in a motor vehicle collision. On arrival, the hip was severely painful with a little ecchymosis. The patient did not have concomitant injuries. Physical examination found a vicious attitude of the left lower limb, the hip was flexed, adducted and internally rotated without distal vascular-nerve deficit. The X-Ray showed ascension of the femoral head along with a disrupted Shenton line, the obliterated lesser trochanter on internal rotation suggests a posterior dislocation of the left hip with a large intra-articular head fragment classified Pipkin II (figure 5), urgent closed reduction of the dislocation within 6 hours is crucial. This maneuver is performed by traction in the axis of the femur on a hip flexed to 90° in forced adduction and internal rotation.

The typical sensation of reduction associated with the recovery of joint mobility under anesthesia suggests that reduction has been successfully achieved, which is confirmed by a control X-ray (figure 6). The hip

is stable, a CT scan was done, showed good joint congruency, confirming adequate reduction of the femoral fracture and the absence of intra-articular fragments (figure 7). Based on these findings, a conservative treatment plan of weight offloading and hip joint immobilization was implemented. After 6 months' follow-up, the patient walks normally without pain, with no signs of femoral head osteonecrosis.

Fig. 5: Front radiograph of the left hip showing femoral head fracture associated with posterosuperior hip dislocation

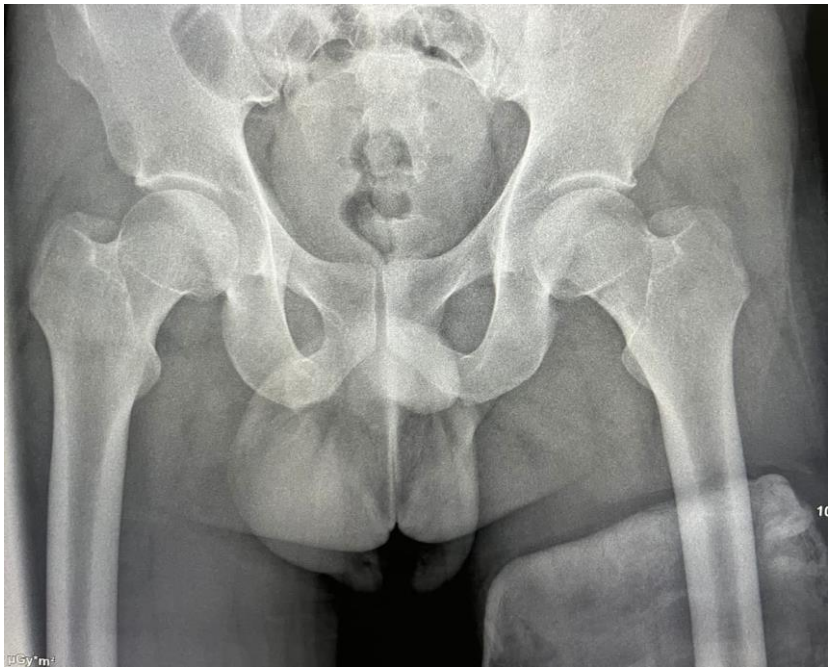

Fig. 6: Post reduction X-ray showing good reduction of the fracture with the head in place

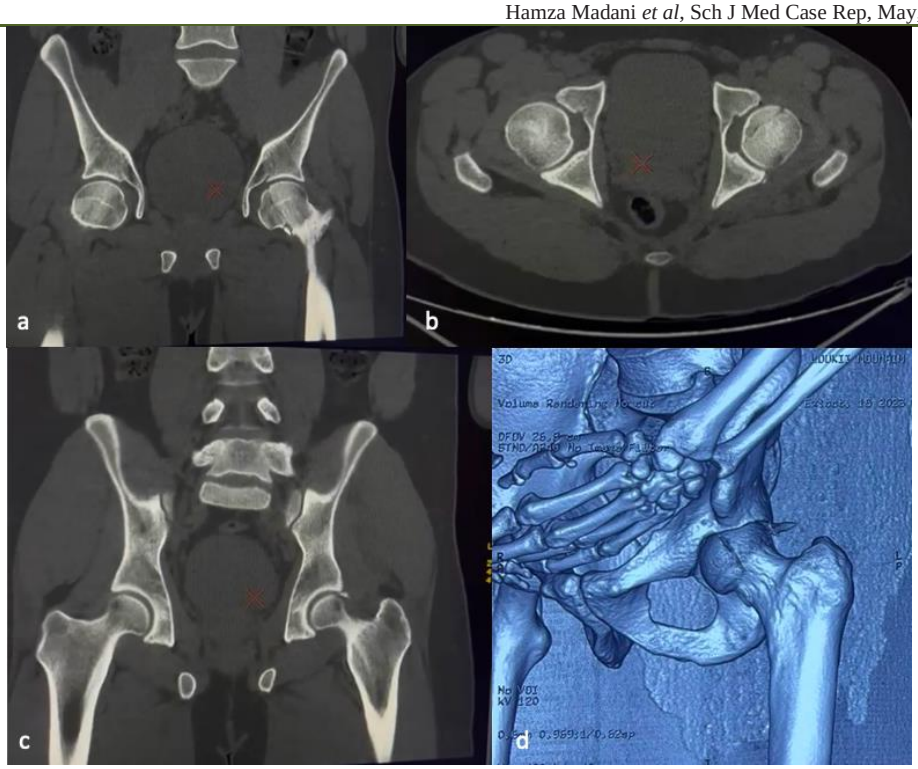

Fig. 7: Post reduction CT scan images. a: frontal section. b: axial section showing well reduced femoral head fracture. c: extra articular fragment. d: 3D reconstruction confirms fracture reduction

DISCUSSION

A deeper understanding of bone and nerve injury mechanisms in femoral head dislocation-fractures, combined with a novel CT scan classification system, allows for more individualized treatment plans. This approach improves patient outcomes in both the emergency phase and for long-term complications [3].

In 1957, Pipkin introduced a classification system to categorize femoral head fractures. This classification divides these injuries into four types based on the location of the fracture: Type I occurs below the fovea, Type II above the fovea, Type III involves a femoral neck fracture, and Type IV associated with an acetabular fractures [4].

The Chiron classification system (2004) considers both fragment size (I to IV) and the presence of associated fractures, with three additional groups: A, B or C, indicate the type of dislocation: A for a pure dislocation, B for a dislocation with an acetabular fracture, and C for a dislocation with a femoral neck fracture [3].

Hip joint fracture-dislocation requires immediate surgical intervention. Regardless of any femoral head fracture, a closed reduction should be performed as soon as possible in the emergency department, ideally under sedation. In order to minimize the risk of femoral head osteonecrosis, any delay in reduction must be strictly avoided. Following successful reduction, new X-rays and a CT scan of the hip are crucial to assess the femoral head and any associated lesions [2].

Orthopedic treatment is indicated when head fragments and possibly of the acetabular wall are well reduced and there are no foreign bodies (37.7%). Fragments of the head located below the fovea, whether osteochondral, of the size of a quarter or a third of the head, can be removed (43.6%) or reduced and fixed (5.4%). it should make it possible to extend the indications for preserving fragments representing a third of the head. In elderly patients, the association of a femoral neck fracture or the existence of a fragment half the size of the head should lead to the immediate proposal of a total hip prosthesis (9%) [3].

Post-operatively, various treatment teams recommend continuous traction for an average of 3 weeks, followed by full weight-bearing restriction for 2 months. Full weight-bearing is only permitted after 3 months [5].

Some series have shown avascular necrosis can occur in up to 25% of femoral head fractures cases. Damage to the proximal femoral blood supply is multifactorial and can be compromised in several ways, either during the initial injury or during surgery. A posterior approach has been associated with greater rates of osteonecrosis than an anterior approach [6].

CONCLUSION

Femoral head fracture-dislocation is a complex joint injury with a variable functional prognosis in the mid- to long-term. Due to their rarity, these injuries present challenges in treatment decisions. Classification system based on initial CT scans performed in emergency categorize all fracture types based on the size of the head fragment and any associated injuries (acetabular or neck fractures). Furthermore, recent surgical advancements allows for treatment plans to be determined in the emergency department, considering the classification, patient age, and time required for reduction, which are all crucial prognostic factors.

These case reports follow scare guidelines [7].

Conflict of Interest: No conflict of interest to be disclosed.

Statement of Informed Consent: Informed consent was obtained from the patient.

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