Initially neglected tissue interposition after reduction of posterior hip dislocation in a child—a case report

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A healthy 12-year-old boy was playing with his friends in the schoolyard. He fell backwards onto his right hip while his left foot held on the ground by another pupil. His hip became acutely painful and could not bear weight.

On arrival in the hospital, his right hip was flexed, adducted and internally rotated. His general condition was normal and his previous pediatric records were unremarkable. No signs of neurological or vascular injuries were noted, nor were there any signs of general joint hyperlaxity. No concomitant injuries were detected.

Radiographs showed a posterior dislocation of the hip (Figures 1 and 2). No fractures of the acetabulum or the femoral head were seen, nor were there any signs of acetabular dysplasia. 5 hours after injury, the boy was given general anesthesia, and closed reduction with traction was performed in the operating room. On the basis of the physical examination at the time of reduction, no gross hip instability was found, and the hip was regarded as clinically reduced. The radiographs after reduction were interpreted as normal despite some lateralization, interpreted as a consequence of hemarthrosis (Figure 3). A CT scan was performed on the next day to exclude overlooked intra-articular fragments. A small intra-articular osseous fragment was missed, and the patient was immediately started on physiotherapy. Due to intractable pain during mobilization and marked limitation of hip mobility, a new CT scan of the hip was taken 5 days after the injury. This showed a small bony intra-articular fragment and a small acetabular fracture (Figures 4 and 5). On the 6th day after injury, he was referred to the regional trauma center for further treatment. On a new radiograph, we found persistent, slight lateralization of the right hip. An MRI scan was taken to evaluate the interposed tissues. A small bony fragment was seen entrapped in the hip, but the site

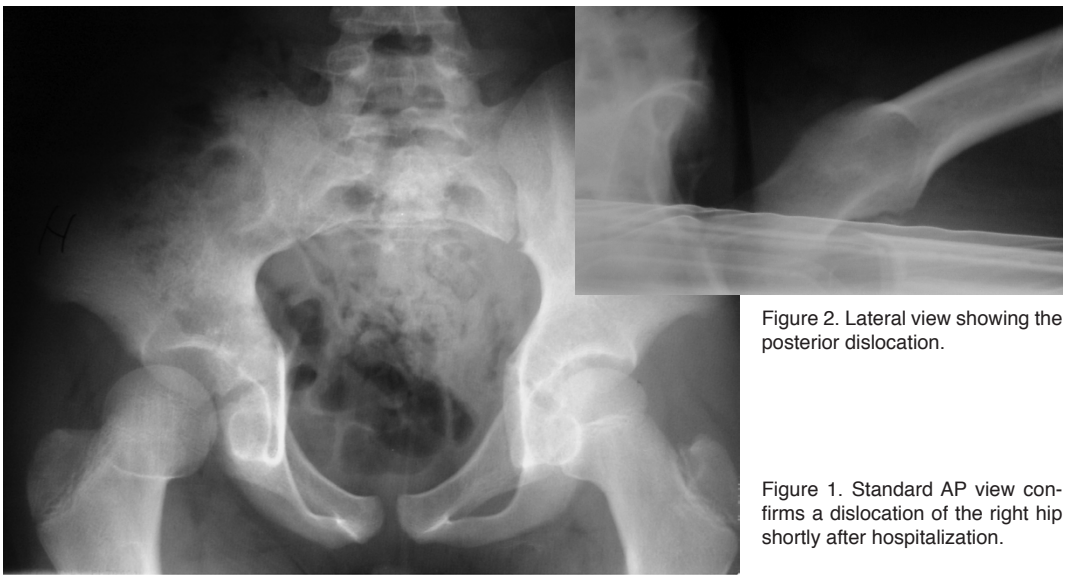

Figure 2. Lateral view showing the posterior dislocation.

Figure 1. Standard AP view confirms a dislocation of the right hip shortly after hospitalization.

Figure 3. Standard AP radiograph shows slight lateralization of the right hip after reduction (note the abducted position of the hip).

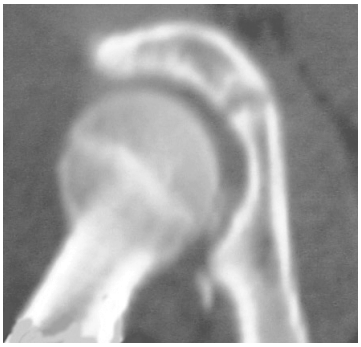

Figure 4. CT reconstruction demonstrates a small osseous interposition in the right hip.

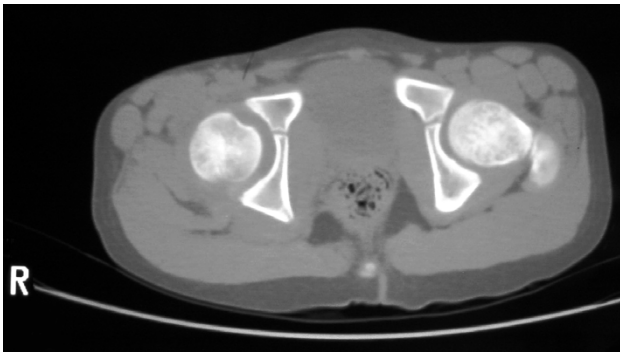

Figure 5. CT scan 5 days after closed reduction. Note 2–3 mm lateralization of the right femoral head, as compared to the left.

Figure 6. MRI scan. The site of origin of the intra-articular fragment can not be determined.

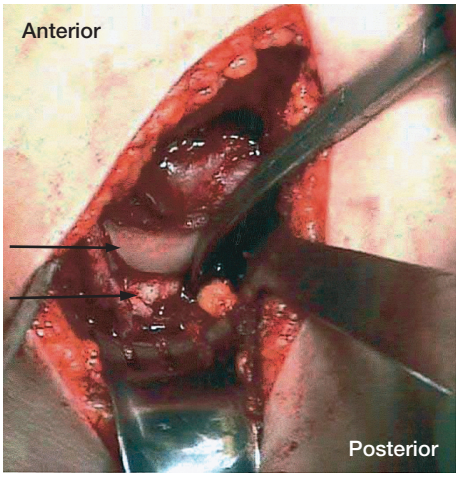

Figure 7. The inverted apophysis with adjoining limbus is seen interposed between the femoral head and the posterior acetabular wall.

of its origin could not be determined exactly (Figure 6).

On the 7th day after injury, surgery was performed with the patient in the lateral position, using a limited Kocher-Langenbeck approach. A traumatic posterior longitudinal capsular tear was present. Tissue measuring 1 x 4 cm was interposed between the femoral head and the posterior acetabular wall, preventing congruent articulation (Figure 7). The interposed tissue consisted of the labrum and a bone fragment

centrally attached by its acetabular cartilage in a hinge-like fashion. The injury was interpreted as an inversion of the secondary center of ossification of the ischium with the adjoining labrum. Normal congruence of the hip joint was achieved after reduction of the interposed tissue. Joint stability was re-established, and no internal fixation was necessary.

No neurological impairments were noted postoperatively and, on the first postoperative day, the patient was allowed free range of motion. However, he was advised to use crutches for 2 weeks, avoid weight bearing and then gradually increase the load. The patient was hospitalized for 10 days.

On the follow-up at 8 weeks, the boy still complained of minor hip pain. A difference of 10-20° in flexion and internal and external rotations of the hip were recorded, as compared to the left hip, but hip extension was normal. The radiographs were normal. The patient was allowed free weight bearing without crutches. 1 year after injury he participated in all his previous sports activities. He still had some intermittent pain in the inguinal region with occasional weakness of his lower extremity when playing football. He had good symmetrical strength in his lower extremities, a reduction of 15° in hip flexion as compared to his left hip, and a difference of 10° both internal and external rotation. No clinical signs of hip instability were noted. Standard radiographs of the hip showed no signs of chondrolysis, exogenous ossification, avascular necrosis, discontinuity of the acetabulum or coxa magna. The MRI was negative, as regards avascular necrosis of the femoral head. After 2 years, he still had slight intermittent pain in his groin, but symmetrical hip movements, and normal MRI.

Discussion

Traumatic dislocation of the hip is uncommon in children—i.e., only 5% to 9% of them are less than 14 years of age. In children younger than 10 years of age, dislocations may be associated with relatively minor trauma of the hip, while in older children, most hip dislocations are associated with more severe injuries (Salisbury and Eastwood 2000). In children, traumatic hip dislocations frequently occur without an associated fracture of the acetabulum or the femoral head, especially in younger children because of pliable cartilaginous components, such as the labrum (Mehlman et al. 2000).

Incomplete reduction secondary to tissue interposition in the joint after hip dislocation can be difficult to diagnose on standard radiographs in children due to the only partly calcified nature of the bone (Altenberg 1977, Canale and Manugian 1979, Hachiya et al. 2001). Portions of radiolucent cartilage may become displaced into the joint, particularly when the acetabular labrum separates from the main hyaline cartilage (Harder et al. 1981). The acetabulum is initially formed by 3 primary centers of ossification; the ischium, pubis and ilium, all of which converge within the acetabulum to form the triradiate cartilage. During adolescence, secondary centres of ossification develop in the hyaline cartilage surrounding the acetabular cavity (Ponseti 1978). Because of the immaturity of pediatric bone, the pathophysiology of a coexisting acetabular injury in hip dislocation differs in adults and children. In posterior dislocations, the partly radiolucent secondary center of the ischium is vulnerable to injury (Rubel et al. 2002).

Traumatic hip dislocations in children with injuries to the acetabulum may have harmful effects on function of the hip joint (Mehlman et al. 2000). Associated complications are reported to be common (Salisbury and Eastwood 2000), but the incidence of avascular necrosis in children after traumatic dislocations of the hip still seems to be lower than in adults, probably about 10% (Mehlman et al. 2000). Our patient required surgical intervention to reduce the intra-articular fragment, but open reduction was delayed for 7 days, and no internal fixation was performed. After reduction of the hip, radiographs of both hips to detect a dislocation should be taken for comparison in order to determine whether hip joint incongruence is present. Hemarthrosis has been claimed to cause the hip joint to appear slightly wider after reduction of a hip dislocation (Rieger et al. 1991), but the increase in iliofemoral distance should subside within a few days (Gennari et al. 1996). In our case, the dislocated, retained secondary center of ossification with adjoining labrum resulted in widening of the joint space, which was initially misinterpreted as hemarthrosis.

Since the joint capsule is torn in complete dislocations of the hip, joint asymmetry based solely on the accumulation of an intraarticular hematoma seems unlikely in our opinion. Any widening of the hip joint in comparison to the contralateral hip must therefore be closely monitored so as not to overlook interpositioning by soft tissue. In our case, only the CT scan after reduction showed the interposed osseous and soft tissues.

MRI has been advocated as being useful in detecting chondral and osseous tissue interposition and determining the amount of posterior wall involvement (Rubel et al. 2002). In our case, the MRI scan provided no more information than the CT scan concerning the site of origin of the interposed tissue.

No competing interests declared.

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