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REPEATED FRACTURE OF THE FEMORAL NECK: TREATMENT TACTICS AND CLINICAL OBSERVATION

***Bortulev P.I.*[1], *Proshchenko Ya.N.*[1], *Ovsyankin A.V.*[1,2], *Drozdetsky A.P.*[1], *Bortulëva O.V.*[1]**

[1] Federal Center of Traumatology, Orthopedics and Joint Replacement, Smolensk, Russian Federation
[2] Smolensk State Medical Academy, Department of Orthopedics and Traumatology-Field Surgery, Smolensk, Russian Federation

We report a case of surgical treatment of multiple femoral neck fractures in a 15-year-old child.

Key words: Repeated hip fracture, surgical treatment.

Introduction

Femoral neck fractures account for approximately 0.5% of all fractures in children. We did not find data on the incidence rate of femoral neck re-fractures in domestic or international literature. Re-fractures most commonly occur in children aged 5–14 years and are much less common in children aged 2–4 years and in adolescents aged 15–17 years [1]. According to the World Health Organization, about 1.3 million fractures of the proximal femur were registered around the world in 1990, with half of those being intra-articular fractures [2].

The cause of femoral neck fracture in more than 80% of cases is a serious injury; but in 15%, the fracture occurs due to an apparently minor injury during normal physiological activity of the child, i.e., through falling and jumping from a height of 0.5–1.5 m, doing the splits and half-splits, falling while running or playing, as well as due to direct impacts of moderate force to the greater trochanter area [1].

Clinical practice throughout the world has confirmed excellent efficacy of operative treatment of fractures of the proximal femur compared to that of conservative treatment. Surgery, which is indicated for more than 80% of cases, involves open or closed reduction of the bone fragments and their fixation by various structures. Despite recent advances, the rate of poor outcomes of treatment of proximal femur fractures still remains relatively high. This is due to a lack of fusion, secondary displacement, and development of subsequent avascular necrosis of the femoral head and false joints. Developed complications lead to repeat surgery and, in most cases, to total hip joint replacement at an older age [2].

Interest in femoral neck fractures in children is not due to the rate of their occurrence but due to the rate of potential complications, the most severe of which is avascular necrosis of the femoral head [1, 3, 4, 5], which can develop in 10%–100% of cases, depending on the fracture type [6, 7].

Clinical case

On May 06, 2013, a 15-year-old male was diagnosed with a closed fracture of the left femoral neck with displacement of fragments and was transferred from the Gagarinskiy Central District Hospital to the Pediatric Department of Traumatology and Orthopedics in the Smolensk Federal Center of Traumatology, Orthopedics, and Endoprothesis Replacement (SFCTOER) for surgical treatment. According to his medical history, he was injured by falling from a horizontal bar on May 02, 2013. He was admitted to the Department of Traumatology of the Gagarinskiy Central District Hospital, where symptomatic therapy was provided. On admission to SFCTOER, the left lower extremity was immobilized by an anti-rotation posterior plaster splint. Clinical examination revealed

Fig. 1. X-ray of the hip joints of the patient M. before surgery.

Fig. 2. X-ray of the hip joints of the patient M. after surgery.

external rotation of the left lower extremity by 35° and adduction and flexion in the knee and hip joints. Active movements were impossible; passive movements were sharply painful; and straight leg raise symptom was present. An X-ray image of the hip joints revealed an intra-articular abduction fracture of the left femoral neck with displacement of fragments (type 2 fracture according to the Colonna classification) (Fig. 1).

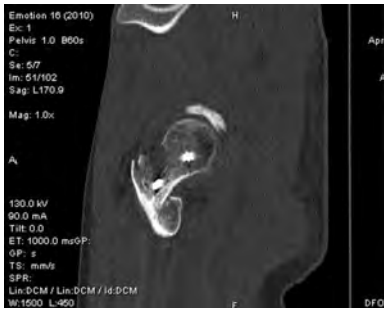
On May 7, 2013, the patient underwent surgery involving closed re-position of fragments of the femoral neck, using a re-position table, and osteosynthesis of the femoral neck fragments using 3 cannulated screws (Fig. 2). No external immobilization was used in the postoperative period. Starting on the third postoperative day, the patient received rehabilitation therapy, including massage of the lower extremity muscles by a KHIVAMAT apparatus and restoration of movements in the hip joint using an Artromot K1 apparatus. Vertical positioning of the patient without support on the operated extremity was performed on the fifth day.

After 4 months, a control X-ray image revealed partial consolidation of the bone fragments and migration of a screw. On October 10, 2013, the cannulated screw was removed.

Eight months after the operation, a control X-ray image demonstrated full consolidation of the bone fragments (Fig. 3). The patient was permitted to walk without crutches with uniform support on

Fig. 3. The result of treatment of the patient M. 8 months after surgery

Fig. 4. X-ray of the hip joints of the patient M. after re-injury



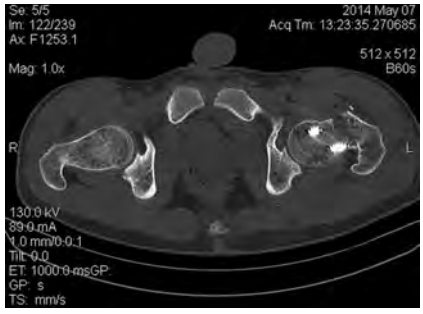


Fig. 5, 6, 7. Computed tomography of the hip joints of the patient M. after re-injury

Fig. 8. X-ray of the hips joint of the patient M. after the second surgery

the lower extremities; he resumed his normal way of life.

On May 07, 2014, a 15-year-old male was diagnosed with a closed re-fracture of the left femoral neck with displacement of fragments and destabilization of steel structures and was transferred from the Gagarinskiy Central District Hospital to SFCTOER for surgical treatment. According to his medical history, he was hit by a train on May 03, 2014. He was admitted to the Department of Traumatology of the Gagarinskiy District Hospital with the diagnosis of a closed fracture of the pelvic bones. He was on strict bed rest in the "frog" position. Symptomatic therapy was provided. On admission to SFCTOER, the left lower extremity was immobilized using an anti-rotation posterior plaster splint. Clinical examination revealed multiple bruises and skin abrasions of the upper and lower extremities and a hematoma of the left gluteal region. X-ray and computed tomography (CT) of the hip joints demonstrated a fracture of

Fig. 9, 10, 11. Computed tomography of the hips joint of the patient M. after the second surgery

Fig. 12, 13, 14, 15. The result of treatment of the patient M. 8 months after surgery

the left femoral neck, varus deformity, an oblique fracture of the ischial bone without displacement, and destabilization of metal structures (Figs. 4–7).

On May 08, 2014, the patient underwent surgical treatment including partial removal of the metal structures, re-position of the femoral neck fragments, and osteosynthesis using a DHS plate (Figs. 8–11). Further treatment was similar to that in the previous case.

Control examination after 6 months revealed full consolidation of the bone fragments and the absence of degenerative and dystrophic changes of the joint components. The patient moved independently without auxiliary support (Figs. 12–15). The hip joints were active in the full range. The length of the lower extremities was equal.

Conclusion

This clinical observation is of interest as an example of high compensatory possibilities of the circulation in the proximal femur. The use of sophisticated osteosynthesis techniques with the right implementation was one of the factors in achieving the positive outcome, which is in line with the modern concept of surgery for musculoskeletal system injury in children.

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Information about the authors

Bortulev Pavel Igorevich — MD, orthopedic and trauma surgeon of the department of pediatric traumatology and orthopedics. Federal center of traumatology, orthopedics and endoprosthetics, Smolensk, Russian Federation. E-mail: pavel.bortulev@yandex.ru.

Proshchenko Yaroslav Nikolaevich — MD, PhD, orthopedic and trauma surgeon of the department of pediatric traumatology and orthopedics. Federal center of traumatology, orthopedics and endoprosthetics.

Ovsyankin Anatoliy Vasilievich — MD, PhD, head doctor. Federal center of traumatology, orthopedics and endoprosthetics. Smolensk. Head of the Department of Orthopedics and Traumatology and military surgery of the Smolensk State Medical Academy.

Drozdetskiy Alexey Polikarpovich — MD, PhD, chief of the department of pediatric traumatology and orthopedics. Federal center of traumatology, orthopedics and endoprosthetics.

Bortuleva Oksana Vyacheslavovna — MD, orthopedic and trauma surgeon of the department of pediatric traumatology and orthopedics. Federal center of traumatology, orthopedics and endoprosthetics, Smolensk, Russian Federation.