

TRAUMATIC POSTERIOR DISLOCATION OF THE HIP IN CHILDREN: REPORT ON FIVE CASES

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ABSTRACT

Objective: To evaluate a series of cases of traumatic posterior dislocations in children, with the treatment and results, and to review issues relating to the epidemiology, clinical and radiographic diagnosis, treatment, complications and prognosis of such cases. **Methods:** Five patients with traumatic hip dislocation, with a mean age of 4.6 ± 0.9 years and a follow-up period of 19.8 ± 7.0 months, were evaluated retrospectively. The time elapsed between dislocation and reduction, the type of treatment, the associated injuries and the subsequent complications were evaluated. **Results:** The initial treatment was closed reduction, which was performed on average 5.2

± 3.6 hours after the initial trauma. All the patients underwent the reduction under anesthesia. The complementary treatment included plaster cast immobilization and traction. No need for additional surgery was observed and there were no long-term side effects. **Conclusion:** Traumatic dislocation of the hip should be treated quickly by means of closed reduction, with appropriate control over the reduction and rigorous observation in order to diagnose and treat late complications.

Keywords: Hip dislocation/epidemiology; Hip dislocation/diagnosis; Hip dislocation/radiography; Hip dislocation/complications; Child

INTRODUCTION

Posterior traumatic dislocation of the hip in children is a rarely seen injury and constitutes an orthopedic emergency⁽¹⁾. During childhood, it may result from low-energy trauma caused by acetabular plasticity and ligament weakness⁽¹⁾.

The treatment should be performed as early as possible. Closed reduction under anesthesia is the method of choice for the initial approach towards these lesions, in order to minimize the complications. However, there continues to be no consensus regarding the treatment after achieving reduction⁽¹⁾.

The most common early complications are associated fractures and neurological lesions. The late complications include episodes of renewed dislocation, chondrolysis, avascular necrosis and degenerative arthritis, usually secondary to delayed reduction. The following factors are related to worse prognosis: dislocation that is not corrected for more than six hours, advanced skeletal maturity, severe joint lesions and the presence of multiple associated trauma⁽¹⁾.

The aim of the present study was to evaluate a series of cases of posterior traumatic dislocation in children, with the treatment and results, and to review the issues relating to the epidemiology, clinical diagnosis, radiographic diagnosis, treatment, complications and prognosis of such cases.

PATIENTS AND METHOD

Five cases of posterior traumatic dislocation of the hip in patients with immature skeletons were evaluated between September 1999 and December 2003. The patients were attended at Hospital da Baleia, Hospital São Camilo and the Minas Gerais Institute of Orthopedics. The mean age was 4.6 ± 0.9 years (ranging from 3.9 to 6 years). Four children (80%) were male and one (20%) was female. The injury mechanism was direct trauma in one case (20%), fall from the patients' own height in three cases (60%) and fall from a high platform in one case (20%). The left side was affected in four cases (80%) and the right side in one case (20%).

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In all the cases, the diagnosis was based on physical examinations and radiographic findings from anteroposterior views of the hip. On examination, all five children were unable to walk and presented typical deformities regarding flexion, adduction and medial rotation of the hip that was affected (Figures 1 and 2A). All the patients underwent closed reduction under venous anesthesia, and monitoring after the reduction was performed using conventional radiographs (Figure 2B), Computed tomography was used if joint incongruence or the possibility of occult lesions was suspected. The patients were followed up every week for the first two months, every month over the first two years and every six months from the third year onwards. The control examinations consisted of clinical assessment of the range of motion, gait pattern, discrepancy between the limbs and radiographic evaluations in anteroposterior and *batráquio* views. The mean length of follow-up was 19.8 ± 7.0 months. The following were evaluated: severity of the trauma, initial time elapsed between the trauma and the reduction, the associated lesions, the functional result in terms of the limitation on joint mobility and residual claudication, the radiographic result in terms of analysis on the sphericity of the femoral head and abnormalities of acetabular development, and new episodes of dislocation. The data were analyzed with the aid of the Epi-Info software, version 6.04.

This study was approved by the Ethics Committees of the respective hospitals, and the parents responsible for these children gave their consent through a free and informed consent statement.



Figure 1 – Clinical appearance characteristic of posterior dislocation of the hip



Figure 2A – Radiographic appearance of traumatic posterior dislocation of the hip



Figure 2B – After reduction of the dislocation and without signs of necrosis, seven months later

RESULTS

The trauma that resulted in the dislocation was low-energy in four cases (80%). Only one case was high-energy, caused by a fall from a high platform (approximately 2.5 m) (Table 1). The initial treatment consisted of closed reduction under anesthesia, which was performed on average 5.2 ± 3.6 hours after the initial trauma (median of 3.5 hours). Epiphysiolysis of the proximal femur was observed in one case, but after the reduction, the radiographic and tomographic examinations showed spontaneous reduction that remained stable in radioscopic control examinations. It was decided to treat it conservatively, with a plaster cast from the pelvis to the foot. None of the cases presented neurological abnormalities as complications. In the evaluation after the reduction, joint congruence was observed in all the cases, and there were no interpositions or occult associated lesions in the radiographic examinations.

After the complementary treatment, all the children were released for walking without restrictions. Dur-

Table 1 – Complementary treatment following closed reduction, among the patients with posterior dislocation of the hip

Patient	Gender	Complementary treatment	Duration of immobilization (weeks)	Time taken to restore weight loading(weeks)
DBL	M	PCPT	3	4
FFL	F	PCPT	4	8
ASR	F	ST + PCPT	4	4
BCMM	F	ST + PCPT	4	4
EML	F	PCPT	4	4

Source: SAME – Hospital da Baleia, Hospital São Camilo and IMOT
 Legend: PCPT – plaster cast from pelvis to foot, ST – skeletal traction, M – male, F – female

ing the follow-up, no clinical abnormalities or episodes of renewed dislocation were observed. All the patients presented symmetrical ranges of motion in relation to the contralateral hip, three months after the trauma, and none of them presented residual claudication. The radiographic evolution was satisfactory, with maintenance of the sphericity of the femoral head, acetabular orientation and joint congruence. No cases of chondrolysis, avascular necrosis or joint degeneration were observed during the follow-up. In none of the cases was complementary surgical treatment necessary.

DISCUSSION

Traumatic dislocation of normal hips in children under the age of 16 years⁽²⁾ is a rare injury, with an incidence of 0.8 cases per million/year, and posterior dislocation accounts for 80% of such cases⁽²⁻¹¹⁾. It is more common in boys (4:1)^(8,9) and may occur at any age among children, although the peak incidence occurs between four and seven years of age and between 11 and 15 years of age^(3,8,9).

In younger children, the acetabulum is very flexible, loose and cartilaginous⁽¹⁻⁴⁾, thus allowing trivial trauma to result in dislocation^(1,3-5,7-10,12). With growth, the cartilage calcifies and the ligament weakness diminishes, such that greater energy is required to dislocate the hip^(1,2,10-12). Thus, associations between traumatic dislocation of the hip and femoral fractures in children should always be borne in mind⁽¹¹⁾, especially among older children and adolescents^(1-4,10).

The cases described here presented characteristics similar to those in the literature. We observed that male patients and a mean age of 4.6 years predominated, with lower-energy trauma in most cases, with the exception of one patient who suffered a fall from a height and presented associated proximal epiphysiolysis of the femur.

The clinical diagnosis for this lesion is based on the history of trauma, pain in the hip and inability to

walk⁽²⁾. The typical deformity varied according to the type of dislocation. In posterior dislocation, the leg will be flexed, adducted and internally rotated^(1-4,9). The functioning of the sciatic nerve should be registered before and after the hip reduction^(3,4). There is also the possibility of spontaneous but partial reduction of the dislocation, through interposition of soft tissues⁽¹³⁾. This situation may not be recognized, thus leading to permanent joint damage^(1,12,14,15).

Good-quality radiographic evaluation is essential for confirming the diagnosis, revealing the type of dislocation and discarding the hypothesis of associated fractures⁽²⁾. Fragments from acetabular or femoral fractures are often seen better on radiographs produced before the reduction^(3,4). In our case of femoral fracture, the lesion was only evident on the initial radiograph, in agreement with Canale⁽³⁾.

Traumatic dislocation of the hip in children is an orthopedic emergency^(7,11). There is a consensus that the reduction should be performed immediately, preferably using a closed procedure and under general anesthesia^(9,16,17) or with relaxants^(3,11), using the same maneuvers as used for reductions in adults (Stimson, Allis and Bigelow)^(2,3,9,10). After the reduction, the joint congruence should be evaluated, comparing the joint space, lateralization of the head⁽¹⁴⁾ and breakage of Shenton's line⁽⁹⁾ with the contralateral side.

In cases of incongruent reduction, computed tomography (CT) and magnetic resonance imaging (MRI) are useful for determining any presence of fragments or interposed tissue⁽¹⁴⁾. If the presence of interposition is confirmed, a second attempt at reduction is made^(3,4), or open reduction using a posterior approach is performed^(3,4,10). The indications for open reduction are weakness of the closed reduction, injury to the sciatic nerve with indication for exploration^(2,3) and fractures of the acetabulum, femoral neck or femoral head that require surgical treatment⁽²⁾.

There continues to be no consensus regarding the treatment to be followed after achieving reduction⁽¹⁾. Price *et al*⁽¹²⁾ and Tachdjian⁽⁹⁾ recommended using a plaster cast from the pelvis to the foot (PCPF) for four to six weeks, in order to allow the capsule to heal. Gianom *et al*⁽⁶⁾ indicated resting in bed until achieving pain relief, following by walking using crutches and protection of the support for four weeks. Blaster and Hughes⁽¹⁰⁾ proposed resting until the pain improved, followed by a return to walking. Canale⁽³⁾ and Hebert⁽²⁾ used cutaneous traction for one week, followed by protection of the support for four to six weeks.

When there is a need for open reduction, skeletal traction (ST) or PCPF is recommended for up to six weeks^(2,3,10). For cases of dislocation that evolved over more than 24 hours, ST prior to reduction is recommended, followed by traction for two to three weeks after the reduction^(2,3).

The five cases analyzed here were subjected to closed reduction under anesthesia. Radiographic evaluation to verify joint congruence was performed on all of them. In cases of dislocation associated with femoral fracture, the congruence is confirmed using CT.

Many complications are associated with traumatic dislocation of the hip in children. Nerve injuries occur in around 5% of such children^(2,9), and the fibular branch of the sciatic nerve is the one most affected in cases of posterior dislocation due to direct compression⁽¹³⁾. Absence of improvement after four to six weeks is an indication for surgical exploration following neurodiagnostic studies⁽⁹⁾. If there is loss of function of the sciatic nerve after the reduction, the nerve should be explored surgically⁽¹⁰⁾. Avascular necrosis has an incidence of 8% to 10%, and delays in performing the reduction, high-energy trauma and age greater than five years are factors associated with higher frequency of this complication^(1-3,7). The main risk factor seems to be the time elapsed since the dislocation. Reduction performed after more than six hours of evolution presents a risk of avascular necrosis that is 20 times greater⁽¹⁸⁾. According to Mehlman *et al*⁽¹⁸⁾, scintigraphic evaluation is unnecessary as routine follow-up. According to Blaster and Hughes⁽¹⁰⁾, it is recommendable for the hip to be evaluated using serial radiographs, at least two years after the dislocation. These authors also did not recommend scintigraphic

evaluation or MRI as routine control examinations until reaching skeletal maturity⁽¹⁹⁾. Renewed dislocation is rare and is associated with children younger than eight years of age⁽¹⁰⁾ and children with ligament looseness, especially those with Down syndrome^(3,10). Its treatment consists of a new reduction, followed by PCPF for six weeks or capsuloplasty^(2,10). Among older children, it may be necessary to associate this with bone procedures such as Salter's operation^(3,10) or varus osteotomy⁽³⁾. Chondrolysis has been reported following traumatic dislocation of the hip, in 6% of the children. It probably results from the joint lesion at the time of dislocation. The treatment should be symptomatic. If joint reconstitution does not occur, arthrodesis or reconstruction should be considered⁽¹⁰⁾. Coxa magna seems to occur as a result of post-traumatic hyperemia. In most of these children, this condition is asymptomatic and does not require any treatment. Ossifying myositis⁽³⁾ and degenerative arthritis^(1,7-9) are potential sequelae.

The five cases reported here did not present any complications up to the time of the last orthopedic evaluation. Most of the children had good long-term evolution and better results than shown by adults^(10,20). A large proportion of such patients (78%) can undertake high-demand activities such as soccer or basketball⁽¹⁸⁾.

CONCLUSION

Traumatic dislocation of the hip occurred in younger children in our case series, with lower-energy trauma and good late evaluation. Despite the satisfactory evolution of our five patients, long-term follow-up needs to be maintained.

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