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RESULTS OF POSTERIOR ROTATIONAL OSTEOTOMY OF THE FEMUR IN CHILDREN

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Abstract:
Rotational femoral osteotomies are rarely used in the treatment of hip pathology. Rotational osteotomies allow you to change the spatial position of the head and neck of the femur in three planes; with their help, it is possible to restore normal relationships in the hip joint and congruence of the articular surfaces, and remove the deformed or destroyed sector of the femoral head from stress.

Introduction

Unlike traditional techniques, a technically correctly performed rotational osteotomy does not cause angular deformations of the proximal femur and shortening of the limb. Posterior rotational osteotomy is rightfully considered more reasonable from an anatomical point of view. Because the posterior rotation of the proximal end of the femur is accompanied by unwinding of the capsule and ligaments of the hip joint, which leads to a decrease in intra-articular pressure, which is usually increased in Perthes disease [3,6,7]. Despite this, the literature provides very little coverage of the use of rotational osteotomies in the treatment of Perthes disease.

Purpose of the study

The purpose of our study is to study the results of posterior rotational osteotomy of the femur in children.

Materials and methods

The results of surgical treatment of 18 patients who underwent posterior rotational osteotomy of the femur according to indications at the age of 4 to 14 years, operated on in the orthopedics department of the Samarkand Regional Medical Multidisciplinary Center in the period from 20 19 to 20 22 , were analyzed . Among the children there were 7 girls (38.9 %) and 11 boys (61.1 %). By age at the time of surgery, patients were distributed as follows: up to 5 years - 2 patients (11.1%), 5-8 years - 6 patients (33.3%), 9-11 years - 7 patients (38.9%) , 12-14 years – 3 patients (16.7%). Before surgery, all patients underwent a general clinical examination, and radiography was also performed in the direct projection and in the Lauenstein position . The operational aid depended on the stage of the process and indicators characterizing the spatial relationships in hip joint. 2 patients had severe aseptic necrosis of the femoral head, which developed during the treatment of congenital hip dislocation. 2 patients had residual hip subluxation after conservative treatment of congenital hip dislocation, with type II deformity according to Kalamchi . Another 14 patients had Perthes disease , 2 of them had stage II of the disease according to the Axhausen - Reinberg classification , 12 had stage III of the disease. When determining indications for surgical intervention, we also used the method of assessing risk signs according to A. Catteral . All 14 patients had risk signs; the most common were lateral subluxation of the femoral head, horizontal location of the epiphysis and cysts in the metaphysis . Lateral subluxation of the femoral head was determined using the epiphyseal index.

Surgery technique: the external incision exposed the trochanteric and subtrochanteric region of the femur. The greater trochanter is cut off at the base with a chisel. An osteotomy is performed in the intertrochanteric region using a Gigli saw. The section line runs parallel to the axis of the femoral neck. Then, using a bone holder, the proximal fragment, including the neck and head of the femur, is easily rotated 45-90 ^{0} posteriorly. The fragments of the femur, after their comparison, are fixed with an L-shaped plate. To speed up the fusion, the cortical walls in the area of the junction of the fragments were perforated. The greater trochanter is fixed in its new location with a screw. X-rays are taken on the operating table and the effect of the operation is analyzed. If the degree of coverage of the femoral head was insufficient, which was observed in 4 patients, the second stage of the operation was performed. The second stage of the operation consists of Salter -type osteotomy of the ilium , however, the operation is performed without detachment of the periosteum, which significantly reduces blood loss. The wound is sutured layer by layer. The limb is fixed for a month with a hip plaster cast. Posterior rotational subtrochanteric osteotomy was performed in 11 patients (61.1%) with 3 for patients (16.7 %) the operation was supplemented open adductorotomy to prevent excessive compression of the femoral head ; in the remaining 4 patients (22.2%), the operation was supplemented with

osteotomy of the ilium to achieve complete coverage of the femoral head . Of particular importance for the prevention of compression of the femoral head is cutting off the m tendon . iliopsoas at the site of attachment to the lesser trochanter, which was performed in all patients. After the operation, the limb was fixed in a hip plaster cast for a month. After removing the plaster cast, physiotherapeutic treatment was carried out aimed at restoring movement in the hip joint. In six operations we performed an osteotomy, then rotated the proximal fragment and inserted the branch of the plate along the axis of the femoral neck . But in 2 patients we observed wedging of the proximal fragment; this required additional fixation and led to an increase in the operation time. In the following patients, we introduced the jaw of the plate taking into account the degree of rotation of the proximal fragment before the osteotomy, which prevented wedging of the proximal fragment. After osteotomy, the diaphyseal plate plate was aligned along the axis of the femoral diaphysis and fixed with screws. Also, technical difficulties associated with incorrect insertion of the jaw plates were observed in 4 patients, which required reintroduction of the fixative after intraoperative radiography. These difficulties were mainly observed during the period of mastering the technique; with the accumulation of experience, these difficulties disappeared.

Results

To assess treatment results, we used a three-grade system for assessing treatment results. Good results were noted in 12 patients (66.6%), satisfactory results were noted in 3 patients (16.7%), unsatisfactory results were noted in 3 patients (16.7%). In two 3-year-old patients who underwent posterior rotational osteotomy and iliac osteotomy for aseptic necrosis of the femoral head during treatment congenital dislocation of the hip, recovery occurred within one year and the results were assessed as good. In 2 patients with residual hip subluxation, fusion of the femoral bone fragments occurred within 7 months, and good results were noted. U the remaining 14 patients had posterior rotation an osteotomy was performed for Perthes disease . In 12 of them, subluxation of the femoral head was detected before surgery; after rotation of the proximal fragment during surgery, the subluxation was eliminated in 8 patients. In 4 patients, after rotation of the proximal fragment, the subluxation remained; after osteotomy of the ilium, the degree of coverage of the femoral head was more than 1.0. Restoration of structure heads occurred mainly in periods from 1 up to 2 years, which is associated with the age of the patient and differences in the severity of the pathological process. The results are estimated as good in 8 patients, satisfactory in 3 patients. In the remaining 3 patients, the results were assessed as unsatisfactory; during treatment, progression of necrosis of the femoral head was observed, due to varization of the proximal fragment and loss of the achieved result. In these patients, after complete restoration of necrosis, subsequent treatment was performed in the form of valgusing corrective osteotomy.

Conclusions

These indicators indicate that the technique of posterior rotational osteotomy requires the surgeon to have knowledge of the topography of the proximal femoral head and spatial representation; the method of multislice computed tomography with the construction of a three-dimensional model and preoperative planning of the operation greatly facilitates the surgeon's work during the operation. However, the clamps used for posterior rotational osteotomy do not meet the requirements of this operation, and we consider it advisable to develop and implement clamps that allow rotation of the proximal fragment by a given amount. If the indications are correctly determined and the operation is performed correctly, posterior rotational osteotomy of the femur allows one to achieve good results in the treatment of severe forms of Perthes disease.

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