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Case Report

Isolated traumatic hip dislocation along with ipsilateral femur shaft fracture: rare case report with review of literature

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ABSTRACT

Hip dislocation accompanied by an ipsilateral fracture of femur shaft is an uncommon injury usually seen after high-velocity trauma and often coincides with multiple systemic injuries. This case report describes a 27-year-old male who suffered a posterior hip dislocation and ipsilateral fracture of femur shaft following a motorcycle-car collision accident with no associated fractures of the acetabulum and femoral neck. He was treated with fixator-assisted hip reduction and intramedullary femur interlock nailing in lateral position in a same setting. The advantage of this method is that the rate of AVN of femoral head is decreased by decreasing the overall timing of surgery and it also allow early successful reduction of the hip. The risk of AVN should be explained to the patient beforehand even if the surgery is done within 6 hours. This case highlights the importance of timely intervention and effective surgical techniques in managing such complex injuries and also aims to share our experience in managing such rare injuries and review the existing literature on this rare injury.

Keywords: Hip dislocation with ipsilateral femur shaft fracture, Outcome, Literature review

INTRODUCTION

Traumatic hip dislocation accompanied by an ipsilateral fracture of femur shaft is an extremely rare injury with an incidence estimated at 1 in 100,000 femur shaft fractures.[1,2] Often, the early detection of hip dislocation is missed because of the accompanying deformity from the femur shaft fracture.[1] However, early diagnosis and treatment of traumatic hip dislocation should be undertaken on an emergency basis to mitigate the risks of sciatic nerve palsy and avascular necrosis of the femoral head, which are commonly associated with hip dislocations. Favorable outcomes are typically observed when the hip is reduced within 24 hours.[3-6] Managing these injuries presents a dilemma in determining the appropriate reduction technique and fixation method.

This case report describes a 27-year-old male involved in a motor cycle-car collision accident who sustained a posterior hip dislocation and an ipsilateral femur shaft fracture, without any concurrent acetabular or femoral neck fractures or other systemic injuries. He was treated with fixator-assisted hip reduction and internal fixation with intramedullary femur interlock nailing, performed in the lateral position in the same setting within 6 hours of trauma.

In this article, we would like to share our experience regarding the treatment of traumatic hip dislocation along with ipsilateral femur shaft fracture and the outcome of patient with this rare injury along with review of the literature.

CASE REPORT

A 27-year-old male presented to the Orthopaedic Emergency Department within 2 hours of motor cycle-car collision accident, complaining of pain, swelling and bruising over the left hip and left thigh. On examination, the patient had an external rotation and abduction attitude of the left leg and foot, along with flexion and adduction of the left hip. There was palpable evidence of the femoral head in the left gluteal area, along with abnormal mobility of the left thigh fracture. The patient had normal sensory-motor function, and the distal pulses were palpable in the left lower limb, and it was a closed injury. There were no additional systemic injuries present. The patient was stabilized hemodynamically, and a Thomas splint was applied before ordering radiographs of the left femur, knee, and PBH.

The radiograph (Figure 1) revealed a left posterior hip dislocation accompanied by a left femur shaft fracture.

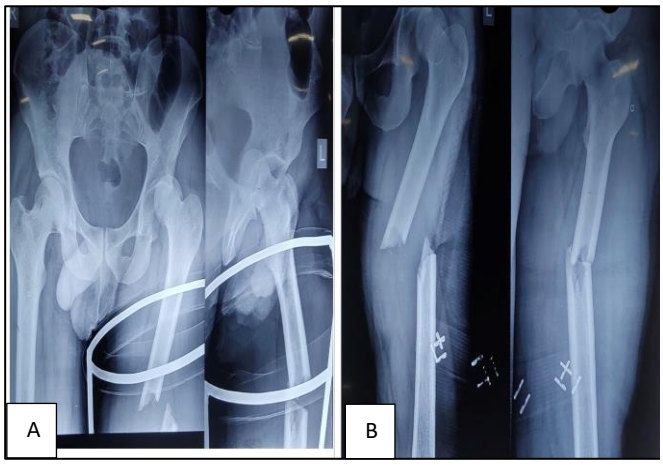

Figure 1 (A and B): Preoperative radiographs of PBH and femur.

In the presence of associated femur shaft fracture, the hip reduction presented a challenge as force transmission during hip reduction maneuver would be compromised. Consequently, the patient underwent emergency fixator-assisted hip reduction and femur shaft fracture fixation under general anesthesia.

In the operating theatre, the patient was positioned in lateral position, and a temporary external fixator was applied to the left femur (Figure 2). Hip reduction was achieved using Allis maneuver, with fluoroscopy confirming reduction and stability. Following that, the guidewire was inserted, and external fixator was removed. The femur shaft fracture was fixed with intramedullary femur interlock nailing in the same lateral position (Figure 3 and 4). Postoperative radiographs showed a satisfactory reduction and stability (Figure 3 and 4). Post-operative computed tomography of the PBH confirmed a good concentric reduction of the hip without evidence of posterior lip fracture of the acetabulum.

The patient was placed on skin traction for 3 weeks and gradually progressed to partial weight bearing, followed by full weight bearing after 8 weeks. At one-year follow-up, the patient reported walking full weight bearing and painless range of motion with terminal restriction of rotation that did not impede his daily activities. Postoperative radiographs indicated good union at fracture site with minimal sclerosis in femoral head (Figure 5).

Figure 2: Intraoperative clinical picture.

Figure 3: Postoperative radiograph of PBH AP.

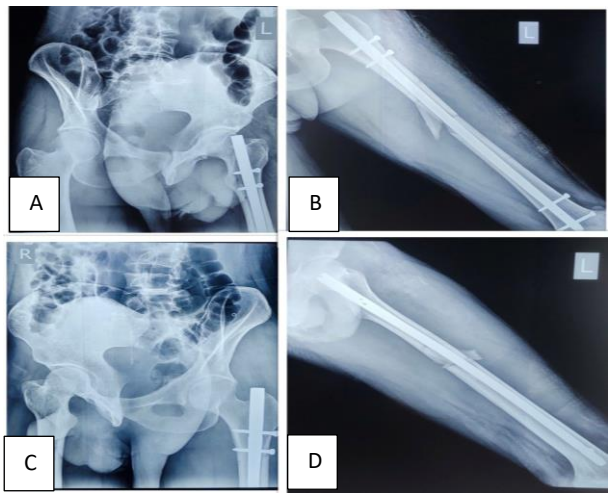

Figure 4 (A-D): Postoperative radiographs of femur shaft-anteroposterior, lateral, Judet view.

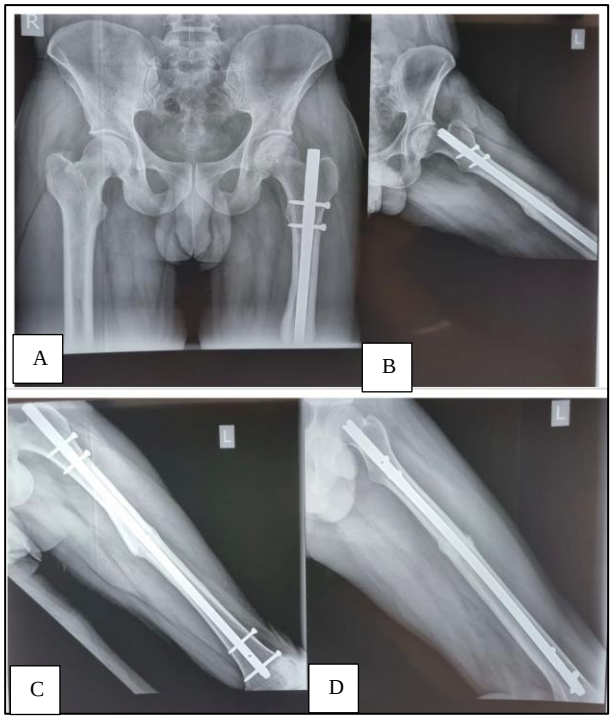

Figure 5 (A-D): Radiographs of follow-up at 1 year.

DISCUSSION

Traumatic hip dislocation accompanied by an ipsilateral femur shaft fracture is indeed a rare injury, with an estimated incidence being 1 in 100,000 femur shaft fractures.[1,2] Clinical suspicion and thorough pelvis examination play crucial roles in diagnosing associated hip dislocation and fracture of the acetabulum and femoral head. These injuries typically result from high-velocity trauma, often involving axial force causing hip dislocation and lateral force leading to femur shaft fractures. However, such trauma is frequently associated with multiple systemic injuries and distal neurovascular injuries, which may be overlooked during initial assessment.

Therefore, careful neurovascular evaluation is necessary both before and after reduction. Hip dislocation is an orthopaedic emergency and prompt reduction of hip dislocation is essential to minimize the risk of complications such as sciatic nerve palsy and femoral head avascular necrosis.[3] However, in cases of hip dislocation with ipsilateral femur shaft fracture, reduction of the hip and surgical positioning becomes challenging. This is due to the disruption of traction transmission to the hip resulting from femur shaft fracture, complicating the reduction procedure.

There is limited literature available on the treatment of such fractures accompanied with dislocation. Three basic approaches for hip reduction have been described in the literature. The first approach involves closed reduction, where traction is applied across the fracture site through the soft tissues of lower limb.[1,3,7] However, this method has a success rate of only 27% and may result in increased soft tissue damage. The second approach is assisted closed reduction, which utilizes various devices such as Steinmann pin, Schanz screw, Lardenois hoop apparatus, torniquet assistance, nail assistance, fixator assistance.[7] While these methods can aid in reduction, they also carry the risk of iatrogenic neurovascular injury and fracture while inserting and applying traction to the proximal fragments. Additionally, there is a potential for increased soft tissue damage and risk of neurovascular injury due to the unsupported distal fragment. The third approach involves open reduction, which carries its own set of risks, including iatrogenic neurovascular injury, increased soft tissue damage, delayed healing of soft tissue, infection, bleeding and increased risk of AVN due to damage to the blood supply.

Each approach has its advantages and disadvantages, and the choice of method should be carefully considered based on the individual patient's condition, expertise of the surgical team and difficulty in reduction.

We used a technique in which, the patient was positioned in lateral position, and both proximal and distal fragments of femur shaft fracture were stabilized with external fixator. Using the Allis maneuver, we successfully reduced the dislocated hip. The external fixator was removed once a guidewire was passed across the site of the femur shaft fracture and in the same lateral position, intramedullary femur interlock nailing was performed.

In obese patients, holding the proximal fragment during reduction can be challenging. Therefore, the fixator stabilizes both the proximal and distal fragment, facilitating the transmission of traction force during reduction. Moreover, since reduction of the femur fracture was already achieved with fixator, passing guidewire across the fracture site was easy, allowing for efficient nailing after fixator pin removal. This approach significantly reduces the operative time. At present, closed reduction is always preferred over open reduction, provided the joint is congruent, as an open reduction is associated with more complications.[8,9] Open reduction is always considered as the last resort when closed reduction fails due to buttonholing of femoral head through capsule, abductor or soft tissue impingement.

Our technique offers several advantages, including a lower risk of infection, bleeding, sciatic nerve palsy, less risk of soft tissue damage, less operative time, less chances of avascular necrosis of the head of the femur, less iatrogenic fractures and does not hamper the fracture healing. There are less chance of distal neurovascular deficit as both proximal and distal fragments were fixed with fixator while doing the reduction maneuver.

The lateral position offers several advantages, including ease in fixator application and better access to the entry point for intramedullary nailing, even in obese or overweight patients. Additionally, it reduces the risk of perineal skin problems and provides access for Allis

maneuver and manipulation of the femoral head. In this position, the alignment of the femoral neck axis, distal locking holes, and parallel femoral condyles allows for precise nail placement and femoral torsion control.[10] Furthermore, the support provided to the distal fragment by the opposite limb facilitates fixator application and reduction, while minimizing soft tissue damage, thereby improving overall outcomes.

Fixator-assisted closed reduction of the hip followed by femur interlock nailing has been reported by a few surgeons.[1,8,9] Wu et al documented 16 cases of posterior hip dislocation with ipsilateral femur fracture, reporting good to excellent outcomes with fixator assisted reduction.[11] However, they did not specify whether the procedure was conducted as a single or two-stage surgery, nor did they mention the patient's position during surgery. Similarly, Rana et al reported a satisfactory outcome in a single case of similar fracture-dislocation treated with two-stage fixator-assisted reduction and fracture fixation, without specifying the surgical position.[2]

Iftekhar et al also reported a single case of fixator-assisted reduction with satisfactory outcomes in a single stage surgery but did not mention the surgical position.[12]

Relevant studies on isolated traumatic hip dislocation along with ipsilateral femoral shaft fracture without acetabular and femoral neck involvement have been added in Table 1.

Table 1: Review of literature.

Authors (years)	Age (in years)/ sex	Mechanism of injury	Posterior dislocation of hip with associated fractures	Treatment given for posterior dislocation of hip + femur shaft fracture	Outcome
Henry et al (1934)[13]	64/ female	Not mentioned	Femur shaft	Open reduction of hip+ traction and immobilization on TT splint	Satisfactory
Wiltberger et al (1948)[1]	35/ male	Industrial accident	Femur shaft	Closed reduction of femur head	Satisfactory
Ingram et al (1954)[14]	17/ male	Automobile vehicle accident	Femur shaft	Steinman pin assisted close reduction+secondary open reduction and intramedullary nailing	Excellent
Murray et al (1958)[15]	25/ male, 18/ male	Motorcycle accident	Supracondylar femur (1st patient)/ supracondylar femur, tibia, compound great toe (2nd patient).	Open reduction+ traction on TT splint (first patient), Steinman pin assisted close reduction+ traction on TT splint.	Excellent/ satisfactory
Helal et al (1967)[16]	-/-	-	Femur shaft	Close reduction	Satisfactory
Ehtisham et al (1976)[6]	19/ male	Motorcycle accident	Femur shaft	Open reduction +Kuntscher nail and traction on TT splint	Satisfactory
Verdonk et al (1984)[17]	17/ male, 21/ male	Motor vehicle accident / -	Femur shaft fracture/ Already operated femur shaft fracture	Lardennois hoop apparatus assisted reduction + Kuntscher nail after 3 weeks/Lardennois hoop assisted reduction + 3 weeks traction	Satisfactory/ satisfactory
Carlsen et al (1991)[18]	42 /Male	Motorcycle car accident	Bilateral femur shaft with right hip dislocation	Tourniquet assisted closed reduction on traction table + traction	Satisfactory
Wu et al (1993)[11]	16 cases (11 posterior+ 5 central dislocations)	-	Femur shaft	Fixator assisted closed reduction + closed reamed intramedullary nailing	Good to excellent

Continued.

Authors (years)	Age (in years)/ sex	Mechanism of injury	Posterior dislocation of hip with associated fractures	Treatment given for posterior dislocation of hip + femur shaft fracture	Outcome
Maqsood et al (1990)[19]	21/ male	Run over by jeep	Femur shaft fracture with right hip posterior dislocation and left hip anterior dislocation	Right hip Schanz screw guided reduction with femur interlock nailing and left hip closed reduction	Satisfactory
Rana et al (2019)[2]	18/ male	Road traffic accident	Femur shaft	Fixator assisted closed reduction + 2nd stage femur interlock nailing	Satisfactory
Iftekhar et al (2020)[12]	24/ male	Motor vehicle accident	Femur shaft	Fixator assisted closed reduction + femur interlock nailing in same setting	Satisfactory (AVN of femur head at 2 year follow-up)

Our case report stands out from these reports as it was performed in a single stage, with the patient in lateral position, resulting in a satisfactory outcome. We believe our study makes a valuable contribution to the existing literature, as there are few reports on fixator-assisted reduction and its outcomes.

CONCLUSION

Traumatic hip dislocation accompanied by an ipsilateral femur shaft fracture is an extremely rare injury and should always be given emergency care. In such cases, temporary fixator-assisted reduction followed by final fixation with intramedullary femur interlock nailing in a single setting in a lateral position can be considered as a preferred option of treatment. The risk of avascular necrosis of the femoral head should be explained to the patient beforehand even if surgery is done within 6 hours of trauma. Additionally, in all the cases of femur shaft fracture, thorough examination of the hip should be done to rule out hip dislocation, proximal femur fracture and acetabular fracture.

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