CASE REPORT

Simultaneous anterior and posterior traumatic hip dislocation: A case report and review of literature

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Introduction

The hip joint is an inherently stable joint, and dislocation requires a significant force. The position of the femoral head in relation to the acetabulum and the vector of the force determine the type of injury produced. Because of the intrinsic stability and massive bony columns of the pelvis surrounding the acetabulum, these injuries may include pure hip dislocations, dislocations with fracture of the femoral head, and dislocations with fracture of the acetabulum, injuries to the pelvis or to other organ systems, and can result in hemorrhage and shock.22 As a result, hip dislocation, and more so bilateral hip dislocations, is highly associated with concomitant injuries that might delay the diagnosis of hip dislocation and divert attention away from the hip in view of other life-threatening conditions. It is considered an orthopedic emergency requiring prompt reduction.5,16,18,31,43

Case presentation

A 20-year-old female was the unrestrained driver involved in a high velocity motor vehicle accident. She was brought to the emergency department 5 h after the accident with bilateral hip pain and deformity. The right lower extremity was adducted, flexed, and internally rotated, with 20 cm shortening. The left lower extremity was abducted and externally rotated (Fig. 1). There was a 2 cm superficial laceration over the lateral aspect of the right knee. No other injuries were present. In the emergency department, AP radiograph of the pelvis revealed right hip postero-superior dislocation, and left hip anterior—inferior dislocation associated with fracture of the left acetabulum (Fig. 2).

The patient was transferred to the operating room where closed reduction under general anesthesia was performed. The left posteriorly dislocated hip was easily reduced using in-line manual traction. The right hip proved difficult to reduce but reduction was achieved in a closed manner. Post reduction radiographs showed bilateral concentric reduction of the femoral heads (Fig. 3). Ten pounds of skin traction was applied to both extremities.

CT scan was done postoperatively and confirmed the presence of a comminuted fracture of the left acetabulum extending into the superior pubic ramus.

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as well as the anterior lip of the acetabulum. The fracture fragments were in satisfactory position (Fig. 4). No further intervention was performed. Skin traction was discontinued on the right side after 3 weeks and physical therapy in bed was started including quadriceps strengthening exercises and active range of motion. At 6 weeks, the traction on the left side was discontinued and the patient was started on strengthening physical therapy and active range of motion of the left hip, and the patient was ambulated with crutches. The patient continued to complain of right hip pain. MRI was requested and revealed grade one avascular necrosis of the right femoral head (Fig. 5).

The patient refused further surgery and was advised protected weight bearing and was discharged home. Follow up assessment and radiographs at 3 and 5 months were satisfactory and crutches were discontinued. On the latest follow up at 14 months, patient was ambulating freely with no radiologic evidence of collapse of the femoral head.

Discussion and literature review

Incidence

With the increase in high velocity trauma, traumatic hip dislocations are becoming common. Bilateral hip dislocations are, however, rare, constituting roughly 1% of all hip dislocations. Simultaneous bilateral anterior and posterior hip dislocation is even less common. A thorough review of the literature revealed 20 documented cases of bilateral asymmetric anterior and posterior hip dislocations (Table 1).
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<tr>
<th>Author</th>
<th>Mechanism</th>
<th>Sides</th>
<th>Reduction posterior</th>
<th>Reduction anterior</th>
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<th>Time (weeks)</th>
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Abbreviations—Lt: left; Ant: anteriorly dislocated hip; Rt: right; Ant: anteriorly dislocated hip; NL: hip joint both clinically and radiologically; aSx: asymptomatic; AVN: avascular necrosis; CBR: complete bed rest; ?: no data available; F/U: follow up; Mn: months.
The majority of hip dislocations occur as a result of high energy transfer mostly in car and motorcycle accidents ranging between 46—61% and 8—18%.\(^9,40\) In bilateral asymmetrical hip dislocations, the most frequent setting is that of a car driver involved in a road traffic accident (12 of 21 patients). Five more patients were injured in association with a road traffic accident. Among car drivers, six had left anterior dislocation and six had left posterior dislocations.

**Mechanism**

When sitting in a car seat the hips naturally tend to abduct, flex, and externally rotate. The left foot is then usually well positioned close to the clutch pedal or resting on the floor. Although most drivers leave the right hip abducted and externally rotated, it has been observed that some drivers will sit with their pelvis at an angle to the seat back and their right hip adducted.\(^{26}\) A worst-case scenario is where the pelvis and the body are twisted to the right at an angle to the long axis of the vehicle and the lower limbs positioned as previously described (Fig. 6). When the car is subjected to a high-impact collision, deceleration force is transferred to the lower limbs. The right limb, being in adduction and flexion, is axially loaded into posterior dislocation. The left limb, relaxed in abduction and external rotation, is hinged on the posterior wall of the acetabulum, forcing the hip into hyperextension and anterior dislocation. A similar mechanism has been discussed by several authors.\(^4,7,11,24,33,35\) If the patient is twisting to the left at the point of collision, the reverse scenario could be in effect. In cars with right-sided steering wheels, the scenario can also be reversed.

**Reduction**

Prompt diagnosis and early reduction are of utmost importance regarding outcome. The time between injury and reduction, the initial classification, and the associated injuries are the most important factors in long-term prognosis.\(^5,31\) This was also confirmed by Yang et al.\(^43\) who found the best results in patients with early, stable, and accurate reductions. Most investigators believe that reduction is best accomplished in the operating room under general anesthesia. However, Rosenthal and Coker\(^30\) stated that the reduction of traumatic dislocation of the hip can often be quickly and gently performed in an emergency department with analgesia alone. This could be the optimal method of management for patients who do not need immediate surgery for other injuries or when delay in transfer to the operating room is anticipated.\(^3,7\) Multiple closed reduction attempts, however, are contraindicated, because they may cause further trauma to an already traumatised hip joint.\(^5,10\) In this review, closed reduction was the mainstay of treatment, successful in 19/20 posteriorly dislocated hips. One required direct hemiarthroplasty for concomitant femoral neck fracture.\(^24\) Three more cases required open surgery: two for delayed internal fixation of a posterior column fracture\(^19,33\) and one for delayed removal of a fragment from the hip joint.\(^7\) None required direct open reduction. Of the anterior dislocations 19 of 21 hips were reduced in a closed manner, but three required open surgery: two required direct open reduction;\(^3,7\) another one required later exploration and removal of a bone fragment.\(^13\) In total, seven of 21 patients required open surgery. Only one required open surgery on both sides.\(^7\)

In this review, two dislocations managed by closed reduction required later exploration and removal of fragments\(^7,13\) and one was advised but declined removal of intraarticular fragment.\(^4\) Additional evaluation of the accuracy of reduction by CT scan is highly recommended, because it can detect otherwise unsuspected bony fragments within the joint.\(^7\)
Rehabilitation

Eighteen patients were put on traction for 1–8 weeks (average: 4 weeks) for both posteriorly and anteriorly dislocated hips. Two patients were put on bed rest with normal outcome on followup and one patient was put on traction for posterior column fracture treated with open reduction and internal fixation. Eleven patients were kept on complete bed rest or confined to a wheelchair for 3–6 weeks. Nine were immediately ambulated with walking aids (crutches and walkers).

Sahin et al. found that treatment with traction or on complete bed rest were equivalent with respect to the long term results of hip dislocations. The time to full weight-bearing also did not influence the prognosis. They recommended that a non-weight-bearing period should be limited to 6–8 weeks if no obligation exists for accompanying injuries. Brav also found that prevention of weight bearing did not prevent osteonecrosis but putting the patient to bed rest for 12 weeks showed the best outcome. No benefit was shown beyond 12–16 weeks. Tornetta recommended bed rest for few days followed by ambulation to chair. Ambulation with toe touching can start after 1 week in case of unilateral dislocation. In case of bilateral dislocations with no associated pelvic ring fractures, it seems plausible to keep patients on bed rest for 1–2 weeks then mobilise them to chair to complete a total of 6 weeks. If associated injuries are present, it is the nature of these injuries that dictate the postoperative course rather than the dislocation per se.

Pelvic Injuries

In this review, 13 patients had associated acetabular or pelvic ring injuries. Additional four had adjacent fractures—femoral head, femoral neck, and femoral shaft fractures. Of these, seven required surgical intervention.

Hip dislocation is frequently associated with concomitant pelvic injury. In presence of pelvic injuries, mortality rate increases. In the study by Hak and Goulet hip dislocations were associated with acetabular or pelvic fracture in 62 of 66 patients (94%).

Osteonecrosis

Two patients in addition to the current case (21%) developed osteonecrosis, but none received operative intervention. Of these, only one was symptomatic at latest follow up. Accounting only for patients with more than 6 months of followup, the rate is 18%. Dudkiewicz et al. recommended follow-up radiographs for at least 18 months at 3-month intervals.

Several studies have shown that the risk of osteonecrosis of the femoral head occurring after a hip dislocation is related to the length of time the hip remains dislocated. The risk rises after a delay of 6–12 h, or after repeated attempts at closed reduction. Others found that although early reduction is critical to improve outcome, they could not find a direct relationship between delay in reduction and increased risk of osteonecrosis. It seems that although prompt reduction alone does not ensure good outcome, delay in reduction of traumatic dislocation of the hip is clearly associated with poorer outcome and an increased incidence of osteonecrosis of the femoral head. Overall, the risk of developing osteonecrosis of the femoral head after an anterior or posterior hip dislocation ranges from between 8% and 15%, to as high as 40% in posterior dislocations. This risk is less common in anterior dislocations and increases with concomitant pelvic fractures.

Arthritis

There is up to 24% incidence of traumatic arthritis. The incidence of secondary osteoarthritis increased with time, but usually plateaus within 5 years of dislocation. In this review, one patient lost his range of motion.

Other injuries

One patient was found to have sciatic nerve contusion. Sciatic nerve damage is reported in 7–19%, but usually plateaus within 5 years of dislocation. In this review, one patient lost his range of motion.

Conclusion

Asymmetric bilateral hip dislocation is a very uncommon injury that constitutes an orthopedic emergency. Reduction should not be delayed and can be done under sedation if transfer to the operating room is anticipated. Options for rehabilitation include traction and mobilisation on a wheelchair after a period of bed rest. The risk of osteonecrosis is mostly related to the initial injury and time to reduction and requires close follow up.
Prompt diagnosis and early reduction remain the most important variables in improving long-term results.

Conflict of interest

The authors deny any financial and personal relationships with other people, or organisations, that could inappropriately influence (bias) this work, all within 3 years of beginning the work submitted.

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References