ORIGINAL ARTICLE

OUR APPROACH TO THE CONSERVATIVE TREATMENT OF THE DISLOCATED HIP IN DEVELOPMENTAL DYSPLASIA

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Summary: The purpose of this study is to evaluate the effectiveness of the use of traction in achieving closed reduction of a dislocated hip. We evaluated 38 hips in 29 consecutive patients who had been treated at our department between January 1999 and December 2001. There were 26 girls and 3 boys and the average age was 8 weeks. The minimal duration of follow-ups was 12 months after closed reduction. We achieved 32 concentricaly reduced hips, the barriers to the concentric reduction were demonstrated by arthrography in 5 hips and 1 hip redislocated after removal of the spica cast. Avascular necrosis of the femoral head developed in no conservatively treated hip. The traction reduction method is preferred at our department because of high rate of success without damaging the femoral head.

Key words: *Developmental dysplasia of the hip; Closed reduction; Avascular necrosis*

Introduction

Developmental dysplasia of the hip is a spectrum of alterations of the hip joint development occuring in different forms at different ages. The infants normal at birth, in whose hip dysplasia or dislocation subsequently developed, should be included and therefore the older term congenital dislocation of the hip has been replaced gradually by developmental dysplasia (4,8). No contact between the original articular surfaces is typical for a dislocated hip and limited contact for a subluxated hip. Dysplasia is defined as a deficient development of the acetabulum and the femur. The goal of the treatment is to obtain and maintain reduction of the dislocated or subluxated hip without damage of the femoral head (7,12).

The purpose of this study is to evaluate the effectiveness of the use of traction in achieving closed reduction of a dislocated hip.

Material and Methods

We evaluated 38 hips in 29 consecutive patients who had been treated for dislocation of the hip at our department between January 1999 and December 2001. The average age of the twenty-six girls and three boys at the time of the use of traction was 8 weeks (range 2–20 weeks). Twenty patients had a unilateral involvement (sixteen on the left and four on the right hip), nine patients had a bilateral involvement.

Our traction reduction method required 6 weeks of in-hospital treatment. The traction was used not only to stretch the shortened pelvifemoral muscles but also to reduce the femoral head. The child laid in bed and skin traction was applied with the hips and the knees extended to pull the displaced femoral head below the acetabulum. After 2 weeks the hips were flexed 90 degrees and the knees extended (over-head traction) and the hips were then gradually abducted until the hip was reduced. Arthrography of the hip was performed under general anesthesia and under strict aseptic conditions from the anterior approach at the end of this initial stage of treatment. If the reduction was concentric and stable, the child was immobilized in a bilateral hip spica cast in a safe and stable position with the hips flexed 90 degrees and abducted (extreme forced abduction of the hips should not be performed). The period of immobilization in the plaster cast was 6 weeks. Following removal of the plaster cast and X-ray control, a Pavlik harness was utilized to maintain the hip in the flexion and the abduction. Most children required the Pavlik harness till the twelfth month of age.

The minimal duration of follow-ups was 12 months after closed reduction. Each patient underwent a careful history, physical examination, and radiografic evaluation at follow-up. The parents were questioned about intrauterine malposture of the child (breech position) and about familial occurence of developmental dysplasia of the hip. Physical examination included assessment of the lower extremity length and the range of the hip joint motion. X-rays included anteroposterior views of the pelvis to assess the efficiency of closed reduction. The presence of avascular necrosis of the femoral head was searched for.

Results

We treated 38 dislocated hips and after using the traction we achieved 32 concentricaly reduced hips (Fig. 1, 2, 3). The barriers to the concentric reduction were demonstrated by arthrography in 5 hips. One hip redislocated after removal of the spica cast. Therefore open reduction of the dislocated hip through anterolateral approach combined with femoral shortening and derotation osteotomy was indicated in 6 hips.

Intrauterine breech position was recorded in 4 children with 6 dislocated hips (14%), familial occurence of developmental dysplasia of the hip was recorded in 17 children (59%).

Fig. 1: X-ray of a three-month-old boy with dislocation of the left hip.

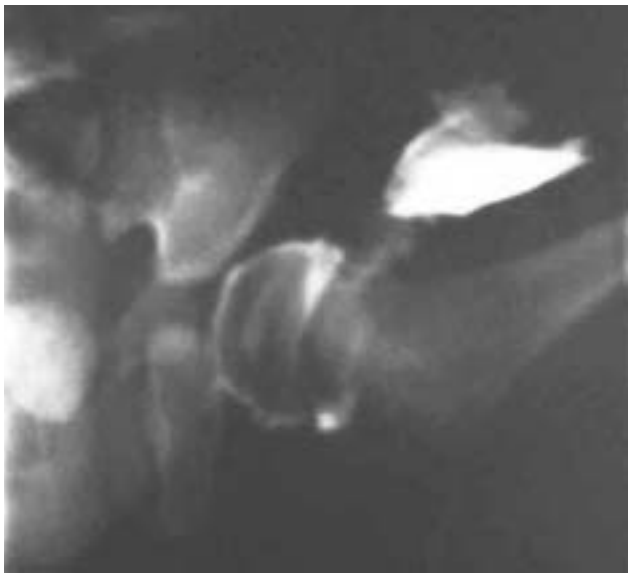

Fig. 2: Arthrogram showing concentric reduction of the affected hip.

Fig. 3: X-ray at twelve months of age, there is no irregularity of the capital femoral epiphysis and the femoral head is covered by the acetabulum.

We found full range of hip joint motion and no leg-length discrepancy in all 32 conservatively treated hips.

Avascular necrosis of the femoral head developed in no conservatively treated hip.

Discussion

Many predisposing factors are involved in etiology of developmental dysplasia of the hip. There were reported two separate heritable systems (10,14). Development of acetabular dysplasia is inherited as a polygenic system (responsible for a large number of late diagnosed cases). Generalized joint laxity is inherited as a dominant trait with incomplete penetrance (responsible for a large number of neonatal cases). Prenatal breech position is a high risk factor for developmental dysplasia of the hip. About 3 percent of babies are born in breech position and it was reported that about 16 percent of babies with developmental dysplasia of the hip were born in breech presentation (1,9). We found the breech presentation in 14 percent of our patients with dislocated hip. There is higher incidence of developmental dysplasia of the hip in first-born children (an unstretched uterus and taut abdominal muscles), in oligohydramnios and on the left hip (the left hip is adducted against the maternal sacrum in the most common intrauterine position) (5). Postnatal positioning of the hips with extension-adduction is associated with higher incidence of developmental dysplasia of the hip (12).

A serious complication of treatment of developmental dysplasia of the hip is avascular necrosis of the femoral head. The entire upper femur is one cartilaginous structure prior to ossification of the femoral head. The ischemic effect may involve only a part of the upper femur or the entire upper femoral epiphysis. At our department there are

used Bucholz-Ogden and Kalamchi-MacEwen classification systems for avascular necrosis of the femoral head (2,6,11). In Bucholz-Ogden type I the changes are limited to the femoral head without the metaphyseal involvement. In Bucholz-Ogden type II the lateral metaphysis is affected and early lateral epiphyseal closure produces a valgus deformity of the femoral head. In Bucholz-Ogden type III the entire metaphysis is involved and growth disturbance causes an extremely short femoral neck with marked trochanteric overgrowth. In Bucholz-Ogden type IV the medial metaphysis is affected and premature medial epiphyseal closure produces growth into a varus deformity. In Kalamchi-MacEwen grade 1 there are the ossific nucleus changes, in grade 2 the lateral physis involvement, in grade 3 the central physis involvement and grade 4 total physis damaging. The incidence of avascular necrosis varies according to the method of treatment. There were reported 74–91 percent efficiency of the traction reduction method with 0–7,4 percent developed avascular necrosis of the femoral head (3,13). We achieved a closed reduction in 84 percent without a case of avascular necrosis.

Conclusions

The traction reduction method is preferred at our department because of high rate of closed reduction success without damaging the femoral head. This procedure is very effective and also very gentle to the growing chondro-osseous components of the dislocated infant's hip.

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