International Journal of Studies in Natural and Medical Sciences
Volume 4 Issue 12, December - 2025
ISSN (E): 2949-8848
Scholarsdigest.org

CHOICE OF SURGICAL TREATMENT METHOD FOR DESTRUCTIVE PATHOLOGICAL HIP DISLOCATION AFTER HEMATOGENOUS OSTEOMYELITIS IN CHILDREN

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Abstract:
Pathological dislocation of the hip is one of the most severe complications of infectious coxitis in early childhood, which leads to pronounced dysfunction of the hip joint, accompanied by changes in statics and gait, which subsequently causes persistent deformities of other parts of the skeleton.

Keywords: Osteomyelitis, hip joint, pathological dislocation, treatment.

Introduction

Pathological dislocation of the hip is one of the most severe complications of infectious coxitis in early childhood, which leads to pronounced dysfunction of the hip joint, accompanied by changes in statics and gait, which subsequently causes persistent deformities of other parts of the skeleton. Acute hematogenous osteomyelitis accounts for 6-12.2% of purulent diseases and affects the long tubular bones in 79.1–88.7% of cases. [5]. The proximal metaepiphysis of the femur is most often affected in patients with this pathology. Moreover, the course of the disease in 35-56% of children is complicated by pathological dislocation of the hip. According to A.A. Akhunzyanov et al. (2006); M.A. According to Norbekova et al. (2006), 75% to 100% of children with hematogenous osteomyelitis are admitted to hospital late, which contributes to the development of orthopedic complications, which develop in 22-71.2% of children and lead to early disability in 16.2-53.7% of patients [2, 6, 7]. Treatment of patients with pathological hip dislocation remains a challenging and unresolved issue for

orthopedists. It is generally recognized that surgical intervention is the only radical treatment for children with this pathology. It should ensure hip joint stability in order to improve the patient's statics and gait, restore anatomical relationships whenever possible, reduce limb shortening, and maintain sufficient mobility. In surgical treatment of pathological hip dislocation, the primary goal is to restore the weight-bearing function of the limb while maintaining joint mobility, followed by addressing secondary deformities and equalizing the length of the lower limbs [1, 8, 9].

Despite the wide variety of treatment methods, the prognosis for pathological hip dislocation remains unfavorable in most cases. This is evidenced by the high incidence of residual deformities and incongruence of the femoral head and acetabulum, as well as joint instability leading to the development of shortening and coxarthrosis [3, 4, 5].

Purpose of the Study: This study analyzes the outcomes of surgical treatment in children with pathological hip dislocation.

Materials and Methods

This study is based on the observation and treatment results of 74 patients with pathological hip dislocation treated in the Hip Pathology Department of the Republican Center for Pediatric Orthopedics of the Ministry of Health of the Republic of Uzbekistan from 2014 to 2025. These patients included 81 boys and 57 girls, aged 3 to 14 years. The study utilized clinical, radiographic, magnetic resonance, and multispiral tomography (MRI) examinations.

According to our data, the optimal age for surgical treatment of pathological hip dislocation is 4-5 years of age, as by this age, most patients have completed the process of ossification of the hip joint structures, before secondary deformities have formed and regeneration processes are well established. Surgical planning for patients was based on an assessment of anatomical relationships within the hip joint, its function, spatial orientation of the bones that form the joint, as well as abnormalities in bone size, shape, and integrity. It was conducted taking into account the identified symptom complexes and the patient's age. The aim of the intervention was to ensure hip joint stability to improve the patient's statics and gait, restore anatomical relationships within the joint, reduce limb shortening, and maintain adequate mobility.

Indications for surgical treatment:

- pathological hip dislocation with no weight-bearing ability of the limb with a preserved femoral head and neck;
- pathological hip dislocation with no weight-bearing ability of the limb due to destruction of the femoral head and neck;
- failure of early conservative treatment of pathological hip dislocation or subluxation;
- deformities of the proximal femur.

Surgical treatment of pathological dislocation in the absence of the femoral head and neck is postponed until the child is 5-6 years old. Contraindications to surgical treatment

include the risk of latent infection in patients who suffered infectious coxitis 1.5-2 years ago and have not had recurrent inflammatory manifestations. When planning the surgery, the nature of the proximal femur deformity and the condition of the glenoid cavity and ilium were taken into account, allowing for the formation of the required acetabulum. All surgical interventions included hip joint revision. The choice of surgical technique depended on the patient's age, the extent of destruction of the femoral head, neck, and acetabulum, and the degree of hip displacement. For destructive hip dislocation, differentiated surgical tactics were used depending on the severity of destruction of the proximal femur and acetabulum. We performed the following complex reconstructive surgeries:

- open reduction of the femoral head or neck stump with intertrochanteric-detorsion, shortening, and varus osteotomy in 64 children,
- open reduction of the femoral head or neck stump with intertrochanteric-detorsion, shortening, and varus osteotomy with acetabular reconstruction according to Pemberton and Lance, and rotational pelvic osteotomy according to Salter in 34 children,
- open reduction of the femoral head and neck stump with lengthening of the latter and transposition of the hypertrophied greater trochanter with the gluteal muscles in the caudal direction with screw fixation and additional catgut sutures in 29 children. The goal of such surgeries is to create stability in the hip joint, restore the approximate relationships within the joint necessary for its proper function, eliminate the abnormal limb position and the most severe symptom of dislocation—Trendelenburg's sign—reduce limb shortening, and, if possible, increase joint range of motion.

Case Study #1. Patient E.D., born in 2003. D-z: Pathological destructive hip dislocation with destruction of the femoral head and neck. Condition after multiple attempts at conservative reduction (Fig. 1).

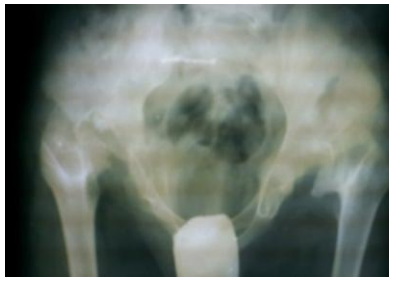

Fig. 1. X-ray of the hip joints. Pathological destructive dislocation of the hips with destruction of the femoral head and neck.

After a complete clinical, instrumental, and laboratory examination, open reduction of the remaining femoral head and neck stump was performed with intertrochanteric detorsion-varus-shortening osteotomies of the right and left femurs. (Fig. 2).

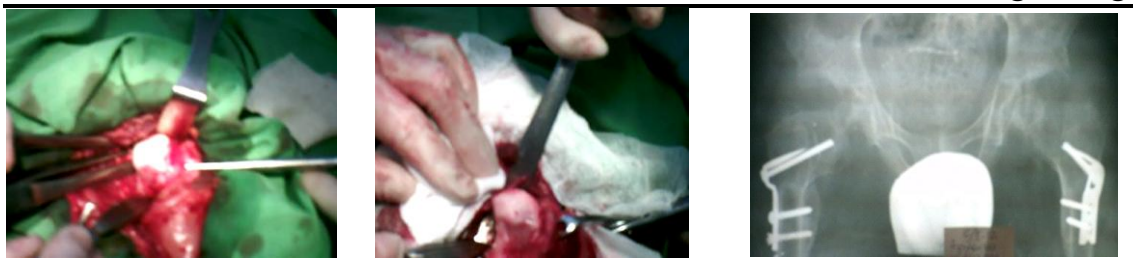

Fig. 2. Intraoperative image and radiograph of the hip joints: saddle-shaped deformity of the femoral head and neck stump, open reduction of the femoral head and neck stump with intertrochanteric detorsion-varus and femoral neck lengthening.

Results 2 years after surgery. The patient walks independently, does not limp, movement in the right hip joint is unrestricted, and the Trendelenburg sign is negative. (Fig. 3).

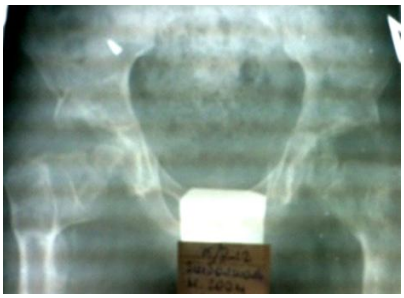

Fig. 3. X-ray of the hip joints: the femoral head and neck stumps are located in the acetabulum and centered on the acetabulum floor.

Case Study #2. Patient Zh.M., born in 2002. Doctor's note: Pathological destructive hip dislocation with destruction of the head and neck and saddle-shaped deformity of the proximal femur. Condition after attempted bloodless reduction (Fig. 4).

Fig. 4. Radiograph of the hip joints in the anteroposterior projection. Position 0-rotation and internal rotation of the lower extremities: pathological destructive dislocation of the hips with destruction of the head and neck and formation of a saddle-shaped deformity of the proximal femur.

Surgery was performed: open reduction of the femoral head and neck stump with intertrochanteric detorsion-varus and femoral neck lengthening osteotomy of the femur. (Fig. 5).

Fig. 5. Intraoperative image and radiograph of the hip joints: saddle-shaped deformity of the femoral head and neck stump, open reduction of the femoral head and neck stump with intertrochanteric detorsion-varus and femoral neck lengthening.

Results 4 years after surgery. The patient walks independently, does not limp, movement in the right hip joint is unrestricted, and the Trendelenburg sign is negative.

(Fig. 6).

Fig. 6. X-ray of the hip joints: the femoral head and neck stumps are located in the acetabulum and centered on the acetabulum floor.

Case Study #3. Patient: M.U., born in 2017. Case Report #361/108. Documentation: Pathological destructive dislocation of the right hip. Condition after attempted bloodless reduction (Fig. 7).

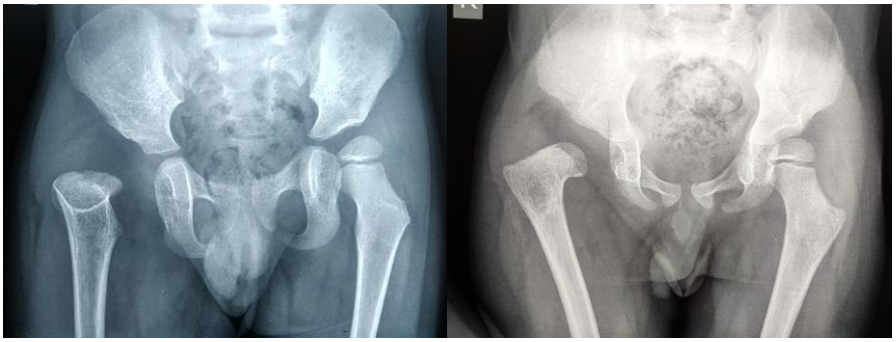

Fig. 7. Anteroposterior radiograph of the hip joints. Position 0-rotation and internal rotation of the lower extremities: pathological destructive dislocation of the hips with destruction of the head and neck of the right femur.

Surgery was performed: open reduction of the femoral head and neck stump with intertrochanteric detorsion-varus and femoral neck lengthening osteotomy of the femur and acetabular roof plasty according to Pemberton (Fig. 8).

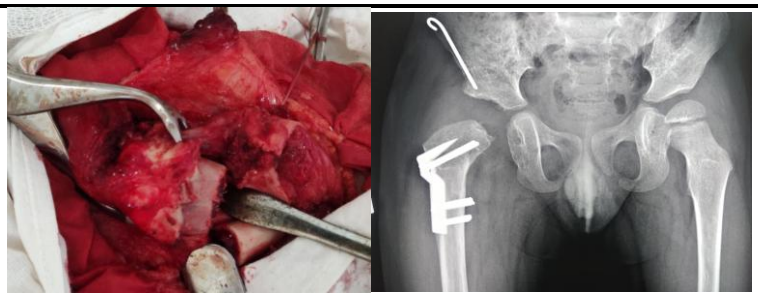

Fig. 8. Intraoperative presentation and radiograph of the hip joints: open reduction of the femoral head and neck stump with intertrochanteric detorsion-varus and femoral neck lengthening osteotomy of the femur and Pemberton acetabuloplasty.

Results 2 years after surgery. The patient walks independently, does not limp, movement in the right hip is not limited, and the Trendelenburg sign is negative. (Fig. 9)

Fig. 9. Hip joint radiograph: the right femoral head and neck stump is located in the acetabulum and centered on the acetabular floor.

Results and Discussion

Treatment outcomes were assessed based on the achievement of anatomical and functional results. Surgical outcomes were better in 34 children in whom open reduction of the dislocation was supplemented by acetabular roof grafting. Open reduction of the femoral head and neck stump involved opening the hip joint, exploring the proximal femur and acetabulum, and mandatory excision of scar tissue. After medialization of the joint, the ilium fragments were repositioned, and the remaining femoral head and neck were submerged under the newly formed acetabular roof. As the children grew, femoral lateralization gradually increased, facilitating the restoration of function of the gluteus medius and minimus muscles. Joint motion within the normal range of 80° was achieved, abduction remained significantly limited, but we did not observe any adduction contractures in the long term. In this group of patients, good long-term outcomes were achieved in 14 children, and satisfactory in 19. In only one case, after open hip reduction, did the postoperative wound become infected, but this did not affect the treatment outcome. Thus, experience in surgical treatment of patients with pathological hip dislocations has shown that the most favorable outcomes are achieved

with open reduction of the femoral head or neck stump with intertrochanteric-detorsion, shortening, and varus osteotomy with acetabular reconstruction according to Pemberton and Lance, and rotational pelvic osteotomy according to Salter. Widespread use of these surgical procedures can significantly improve the support and dynamic function of the affected limb.

Conclusions

Following hematogenous osteomyelitis of the proximal femur, destruction of the femoral head and neck, including complete destruction, is often observed. According to our data, the optimal age for surgical treatment of pathological hip dislocation is 4-5 years of age, as by this age, the ossification process of the hip joint structures has completed in most patients, and early surgical intervention often causes severe secondary deformities, including complete destruction. Indications for a particular type of intra-articular surgical intervention, according to our data, should be determined strictly individually for each patient, depending on the patient's age, the type and degree of deformity of the hip joint elements, and the magnitude of shortening of the lower limb.

Our observations indicate that reconstructive surgery eliminates flexion-adduction and external rotation contractures in most patients, ensures hip stability, thereby improving gait and posture, reduces pelvic tilt, and eliminates Trendelenburg's sign. Surgical treatment of children with destructive pathological hip dislocations involves stabilization of the hip joint first and restoration of lower limb length second. Restoration of hip range of motion depends on the degree of damage to the femoral head and neck.

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