

**SURGICAL TREATMENT OF FRACTURES OF THE NECK AND DIAPHYSIS OF
THE FEMUR**

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Abstract: *17 patients with fractures of the femoral neck and diaphysis were operated on. Fractures were obtained as a result of high-energy trauma, accompanied by multiple and combined injuries. When planning and performing internal osteosynthesis, anatomical and physiological features of the proximal femur, localization and type of cervical fracture according to Pauwels, the nature of the diaphyseal fracture, the condition of the surrounding soft tissues were taken into account.*

Keywords: *femoral neck, ipsilateral fractures, osteosynthesis.*

17 patients with unilateral femoral neck and shaft fractures were operated. Fractures result from high-energy trauma, accompanied by multiple and concomitant injuries. When planning and carrying out internal fixation, the authors considered anatomical and physiological characteristics of the proximal femur, location and type of fracture by Pauwels, nature of diaphyseal fracture, surrounding soft tissues condition.

Introduction

The problem of femoral neck fractures (PSHBC) is currently one of the urgent problems of modern traumatology [2]. Under the age of 50-55 years, PSHBC rarely occurs as a result of a normal fall on the outer surface of the thigh. They are mainly the result of a high—energy impact - a fall from a height (catatrauma) or a traffic accident .

The mechanism of injury causes the presence of multiple and combined injuries in the victims, a significant frequency of traumatic shock. According to George J. Haidukewych et al. (2004), severe multiple and combined injuries were noted in 43% of cases among victims with PSHBC aged 15 to 50 years.

Osteosynthesis is recognized as the main method of treating PSHBC in young people .

The features of hip joint injury in PSHBC at a young age require a differentiated approach to choosing the method of internal fixation of fragments, depending on the localization, the nature of the destruction of the neck, the degree of displacement of fragments and the spatial orientation of the fracture plane according to Pauwels .

In this regard, the issues of timely diagnosis of PSHBC and the choice of optimal treatment tactics for victims with polytrauma are becoming relevant. When studying the literature on cervical fractures and diaphyseal hip fractures, there is a contradiction in the data on the timing of surgical interventions, the choice of a fixator, and the sequence of stabilization.

The purpose of the work is to analyze the results of surgical treatment of fractures of the neck and diaphysis of the femur.

MATERIAL AND METHODS

In the period from 2010 to 2019, 79 victims with PSHBC aged 18 to 60 years were under our supervision. The study group included patients under 60 years of age. Fractures of the femoral neck and diaphysis were observed in 17 victims (21.5%). The age of the victims ranged from 22 to 55 years. The aim of the study was the methods of reposition and osteosynthesis of cervical and diaphyseal femoral fractures, the timing of surgery, factors determining the choice of fixators, clinical and radiological results of treatment.

RESULTS AND THEIR DISCUSSION

According to the results of the analysis of the mechanism of injury: 9 victims were injured as a result of an accident, 6 — catatrauma, 2 — falling on the hip.

Only in 2 patients, the lesions were localized within one segment. 7 had bone fractures and joint injuries in two anatomical areas: fractures of the pelvic bones — in 2, contralateral femoral fracture — in 1, diaphyseal fracture of the lower leg bones — in 1, rib fractures — in 3. Combined injuries were observed in 6 victims: traumatic brain injury (TBI) - in 3, chest injury — in 2, abdominal cavity — in 1. 4 had open fractures: the diaphysis of the femur — in 3, the bones of the lower leg — in 1. Upon admission to the medical institution, 14 patients were in a state of traumatic shock, 3 needed resuscitation.

Osteosynthesis for IPSHDBK was performed after stabilization of the general condition of the victims due to the multiple and combined nature of the injury. As a temporary stabilization of the diaphyseal fracture of the femur, extra-focal fixation with rod-type or spoke-rod-type devices or a system of permanent skeletal traction were used. The timing of internal osteosynthesis depended largely on the condition of the skin and soft tissues of the injured thigh. In 3 patients, the operation was performed in the first 5-7 days after the injury. In 12 patients, the duration of the operation varied from 7 to 15 days.

Taking into account the anatomical and physiological features of the proximal femur and biomechanically unfavorable features of cervical fractures (basicervical localization and vertical orientation), angular screw structures (DHS) or cephalomedullary fixators were used for osteosynthesis. We consider the main requirement for the structures used to be the possibility of stable fixation of the neck fracture and the provision of dynamic compression between fragments due to the implementation of the sliding effect in the "bone - fixator" system.

In 9 patients, blocking intramedullary osteosynthesis using cephalomedullary nails was used to stabilize fractures of the neck and diaphysis of the femur. According to the literature [1, 8], there are conflicting opinions about the sequence of stabilization of the fracture of the neck and diaphysis.

During the observations, we first performed stabilization of the diaphyseal fracture (the nature of fractures corresponded to types A1, A2, A3, B1, B2, B3). We consider it expedient to perform an open reposition of a diaphyseal fracture. This helps to prevent residual rotational displacement of fragments at the level of the diaphysis due to the possibility of rotation of the nail in the medullary canal, helps to choose the right direction of insertion of fixing screws into the neck and head of the femur, especially if it is necessary to reposition the fracture of the neck. Distal blocking of the cephalomedullary nail was performed after completion of osteosynthesis of a cervical fracture.

Open fragment reposition was performed in 8 patients with PSHBC with displacement. Based on the data of the study of the blood supply system of the neck and head of the femur [3, 6], anterior arthrotomy from lateral surgical access was used.

In one patient, an ipsilateral fracture of the diaphysis (A2) and femoral neck (B2) was accompanied by a fracture of the posterior column of the acetabulum and a posterior dislocation of the hip. To eliminate dislocation, reposition fragments of the acetabulum and femoral neck, the posterior-external Kocher—Langenbeck approach was used. Internal fixation of the fracture of the neck and the diaphysis of the femur is performed with an LSP plate.

Long-term results of surgical treatment of IPSHDBK were studied in all 17 observed patients. The follow-up period ranged from 14 months to 5 years after surgery. Consolidation of cervical and diaphysis fractures was achieved in all patients, motor and support functions of the damaged limb were restored. In 14 patients, the average score on the Harris Hip Score scale was 94.43 ± 1.30 points. They had no radiological signs of avascular necrosis of the femoral head. The existing changes corresponded to the I–II stage of coxarthrosis.

In 2 patients who underwent reconstructive surgery on the proximal femur, the functional results were 84.43 and 86.23 points with follow-up periods from 1 to 2 years. Moderate functional limitations were caused by a shortening of the operated limb, a change in the anatomy of the proximal thigh and the resulting imbalance of the pelvic girdle muscles.

The unsatisfactory result in 1 patient was due to a pronounced destructive-dystrophic process in the hip joint with a predominance of avascular necrosis of the femoral head. Based on a retrospective assessment, the development of the complication was facilitated by the high—energy nature of the injury and the severity of the hip joint injury - PSHBC, fracture of the posterior wall of the acetabulum, posterior hip dislocation, as well as the late timing (14th day after the injury) of the recovery operation.

Thus, the results of clinical observations confirm the literature data that unilateral fractures of the femoral neck and diaphysis are a relatively rare injury resulting from high-energy trauma. The severity and possible frequency of adverse outcomes are obvious, primarily due to damage to the hip joint. When planning an osteosynthesis operation, it is necessary to take into account the anatomical and physiological features of the proximal femur, unfavorable biomechanical conditions for achieving stable internal fixation of cervical fractures, the prevalence and complexity of diaphyseal fracture. Correctly chosen surgical tactics based on a differentiated approach to assessing the features of the injury can ensure success in the treatment of victims.

Conclusions

1. Fractures of the femoral neck and diaphysis present a complex problem in terms of diagnosis and treatment.
2. Mandatory radiographic examination of the hip joint area in polytrauma victims with an active search for possible hidden injuries makes it possible to exclude diagnostic errors.
3. The use of biomechanically based tactics of osteosynthesis based on a differentiated approach to assessing the features of fracture of the neck and diaphysis of the femur allows to restore the motor and supporting function of the damaged limb.

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