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Trauma Case Reports

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Obturator dislocations of the hip associated with pelvic ring injuries: Case report and review of the literature[☆]

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ARTICLE INFO

Keywords:

Hip dislocation
Pelvic ring injury
Polytrauma

ABSTRACT

Case: An obturator hip dislocation with an associated open book pelvic ring injury is an extremely rare injury pattern. This case report will discuss challenges to closed reduction, acute management strategies and review the literature on combined hip dislocations and open book pelvic ring injuries.

Conclusion: This injury pattern presents unique reduction challenges that should be recognized early in order to provide effective resuscitation and preserve the femoral head blood supply. Failing to close reduce the hip delays reducing the pelvic ring volume because sheets and binders are precluded from working effectively.

Introduction

Anterior hip dislocations result from high energy trauma and typically occur in young males [1]. Anterior inferior dislocations of the femoral head, also known as an obturator hip dislocation, are rare injuries, comprising 2–5 % of hip dislocations [2]. Even more rare is a combined obturator hip dislocation with an open book pelvic ring injury [3,4]. Both injuries require urgent reduction in order to preserve the blood supply to the femoral head and tamponade pelvic bleeding to facilitate hemodynamic resuscitation. This case report highlights a patient with an ipsilateral combined obturator hip dislocation and open book pelvic ring injury. It will discuss challenges to closed reduction, acute management strategies of the injuries and review the literature on combined hip dislocations and open book pelvic ring injuries.

Case report

Our case involves a 44 year old male who was found lying next to his motor vehicle presumably struck by another motor vehicle at highway speed. Upon arrival to the trauma center he underwent Advanced Trauma Life Support protocol. On physical exam, his left hip was flexed and abducted. The foot was cool and distal pulses were only detectable by Doppler. A detailed neurological exam was limited by altered mental status. His orthopaedic injuries included a pelvic ring injury with pubic symphysis diastasis and left sacroiliac joint disruption, left obturator hip dislocation, type II open left bimalleolar ankle fracture and left ligamentous knee injury (Fig. 1).

[☆] Work for this case occurred at Virginia Commonwealth University, 1200 E. Broad Street, 9th Floor, Box 980153, Richmond, VA 23298-0153. This work has not been presented at any meeting.

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<https://doi.org/10.1016/j.tcr.2023.100871>

Accepted 4 June 2023

Available online 5 June 2023

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Attempts were made to close reduce the hip in the trauma bay under adequate sedation with propofol and ketamine but were unsuccessful potentially due to the unstable hemipelvis external rotating with reduction maneuvers. A pelvic resuscitation sheet was also attempted in order to reduce the anterior pelvic ring diastasis but this was also unsuccessful due to the proximal femur abduction deformity of the dislocated hip. After discussion with the trauma team the patient was taken emergently to the operating room for stabilization of pelvic ring, left hip reduction and left ankle debridement and stabilization.

In the operating room, the patient was positioned supine on a radiolucent flattop table. With the patient fully anesthetized and relaxed, one more attempt at a closed reduction was attempted but was not successful. With the entire pelvis and left lower extremity prepped and draped, a 5.0 mm Schanz pin was introduced percutaneously into the femoral neck. With gentle manipulation, the femoral head was able to be concentrically reduced (Fig. 2). After discussing the patient's hemodynamic status and stability with anesthesia and the trauma team it was decided to definitively fix the anterior pelvic ring injury. The anterior ring was then exposed through a Pfannenstiel approach. It was reduced with two Weber clamps to correct the external rotation deformity and fixed with a 6 hole 3.5 mm symphyseal plate (Fig. 3). The ankle and knee were then provisionally stabilized with external fixation. After further imaging of the pelvis and to add additional posterior stabilization, he returned to the operating room on postoperative day one for left iliosacral screw placement. His ankle and knee were also definitively treated within a week of his injury and he was discharged home on hospital day 14. During his hospital stay, once appropriately examinable, he was noted to have an ipsilateral foot drop. At his most recent follow up 20 months after his injury, he was ambulating without any assistive devices and had minimal pain. His foot drop had resolved and he has made a good recovery with no radiographic evidence of avascular necrosis of the femoral head (Fig. 4). At his most recent follow up, he provided consent for publication of this case report.

Discussion

Anterior hip dislocations can be classified as superior (pubic or subspinous) or inferior (obturator and perineal) [5]. Obturator dislocations of the femoral head result from a hip that is hyperabducted, flexed and externally rotated [6]. This hip position frequently occurs from motorcycle accidents where the patient is seated with the hips hyperabducted. A superior dislocation occurs when the hip is more extended [1,5,6]. In a case series of 32 anterior hip dislocations by Wojahn et al., obturator dislocations accounted for 69 % of the dislocations. Obturator dislocations and younger age were associated with better modified Harris Hip Scores in this series [1]. Anterior hip dislocations can be further subclassified as simple without associated fractures or complex which involve associated injuries. Complex anterior dislocations are most commonly associated with impaction or fractures of the femoral head with a reported incidence of 12–87% [7]. Other less commonly associated fractures include acetabulum fractures, femoral neck fractures, femoral shaft fractures, greater trochanter fractures and pubic rami fractures [7–12]. Obturator dislocations can even progress to open injuries about the perineum in extremely high energy mechanisms [4,13].

To our knowledge, an anterior hip dislocation with an associated pelvic ring injury has only been described twice in the literature [3]. Markham reported a case of a 19 year old male who was an unrestrained, back seat passenger involved in a high speed motor vehicle collision and sustained an obturator hip dislocation with a contralateral sacroiliac joint disruption. He was successfully treated with closed reduction of the hip and nonoperative treatment of the pelvic ring injury [3]. Medda et al. reported a case of an 18 year old female who sustained an open obturator hip dislocation in which the femoral head protruded through a perineal wound. She also sustained ipsilateral rami fractures and sacroiliac joint diastasis. The hip was successfully reduced by palpating the femoral head through the wound and applying lateral force. She was definitively fixed with a subcutaneous anterior external fixator and

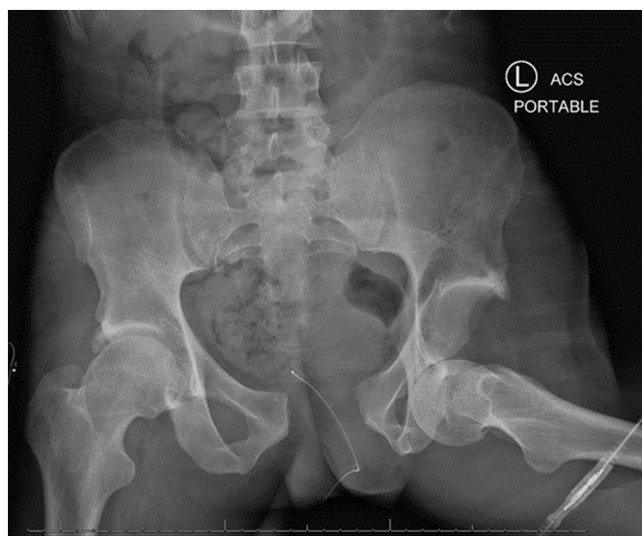


Fig. 1. AP pelvis radiograph demonstrating pubic symphysis diastasis, left sacroiliac joint disruption and left anterior/inferior hip dislocation.

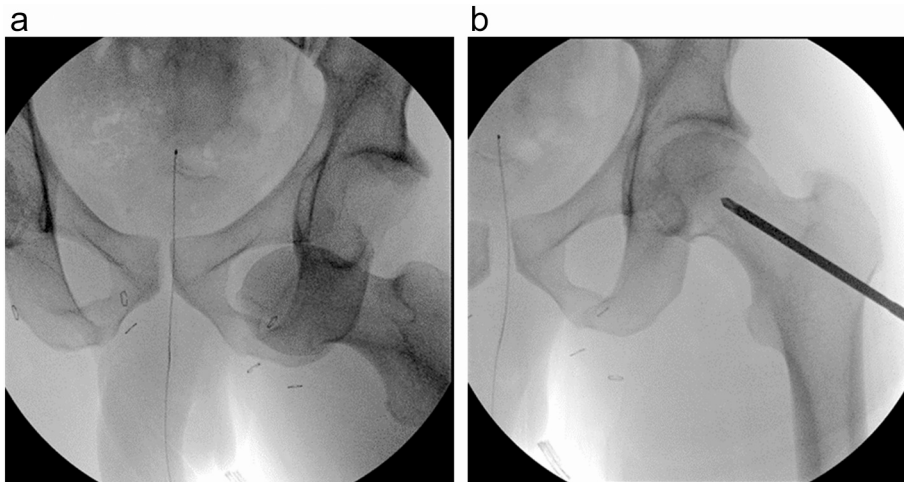


Fig. 2. (A) AP pelvis fluoroscopic view of a failed closed reduction maneuver and (B) successful reduction using a 5.0 mm Shanz pin in the femoral neck for manipulation.

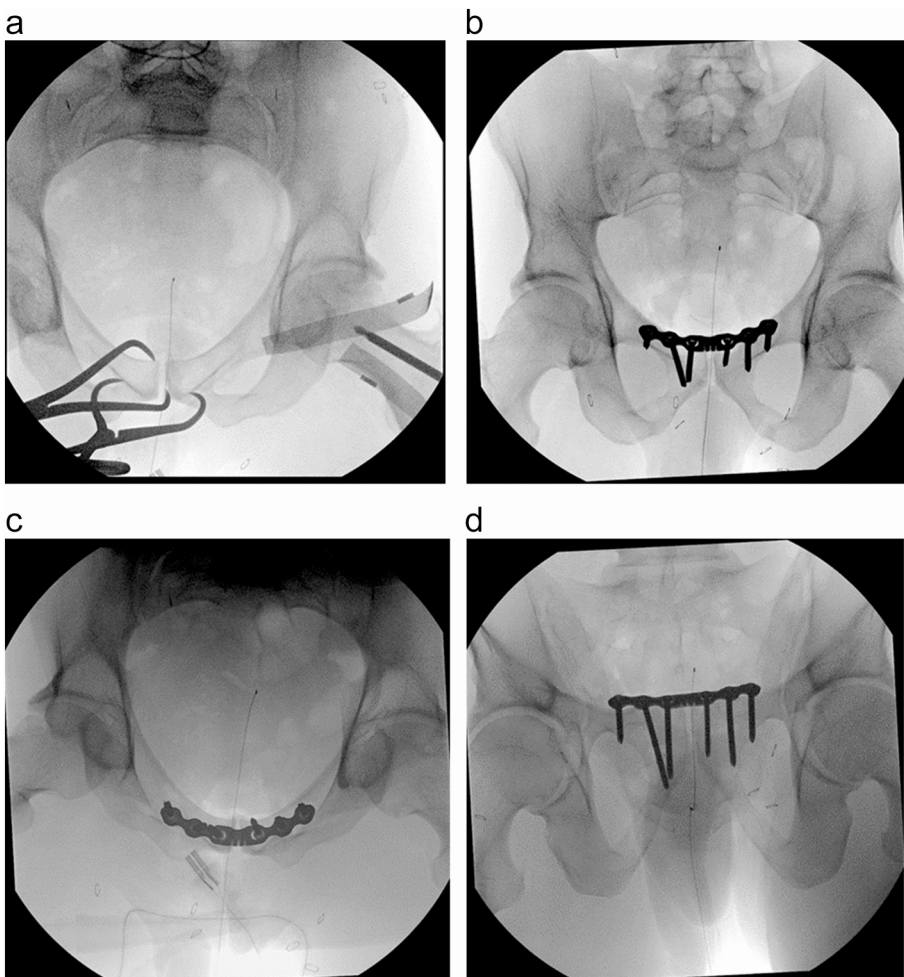


Fig. 3. (A) AP pelvis fluoroscopic view of the reduced anterior ring using two Weber clamps. (B) AP, (C) inlet and (D) outlet fluoroscopic views of final anterior ring fixation.

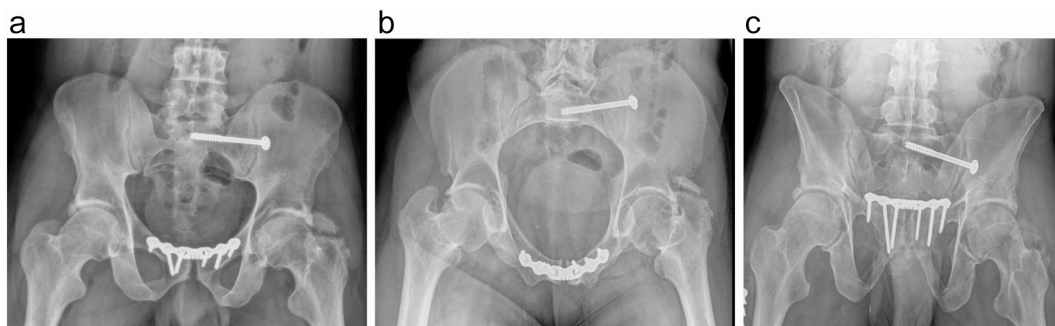


Fig. 4. (A) AP, (B) inlet and (C) outlet radiographs of final pelvic ring fixation at 20 months postop.

percutaneous posterior pelvic ring fixation [4].

However, our case differs from the previous two in that the sacroiliac joint disruption was an ipsilateral injury and we did not have an open wound to assist with accessing the femoral head. The standard closed reduction maneuver for obturator dislocations consists of gentle inline traction, hip flexion and rotation while having an assistant laterally translate the thigh [5,14]. But with an ipsilateral APC type pelvic ring injury, the reduction maneuver causes the innominate bone to further externally rotate due to the incompetent anterior and posterior pelvic ligaments. Even with counter traction through the ipsilateral iliac wing, there is enough diastasis of the pelvic ligaments, combined with soft tissue entrapment around the femoral head, to inhibit a successful reduction. Therefore, the only way to effectively reduce the femoral head is in the operating room where the patient can be intubated and completely paralyzed. This also allows for percutaneous techniques to be utilized, such as a Shanz pin in the femoral neck for more direct manipulation of the femur. If the ilium continues to externally rotate, then reducing it first with an anterior inferior based pelvic external fixator should provide enough stability to close reduce the hip assuming there are no soft tissue or bone fragments blocking the reduction. Potential soft tissue blocks to reduction include the labrum, iliopsoas tendon, anterior capsule and rectus femoris [15].

Quickly recognizing an obturator hip dislocation with an ipsilateral “open book” pelvic ring injury is extremely important in aiding resuscitation efforts. Attempting an initial closed reduction of the hip in the emergency department is a reasonable and appropriate first step in the management of this rare injury but may prove difficult without appropriate sedation and secondary to the unstable pelvis. This in turn can delay reducing the pelvic ring volume and hemorrhage control because sheets and binders are precluded from working with a hip that is dislocated and abducted. This injury pattern can be identified early in primary survey on a pelvis radiograph so that operating room personnel and resources can be quickly mobilized. In conclusion, obturator hip dislocations associated with pelvic ring injuries are extremely rare and present unique reduction challenges that should be recognized early in order to provide effective resuscitation and preserve the femoral head blood supply.

Declaration of competing interest

The above authors have no conflicts of interest to disclose. This includes financial and personal relationships with other people or organisations that could inappropriately influence (bias) their work.

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