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Bilateral asymmetric hip dislocation. A case report and literature review

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There are few reports in the literature on bilateral asymmetric hip dislocations. A total of 27 cases have been described since 2000, the majority of which (19 cases) were related to some type of car accident. Normally, these injuries are associated with high-energy mechanisms; in car accidents, these injuries are often an indirect hip trauma due to the direct impact on the knees by the vehicle dashboard. Our report is about a 30-year-old male patient who was involved in a rollover crash and was admitted to our Shock Trauma Unit 8 hours after his accident. We performed closed reduction maneuvers (Allis); the post-reduction management included limited-range hip movement for 3 weeks and body weight bearing, as tolerated, from the 4th week onwards. Currently, the patient is in his third year of progress with a satisfactory outcome. We consider it appropriate to undertake a review of the literature on hip dislocation, including its etiology, diagnosis, treatment, and possible complications.

KEY WORDS: Hip dislocation - Accidents, traffic - Hip.

The frequency of bilateral hip dislocations is rare, representing approximately 1.25% of all hip dislocations.[1] We searched PubMed with the keywords "hip", "traumatic", "dislocation", and "bilateral" using the Boolean "and" and found 27 reported cases of bilateral asymmetric hip dislocations caused by trauma in the literature in English within the last 12 years. We found that 19 of these cases were associated with car accidents. According to our research, we present the 28th case, reported in English, of a 30-year-old male patient who was involved in a car accident and suffered a bilateral asymmetric hip dislocation.

Case report

In this case, a 30-year-old male patient was involved in a car accident (rollover) on a medium-high speed road and was thrown from the vehicle. He was admitted to a secondary hospital in a rural area of our state and was hemodynamically stable, with a Glasgow Coma Scale (GCS) of 15. In the emergency room, the patient suffered progressive neurological deterioration and a decrease in the Glasgow Coma Scale of 6 points, leading to an endotracheal intubation 4 hours after admission. The patient was transferred to our hospital (8 hours after the accident) with a GCS of 6 upon admission and was hemodynamically stable. The patient was diagnosed as suffering from an interpeduncular concussion and subarachnoid hemorrhage by the Neurosurgery and Neurological Endovascular Therapy Department, and nonsurgical management was decided.

During the orthopedic physical examination of the patient, we found clinical signs of a bilateral hip dislocation; the right lower extremity was in internal rotation and adduction and was shortened, while the left leg was in abduction and external rotation and was shortened. Both limbs had normal vascular status distal to the injury site.

The clinical diagnosis of a bilateral hip dislocation on the right posterior side and the left anterior side (Figure 1) was confirmed by plain radiographs of the pelvis. Under sedation and given the patient's neurological condition, we proceeded to perform closed reduction maneuvers (Allis method). A concentric reduction of both hips could be observed from the simple radiographs taken before the reduction maneuvers. We also visualized a Hill-Sachs-type injury on the left side (Figure 2). A computed tomography (CT) scan was requested, which confirmed an adequate concentric reduction. The scan also showed a non-surgical acetabular posterior wall fracture and a Hill-Sachs-type injury in the left femoral head, as observed on plain radiographs (Figures 3, 4). The post-reduction management included not supporting the body weight for 3 weeks. During this period, controlled mobility of the hip was allowed with a maximum flexion of 90°, extension of 0°, abduction greater than 40°, free adduction, and internal and external rotation of up to 45°. Afterwards, weight bearing and free mobility of both hip joints were permitted as tolerated. At 16 weeks of progress, the patient had a visual analog scale score of 2 and a Harris score of 70 points. Currently, the patient is in his third year after the injury and remains asymptomatic, with a Harris score of 92 and a visual analog scale value of 0.

Discussion

Etiology and mechanism of injury

A bilateral asymmetric hip dislocation is a rare lesion, with only 27 cases reported in the English literature in the last 12 years. However, we have observed an increase in the

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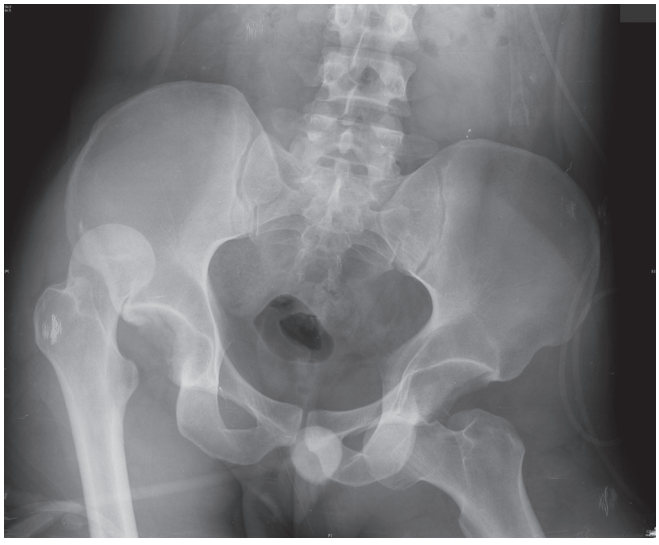

Figure 1.—Plain radiographs of the pelvis.

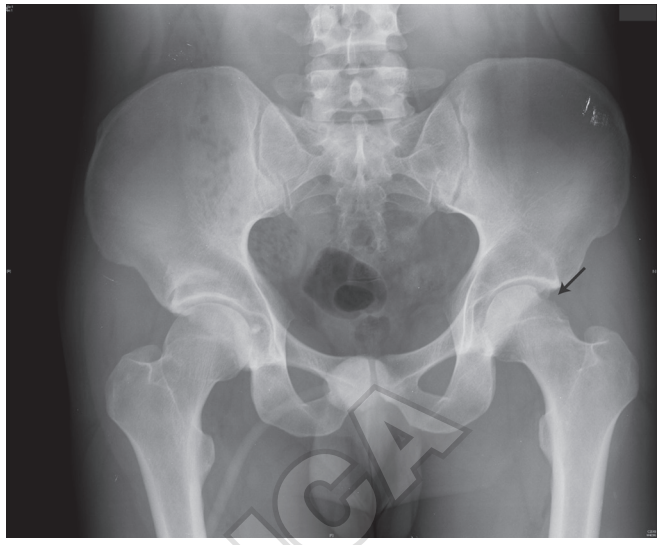

Figure 2.—A Hill-Sachs-type injury on the left side.

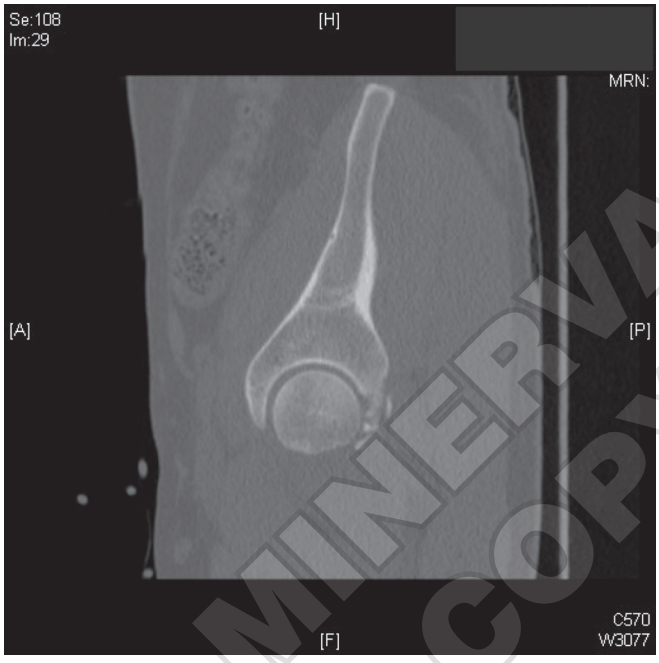

Figure 3.—CT scan showing a non-surgical acetabular posterior wall fracture

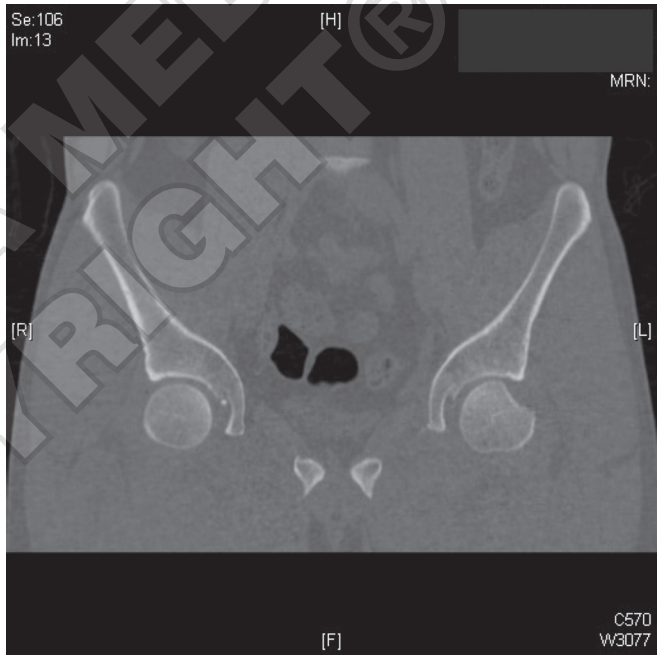

Figure 4.—CT scan showing a Hill-Sachs-type injury in the left femoral head.

incidence of this injury, which is mainly associated with car accidents due to the use of "freeways" and high-speed vehicles [2]. In the literature in English, 20 cases of bilateral asymmetric hip dislocations had been reported before 2008; 16 of these cases were due to car accidents.[3] Between June 31, 2008 and July 26, 2012, 20 cases were reported that were related to road accidents. Our report describes a patient with a bilateral asymmetric dislocation as a result of a traffic accident on a medium-high speed road in which he was thrown from the vehicle.

The common denominator of these lesions is that they are caused by a high-energy mechanism (objects falling on the back, electrofulguration, seizures, and road accidents).[4, 5] When the lesions occur as a result of car accidents, they are caused by an indirect trauma on the knees by the dashboard or a "dashboard injury". "Simultaneous" bilateral asymmetric dislocations occur due to the "submarine" effect that occurs when the vector undergoes a sudden deceleration. This deceleration causes a hip flexion of <90° with regard to the ipsilateral knee, producing a posterior dislocation of the hip caused by the dashboard impact on the anterior surface of the knee joint. Simultaneously,

the contralateral hip is in abduction and external rotation, clearing the way for the dashboard to strike the medial portion of the contralateral knee, thereby causing an anterior dislocation of the hip.[6, 7] There is a tendency for the right hip to dislocate before the left hip. This is due to the application of the brakes, which leaves the joints (knee and hip) in a vulnerable position for dislocation.[8] Our patient exhibited a simultaneous bilateral asymmetric dislocation on the right posterior side and anterior left side.

Classification

Several classification systems have been reported for this type of injury, such as the Stewart-Milford [9] and Thompson-Epstein [10] systems, which permit the establishment of a prognosis for fractures and a description of the association of a fracture in the acetabulum or femoral head, which is often associated with a poor prognosis.[11] The Thompson-Epstein classification is based on radiographic findings and is defined as follows: type 1, with or without minor fracture; type 2, simple fracture of the posterior acetabular ring; type 3, acetabular ring comminution with or without large fragments; type 4, with fracture of the floor of the acetabulum; and type 5, with fracture of the femoral head. The Stewart-Milford classification is based on the stability of the hip and is divided as follows: type 1, without fracture or insignificant fracture; type 2, associated with a fragment or comminution of the posterior wall with the hip remaining stable in functional movement ranges; type 3, associated with instability related to loss of bone support; and type 4, associated with femoral head fracture.

In our case, both hip dislocations were classified as type 1 according to both the Thompson-Epstein and Stewart-Milford classifications.

Diagnosis

With these injuries, a clinical evaluation is imperative and usually indicates the site of the displacement of the dislocation. When the dislocation is anterior, the extremity is usually externally rotated and abducted and has some degree of flexion. By contrast, a limb with a posterior dislocation usually shows internal rotation, abduction, and flexion. This can be confirmed by an anteroposterior (AP) radiograph of the pelvis, which shows the articular incongruity. Radiographic data support the direction of the dislocation; for example, the femoral head is usually smaller and is above the acetabular roof when the dislocation is posterior. However, in an anterior dislocation, the femoral head appears larger and is usually located in a lower position, close to the obturator foramen or overlying the medial acetabulum.[12] In our patient, the dislocated left hip was classified as anterior and obturator with a Hill-Sachs-type lesion.

Associated injuries

Associated injuries may be due to the car accident or directly related to the affected hip. Associated injuries of the musculoskeletal system can be fractures of the femoral head, neck, or shaft, fractures of the acetabulum or pelvis, sciatic nerve injuries, or knee, foot, and ankle injuries. Anatomically, the hip joint is stable and resistant, with reinforcements consisting of anterior and posterior ligaments, muscles, and the joint capsule. When a hip is dislocated, these anatomical reinforcements are lost; anterior dislocations are strongly associated with fractures of the femoral head due to impaction, while posterior dislocations may be more frequently associated with fractures of the acetabulum.[12] Similar to what has been described in the literature, our patient showed an impaction fracture of the left side (similar to Hill-Sachs).

There are also reports of extra-skeletal injuries such as thoracic and abdominal trauma. These lesions may cause a delay in the diagnosis and treatment of a dislocation.[11] Our patient had a lesion in the central nervous system (interpeduncular concussion and subarachnoid hemorrhage) with a progressive neurological impairment (Glasgow 15-6 points) that was managed conservatively.

Treatment

Because most of these patients are polytraumatized, the Advanced Trauma Life Support (ATLS) guidelines should be followed.

The treatment for this type of injury must be established as soon as the patient status allows and is considered an emergency because the incidence of avascular necrosis of the femoral head increases with delays in the reduction.[13, 14] Treatment is usually first performed by a closed reduction, unless there is a fracture of the femoral head, neck, or shaft that contraindicates the procedure.

Traditionally, three methods of closed reduction have been reported for these injuries:

1. the Allis method: traction applied in line with the deformity, with the patient in a supine position. The traction is applied in line, gently flexing to approximately 70º with traction while an assistant stabilizes the pelvis. Rotation movements are usually applied with a slight abduction. Occasionally, a lateral force must be applied to the proximal thigh, and the reduction is obtained with an audible "clunk";
2. gravity method of Stimson: the patient is placed in pronation, with the affected limb hanging over the side. The hip and knee are flexed at 90°, and an assistant stabilizes the pelvis and applies an anterior force. Gentle rotation maneuvers may be needed;
3. Bigelow's maneuver and reverse Bigelow's maneuver: not usually used, associated with femoral neck fractures. This method involves a longitudinal traction. In its position, the hip is flexed to 90°, and the femoral head is then externally rotated and abducted with hip extension. The reverse maneuver is used for anterior dislocations, with traction in line with the deformity, followed by adduction, internal rotation, and extension.

After the reduction, a radiographic confirmation is usually required. The stability of the hip is tested by a hip flexion to 90° in the neutral position and by a posterior or anterior traction force, depending on the direction of the reduced dislocation. A CT scan is usually ordered to evaluate the presence of loose bodies within the hip joint. In situations where hip instability is detected, skeletal traction is usually needed.

Up to 15% of hip dislocations tend to be irreducible by closed methods.[11] In these cases, it is often necessary to perform an open reduction. Absolute indications for an open reduction of hip dislocations include an irreducible dislocation by external maneuvers and a non-concentric reduction with the presence of intra-articular loose bodies. The surgical approach usually corresponds to the direction of the dislocation. Another indication is an unstable fracture-dislocation requiring an acetabular fracture fixation.[12]

There are reports of the general use of hip arthroscopy in treatment after a closed reduction of a dislocation. This approach leads to a finding of mainly loose intra-articular labral or chondral bodies and ligamentum teres disruption.[15] However, in a recent review by Stevens *et al*.[16] evidence supporting the use of hip arthroscopy for the removal of intra-articular loose bodies and acetabular labral ruptures was determined to be of poor quality.

Monitoring and progress

In subsequent handling of these patients after reduction, it should be noted that prolonged immobilization may cause adhesions, mobility limitations, and arthritis. Controlled passive movements are advised, avoiding extreme ranges of motion for 4-6 weeks. Some studies advise weight bearing as soon as the patient can tolerate it.[12] A retrospective review [17] of 50 patients who were managed with closed reductions found no differences in the progress of patients regardless of post-reduction treatment and the onset of patient weight bearing. The recommendation of the start of weight bearing is at the discretion of the orthopedist.[18]

Complications

Avascular necrosis

Letournel and Judet [19] suggest that the reduction time has little predictive value. They presented a series of dislocations with acetabular fractures with a low incidence of avascular necrosis, regardless of the time between injury and reduction (5% less than 6 hours, 8% between 6-24 hours, and 4% over 24 hours). Other studies have shown the same prevalence of avascular necrosis (3%) with a posterior dislocation and associated acetabular fracture.[20]

However, some studies that report a dislocation without fracture have indicated that the reduction of a hip dislocation within the first 12 hours of injury reduces the incidence of avascular necrosis. The incidence of avascular necrosis of the hip in dislocations that are reduced within the first 12 hours is 2.9-17.6%. After 12 hours, the incidence is 14.8-58.8%.[17, 21, 22]

Post-traumatic osteoarthrosis

Post-traumatic coxarthrosis is referred to as the most common complication after a hip dislocation [18]. It may or may not be associated with osteonecrosis. Upadhyay *et al*.[23] have reported a 16% incidence of post-traumatic coxarthrosis and an 8% incidence of coxarthrosis secondary to osteonecrosis, while others have reported a 24% incidence of coxarthrosis with isolated dislocations and up to an 88% incidence of coxarthrosis with dislocations associated with acetabular fractures.[24] The nature of the injury to the joint and to the surrounding tissues is crucial in the incidence and severity of post-traumatic osteoarthritis. Reports have found an incidence of post-traumatic osteoarthritis of 23%,[25] and up to 35% of those treated with closed maneuvers develop changes, compared with 17% of those managed with open surgical access and the removal of osteochondral fragments. Hougaard and Thomsen [22] reported an incidence of up to 25% of post-traumatic arthritis in Epstein type I dislocations that were managed with a closed reduction.

Conclusions

The treatment of a bilateral dislocation of the hip is doubly important to prevent the development of complications. Early treatment, as well as the association with the acetabulum fracture, are the main factors to take into account to determine the prognosis of hip.

Riassunto

Lussazione bilaterale asimmetrica dell'anca. Segnalazione di un caso e review della letteratura

Esistono poche segnalazioni nella letteratura di lussazioni bilaterali asimmetriche dell'anca. Dal 2000, sono stati descritti un totale di 27 casi, la maggior parte dei quali (19 casi) associati a qualche tipo di incidente automobilistico. Normalmente, tali lesioni sono associate a meccanismi a elevata energia; negli incidenti d'auto, tali lesioni derivano spesso da un trauma indiretto dell'anca, dovuto all'impatto diretto sulle ginocchia del cruscotto del veicolo. Segnaliamo il caso di un paziente di sesso maschile di 30 anni di età che è stato coinvolto in un incidente con ribaltamento ed è stato ricoverato presso la nostra unità di traumatologia 8 ore dopo il suo incidente. Abbiamo effettuato manovre di riduzione chiusa (Allis); la gestione di post-riduzione includeva un limitato *range* di movimento dell'anca per 3 settimane, mentre il carico del peso corporeo è stato consentito, come tollerato, dalla 4ª settimana in avanti. Attualmente, il paziente è nel suo terzo anno di progressi con esito soddisfacente. Consideriamo appropriato intraprendere una *review* della letteratura sulla lussazione dell'anca, inclusa la sua etiologia, diagnosi, trattamento, e possibili complicanze.

Parole chiave: Anca, dislocazione - Incidenti stradali - Anca.

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