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# THE ALGORITHM OF SURGICAL TREATMENT OF TROCHANTERIC FRACTURES OF THE FEMUR

**Summary.** *On the basis of comprehensive studies and determine the effectiveness of surgical treatment of 240 patients with trochanteric fractures of the femur the algorithm of surgical treatment of trochanteric fractures of femur patients. The implementation of the developed algorithm will allow for differentiated treatment, taking into account the General condition, the presence of systemic osteoporosis, and type of fracture classifications AO and in turn will improve the efficiency of providing medical care for this severe category of patients.*
**Key words:** *trochanteric fractures of the femur, operative treatment algorithm.*

## Introduction

Fractures of the proximal femur and their consequences every year cause enormous damage to the economy of any state. Thus, according to statistical studies, fractures of the proximal femur account for 17 % of injuries to the musculoskeletal system, of which hip fractures account for 50-55 %, [2, 6].

Despite recent advances, remains a fairly high percentage of unsatisfactory results of treatment of fractures of the femoral neck. In most cases, this is due to the development of avascular necrosis of the femoral head (8 to 35 VDC %), nonunion (7-33 %), the development of a false joint (10-20 %), secondary displacement (10 %). Received complications usually lead to repeated surgical intervention, in most cases, total hip replacement surgery. [3, 9].

In world practice has long recognized the advantage and greater effectiveness of surgical treatment of fractures of the proximal femur before conservative. Surgical intervention, which should be made more than 80% of cases, consists in the open or closed reposition of bone fragments and their fixation in different designs. But sometimes very difficult to determine the timing and extent of surgical treatment due to the nature of general condition of the patient, the choice of fixing method (use of proximal femoral rod, plate DHS, or other structures) or arthroplasty, and rational treatment of post-traumatic coagulopathy [4, 8].

Today, in developed countries for the treatment of fractures of the proximal femur widely introduced minimally invasive, low-impact use of technology proximal femoral rod (Troshanteric gamma nail G 3 - STRYKER, PFN A - SYNTHES, ChFN - ChM). This method of surgical treatment of fractures of long bones is used in 60-70% of patients [1, 3] and can, unlike arthroplasty, in most cases save function injured hip joint.

Choice of treatment of fractures of the proximal femur is one of the most important because it affects not only time of fracture, but also restore function of limb and disability renovation of the victim [8]. Minimally invasive techniques stable functional osteosynthesis (application PFNA) prevent muscle atrophy, joint contractures, promote the speedy normalization of blood supply to the damaged segment that provided stability are crucial factors in achieving consolidation and recovery of limb function.

Therefore, the definition of a differentiated approach to the choice of method of surgical treatment femoral neck fracture is an important task of the scientific and practical point of view.

*Purpose* - determine the optimal tactics of surgical intervention in patients with fractures of the femoral neck.

## Materials and Methods

The basis for the development of the algorithm was to analyze the effectiveness of treatment of 240 patients with femoral neck fractures who were treated using the proximal femoral rod - 70 persons execution locking rod carried by their rational proposals to that filed patent of Ukraine for utility model and the conventional methods (on bone plate , DHS) - 170 people [5]. Patients were operated on the basis of traumatology department of Poltava Regional Hospital and SI "Institute of Traumatology and Orthopedics NAMS Ukraine" in the period 2006-2015. We determined the following clinical and radiological signs and medical history: presence of concomitant diseases of internal organs, duration of surgery, intraoperative blood loss, type of fracture by AO classification [8], to determine the state of the bone tissue of patients defined index Barnett-Nordin [7]. To determine the effectiveness of surgical intervention determined the number of postoperative complications and the percentage of positive results of operative treatment of fractures both research groups observation. Conducted research clearly proven statistically significant ($r \leq 0,01$) compared with patients who performed traditional osteosynthesis, reducing blood loss and duration of surgery in patients who performed osteosynthesis blocked intramedullary rods, which in turn allowed in 4 times to reduce the number of postoperative purulent complications and mortality, provided absence reparative osteogenesis disorders (12% in patients with patch plates) and in 7 times to reduce the number of negative results of surgery.

## Results. Discussion

Algorithm surgical treatment of hip fracture patients are presented in Figure 1.

To use the above algorithm must answer a number of questions and complete the following steps:

*Step 1.* Determine according to X-ray type of fracture according to the AO classification.

*Step 2.* Answer the question: have the patient presence of serious systemic diseases of internal organs and / or systemic osteoporosis??

*Step 3.* Identify the method of osteosynthesis:

In the presence fracture type A1 (stable vertical and rotary) and the presence of serious systemic diseases of internal organs and/or systemic osteoporosis patients showed proximal femoral rod using in accordance with our proposals without further introduction of distal cortical screws.

In the presence fracture type A1 (vertical and rotary stable) and the absence of serious systemic diseases of internal organs and/or systemic osteoporosis patients showed use of the proximal femoral shaft, according to our proposals without further introduction of distal cortical screws or plates DHS, DCS, corner and plates with angular stability.

In the presence fracture type A2 (vertical and rotary instability) and the presence of serious systemic diseases of internal organs and / or systemic osteoporosis patients showed proximal femoral rod use in accordance with our proposals on introduction of additional distal cortical screws.

In the presence fracture type A2 (vertical and rotary instability) and the presence of serious systemic diseases of internal organs and / or systemic osteoporosis patients showed proximal femoral rod use in accordance with our proposals on introduction of additional distal cortical screws or plates with angular stability.

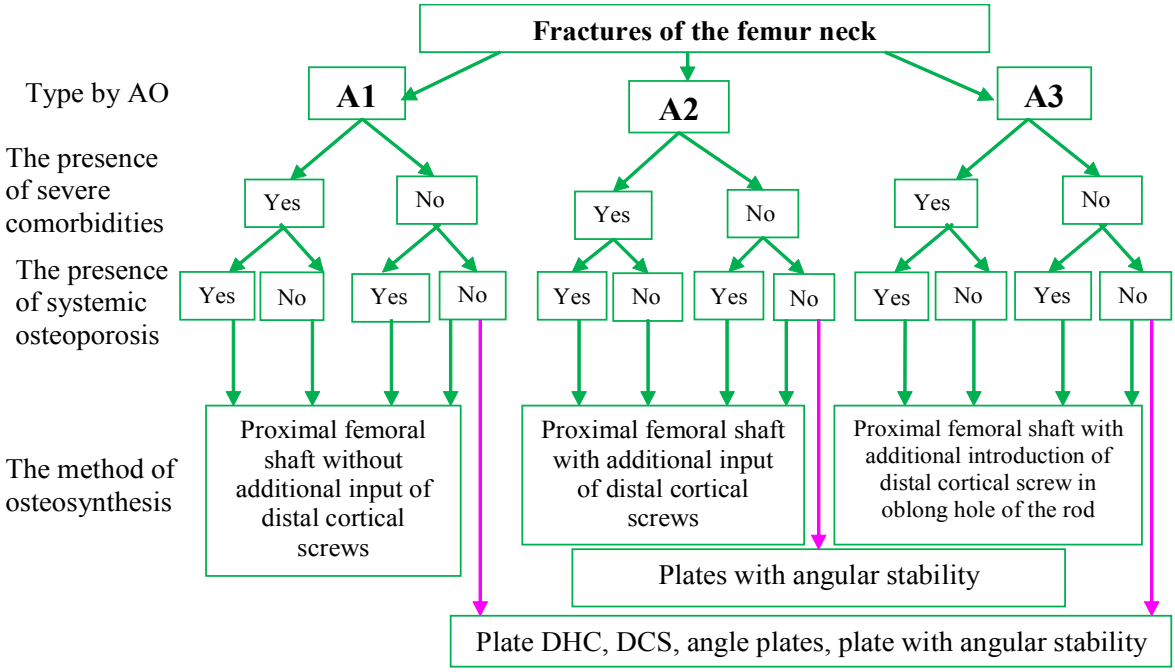


**Fig.1.** Algorithm surgical treatment of femoral neck fracture patients.

In the presence A3 fracture type (rotation unstable) and the presence of serious systemic diseases of internal organs and/or systemic osteoporosis patients showed proximal femoral rod use, according to our proposals on introduction of additional distal cortical screw in oblong hole rod.

In the presence fracture of type A3 (rotation unstable) and the presence of serious systemic diseases of internal organs and/or systemic osteoporosis patients showed use of the proximal femoral shaft, according to our offerings with additional introduction of distal cortical screw in oblong hole rod or plate DHS, DCS, angular and plates with angular stability.

## Conclusions and recommendations for further development

1. Based on a comprehensive study and determine the effectiveness of surgical treatment of 240 patients with femoral neck fractures developed algorithm surgical treatment of femoral neck hip fracture in patients.

The implementation of the algorithm allow to conduct differentiated treatment, taking into account the overall situation, the presence of systemic osteoporosis and fracture type AO classification and in turn improve the efficiency of care for this severe category of patients.

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**АЛГОРИТМ ОПЕРАТИВНОГО ЛЕЧЕНИЯ ВЕРТЕЛЬНЫХ ПЕРЕЛОМОВ БЕДРЕННОЙ КОСТИ**

***Резюме.*** *На основе комплексного исследования и определения эффективности оперативного лечения 240 больных с вертельными переломами бедренной кости разработан алгоритм оперативного лечения вертельных переломов бедренной кости больных. Внедрение разработанного алгоритма позволит проводить дифференцированное лечение, с учетом общего состояния, наличия системного остеопороза и типа перелома по классификации АО и в свою очередь улучшит эффективность предоставления медицинской помощи этой тяжелой категории больных.*

**Ключевые слова:** *вертельные переломы бедренной кости, алгоритм оперативного лечения.*

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**АЛГОРИТМ ОПЕРАТИВНОГО ЛІКУВАННЯ ВЕРТЛЮГОВИХ ПЕРЕЛОМІВ СТЕГНОВОЇ КІСТКИ**

**Резюме.** *На основі комплексного дослідження та визначення ефективності оперативного лікування 240 хворих із вертлюговими переломами стегнової кістки розроблений алгоритм оперативного лікування вертлюгових переломів стегнової кістки хворих. Впровадження розробленого алгоритму дозволить проводити диференційоване лікування з урахуванням загального стану, наявності системного остеопорозу та типу перелому за класифікацією АО, а також покращить ефективність надання медичної допомоги для цієї тяжкої категорії хворих.*

**Ключові слова:** *вертлюгові переломи стегнової кістки, алгоритм оперативного лікування.*

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