Traumatic Anterior Hip Dislocation in a 7-Year-Old Pediatric Patient

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ABSTRACT

Traumatic hip dislocation in children is extremely rare, and the anterior type is exceptional. It is considered an emergency due to the high risk of complications, the most serious being avascular necrosis of the femoral head. We report the case of a 7-year-old child who sustained a fall from a height of five meters, resulting in an anterior hip dislocation. The diagnosis was confirmed with computed tomography, and closed reduction was performed eight hours after the accident. Radiographic follow-up at three and six months showed no signs of avascular necrosis; however, given the risk of its occurrence, continued monitoring is warranted.

Keywords: Pediatric hip dislocation; avascular necrosis of the femoral head; traumatic dislocation; anterior hip dislocation.

Level of Evidence: IV

Luxación anterior traumática de cadera en un niño de 7 años

RESUMEN

La luxación traumática de cadera en la edad pediátrica es un cuadro sumamente infrecuente, y la luxación anterior es una lesión excepcional. Se considera una urgencia debido al alto riesgo de complicaciones, la más importante es la necrosis avascular de la cabeza femoral. Se presenta el caso de un niño que sufrió una caída de 5 m de altura que le provocó una luxación anterior de cadera. Se diagnosticó mediante una tomografía computarizada simple, y se la trató, de manera cerrada, a las 8 h del accidente. En el control radiográfico a los 3 y 6 meses, no se observaron signos de desarrollo de necrosis avascular; sin embargo, ante la posibilidad de este cuadro, es necesario continuar con un protocolo de seguimiento.

Palabras clave: Luxación de cadera; pediatría; necrosis avascular de la cabeza femoral; luxación traumática; luxación anterior de cadera.

Nivel de Evidencia: IV

INTRODUCTION

Traumatic hip dislocation is rare in children, accounting for 2-5% of all dislocations in this age group.[1] The incidence increases with age, yet it is up to 25 times less frequent than in adults.[2,3] This is attributed to anatomical factors such as skeletal immaturity and ligamentous laxity, which compromise joint stability.[1,4]

In children under 6 years of age, dislocation occurs after low-energy accidents as a result of limited joint contact from cartilaginous acetabular coverage and ligamentous hyperlaxity.[4] In those over 6 years of age, it is associated with high-energy mechanisms,[4] which can cause life-threatening injuries; therefore, a standardized initial clinical assessment is essential to rule out severe systemic and orthopedic injury.[5]

The most common presentation is posterior dislocation (95%); anterior dislocations account for only 5% and are subdivided into pubic (superior) and obturator (inferior).[6] Another classification considers soft-tissue integrity; closed dislocations are more common, whereas open dislocations require high-energy mechanisms.[7]

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Clinically, posterior dislocations present with the limb in adduction, flexion, internal rotation, and shortening; anterior dislocations present with abduction, external rotation, flexion, and also shortening.[8] The mechanism of anterior dislocation is not fully defined, but a force vector in external rotation and abduction with flexion has been proposed for the obturator type, and with extension for the pubic type.[6]

Diagnosis requires pelvic radiographs supplemented with computed tomography (CT) and magnetic resonance imaging (MRI) to evaluate osseous and soft-tissue structures.[7,8] The standard treatment is closed reduction under sedation within the first 6 hours.[5]

Complications include associated fractures (40%), neurovascular injuries (25%), and articular cartilage injuries (6%).[7] The most important complication is avascular necrosis of the femoral head (AVN), detected in 8% of patients at 12 months. [9,10]

CLINICAL CASE

A 7-year-old boy with normal neurological and psychomotor development for his age and no relevant medical history suffered a fall from a height of 5 m, with an apparent injury mechanism involving traction, external rotation, and abduction of the right hip, as well as traumatic brain injury.

He was stabilized by a mobile medical unit and transferred to the emergency department 6.5 hours after the accident. On admission, his Glasgow Coma Scale score was 8, and the right lower limb was in flexion, abduction, and external rotation (Figure 1).

Figure 1. Clinical presentation with flexion, abduction, and external rotation of the right lower limb.

Orotracheal intubation was performed. A cranial CT scan showed an epidural hematoma and a frontotemporal fracture without surgical indication. Initial pelvic CT revealed right hip joint incongruity consistent with an anterior dislocation of obturator type (Figure 2); associated injuries were ruled out.

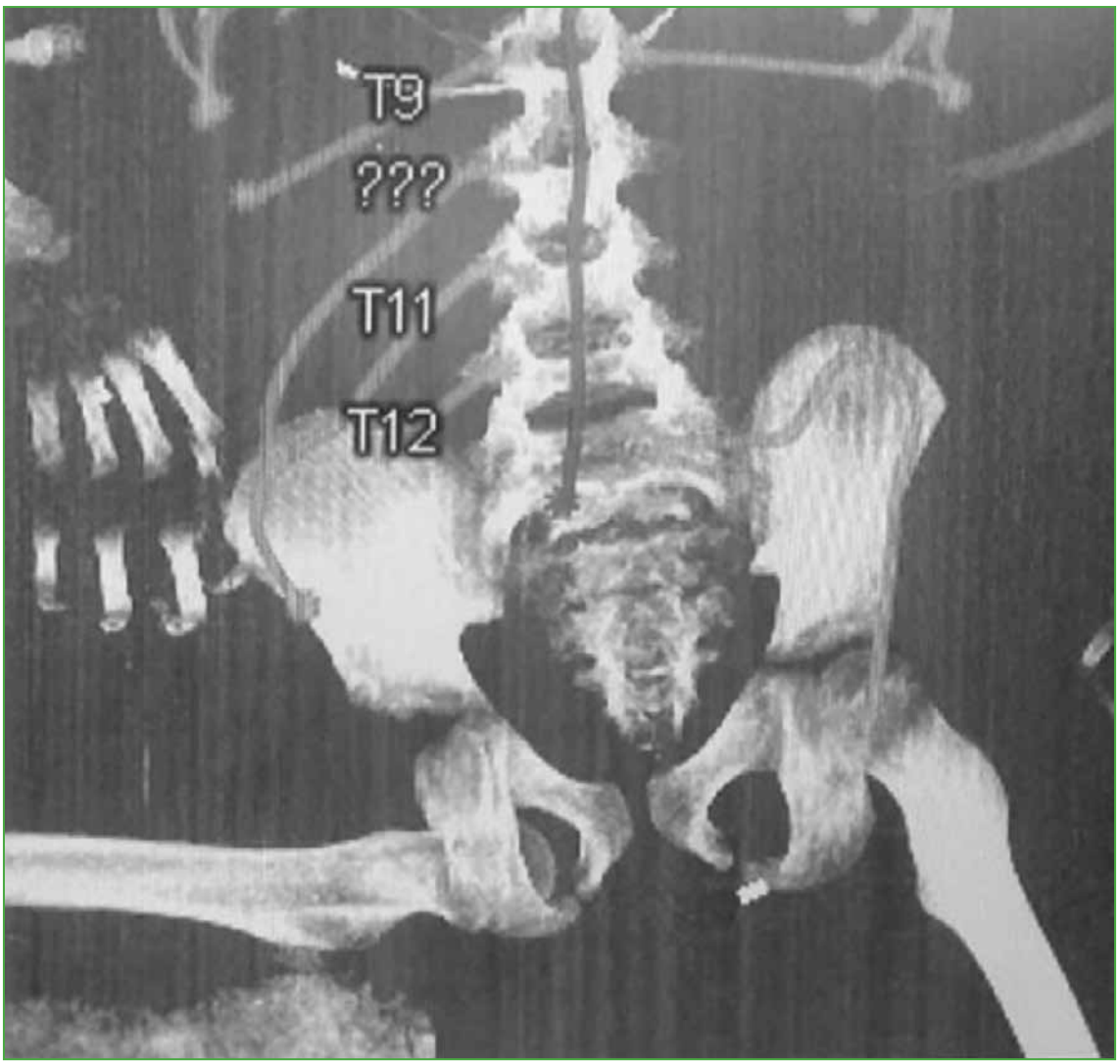

Figure 2. 3D CT of the pelvis. Anterior dislocation of the right hip, obturator type.

After stabilization, closed reduction under sedation was performed 8 hours after the accident. With the child in the supine position and the knee flexed at 90°, longitudinal traction was applied; simultaneously, the proximal femur was displaced laterally using a strap and external rotation, achieving successful clinical reduction. Stability maneuvers were positive, and reduction was confirmed by fluoroscopy (Figure 3).

Figure 3. Fluoroscopic confirmation of closed reduction of the right hip.

The patient was admitted to the intensive care unit for observation and monitoring. A cranial CT at 48 hours revealed no changes. At three weeks, progressive neurological improvement was noted. He was discharged from intensive care with instructions for close follow-up.

Follow-up radiographs at 3 (Figure 4) and 6 months (Figure 5) showed no evidence of AVN, and other musculoskeletal complications associated with traumatic dislocation were also ruled out.

Figure 4. Anteroposterior pelvic radiograph at 3 months of follow-up.

Figure 5. Anteroposterior pelvic radiograph at 6 months of follow-up.

DISCUSSION

Traumatic hip dislocation has an incidence of 0.8 cases per million in the pediatric population.[3,11] Our patient, a 7-year-old boy, falls within the most frequent age range, according to Mehlman et al., who reported a mean age of 9 years and 10 months.[12] In addition, this injury is 3 to 4 times more common in males.[13]

In this case, the child sustained an anterior dislocation, the less frequent type, as 95% of dislocations are posterior.[12] Baumann et al. reported a prevalence of 2.8% for anterior dislocations involving the obturator foramen.[11]

CT was useful to confirm the dislocation direction, although it is not ideal for detecting acetabular fractures in children due to unossified cartilage; MRI would be more appropriate,[8] but was not performed. This case corresponded to an isolated dislocation (grade I),[10] without associated injuries, which is common in children under 8 years of age, in whom acetabular fractures are rare.[14] Chondral and osseous injuries increase with age.[3]

Closed reduction was performed 8 hours after the accident. A delay greater than 6 hours increases the risk of AVN up to 20-fold.[15] MRI is indicated if soft-tissue interposition is suspected after reduction.[8] Immobilization was not indicated after reduction due to the patient's neurological status. In children under 10 years of age, immobilization with a spica cast for 4 weeks and a rehabilitation protocol are recommended,[10] but authors such as Sahin et al. report that neither immobilization nor time to weight bearing significantly influences functional outcomes.[16]

Reported complications include coxa magna, sciatic nerve palsy, paresthesias, and AVN of the femoral head.[10] In patients under 18 years of age, the incidence after isolated dislocation ranges from 3% to 15%,[17] and is higher if reduction is delayed.[18] Therefore, imaging follow-up is essential. Although there is no consensus on ideal timing, in this case, check-ups were performed at 3 and 6 months, and no radiographic evidence of AVN was detected.

MRI is the diagnostic gold standard, with specificity and sensitivity greater than 99%,[19] but it could not be obtained due to socioeconomic and infrastructure limitations in our setting. Plain radiographs were chosen which, although less sensitive in early stages, can be an acceptable alternative when MRI is unavailable, as noted by Manenti et al.[19-21]

Follow-up radiographs showed no signs suggestive of AVN (sclerosis, collapse, cysts, joint-space narrowing, etc.).[22] These findings may take 2 to 6 months to become visible on radiographs,[20] so the follow-up schedule was appropriate.

Finally, beyond time to reduction, factors such as age, trauma severity, and concomitant intra-articular fractures also influence outcomes. In our patient, young age, absence of an intracapsular fracture, and no prior coxa vara were protective factors.[23,24]

Despite the absence of radiological signs of AVN up to 6 months, continued imaging follow-up is necessary to detect potential development of AVN, which may take up to 2 years to manifest.[25]

CONCLUSIONS

Traumatic anterior hip dislocation in children is uncommon. Diagnostic and therapeutic management must be timely. Closed reduction within the first 6 hours after injury is essential to reduce the risk of complications such as AVN of the femoral head, which leads to early joint degeneration, limits therapeutic options, and compromises the likelihood of a favorable outcome.

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