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THE USE OF RETROGRADE INTRAMEDULLARY OSTEOSYNTHESIS IN THE TREATMENT OF FRACTURES OF THE DISTAL FEMUR

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Abstract:

This paper highlights the results of treatment of 27 patients with fractures of the distal femur using the method of closed retrograde intramedullary osteosynthesis with locking rods, treated in the departments of adult traumatology of the RSNPMCTO in Tashkent for the period from January 2019 to 2022. The analysis of the results of surgical treatment of 27 patients was carried out. Good results were obtained in all patients according to the Matisse criterion. Complications were not observed.

Keywords: Fracture treatment, distal femur, retrograde osteosynthesis.

INTRODUCTION.

Distal femoral fractures account for approximately 6–8% of all skeletal fractures and approximately 12–25% of femoral fractures [1, 4, 6,]. Despite some progress in the treatment of injuries of the musculoskeletal system, from 5 to 54% of cases of femoral fractures lead to various unsatisfactory outcomes - delayed consolidation, fracture nonunion, the formation of a false joint, limb deformity, and persistent dysfunction of the knee joint [5]. Currently, there is no consensus in the domestic and foreign literature regarding the fixation of fractures of the distal femur: traumatologists are conditionally divided into supporters of osteosynthesis with plates [3,4] and BIOS with a retrograde rod [2,4,7]. An analysis of complications after osteosynthesis with various fixators indicates the need for research aimed at determining the indications for choosing a fixator in the treatment of fractures of the distal femur [1].

THE AIM OF THE WORK is to improve the results of surgical treatment of patients with fractures of the distal femur, using retrograde osteosynthesis with locking rods.

MATERIALS AND METHODS.

We studied 27 patients with recent fractures and the consequences of a fracture of the distal femur, who underwent intramedullary osteosynthesis with retrograde insertion of a locking rod. The material for the analysis was the results of examination and treatment of 27 patients who were in the clinic of the Republican Specialized Scientific and Practical Center for Traumatology and Orthopedics from 2019 to 2022. The most common cause is injuries in road traffic accidents x 17 (62.7%), work-related injuries in 6 (24.1%), domestic injuries in 3 (13.2%) patients. The age of the victims ranged from 18 to 60 years. The average age of the examined patients was 40.5+11.9 years. Of the total number of victims, 3 had traumatic shock, predominantly I-II degree 23 (- 85.6%). The vast majority of 18 (69.5%) patients had closed fractures, open fractures were observed in 8 (30.5%) patients. The most common comorbid injury was traumatic brain injury (35.5%) of 27 patients.

The mean age of the patients was 48.6 years: On admission to the hospital, the primary method of stabilizing fresh fractures was skeletal traction — 25 patients.

The final stabilization of the fresh fracture was performed:

- during the first day after the injury - 1 patient;
- 2–5 days — 2 patients;
- 6–10 days — 20 patients;
- 11–20 days — 4 patients, which was due to the need to stabilize the general condition of the patient with associated injuries. In 2 patients, a subacute form of fat embolism developed after the so-called "light period", the duration of which in 3 (13.2%) patients was one day.

The patient was treated according to the algorithm developed by us: prophylaxis of fat and thromboembolism was carried out, procedures for the physiological dissolution of neutral fat in the blood with the help of fat demulsifiers, detoxification therapy were prescribed. In 4 cases of patients with false joints, open removal of the metalloconstruction and resection of the false joint were required, repositioning of the fragments. With further reposition and osteosynthesis with locking rods in a retrograde way. In 20 cases, the technique of closed indirect reposition of fragments was used, fixation of the fracture without exposing the fracture zone; in 3 cases, access to the fracture site was performed due to the difficulty of repositioning bone fragments;

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Retrograde OMI of the femur was used for fractures of the lower and middle third of the diaphysis, for injuries of the "floating knee" type. With retrograde introduction - through the knee joint (intermuscular fossa of the femur), the diameter of the rod should be 1 mm less than the width of the narrowest part of the brain cavity of the bone with an awl. The hole is strictly along the course of the brain cavity of the bone, through which the conductor of the rod is inserted into both fragments under the control of the image intensifier tube, put on the conductor and inserted into the bone marrow cavity of both fragments. Before the operation, the length of the rod is determined from X-ray images by measuring the distance from the top of the greater trochanter to the intercondylar fossa.

When choosing a method for the treatment of periarticular fractures, it should be taken into account that the intraosseous canal of the femur has an elliptical shape - the sagittal diameter is larger than the frontal one. With this form of the channel, the intraosseous nail is in close contact with the lateral and medial walls of the channel, which ensures the stability of fixation. In the distal femur, the intraosseous canal is expanded in the frontal plane, which prevents the nail from close contact with the bone in this area. During intramedullary osteosynthesis of fractures of the distal femur, it becomes necessary to increase the rigidity of fixation of the distal fragment.

In our study, for this purpose, universal retrograde rods were used, in which distal blocking was performed with ChM bolts-couplers. Retrograde rods with the possibility of fixing the distal fragment with 4 screws in one plane. In case of multi-comminuted fractures, revision of the knee joint, comparison of the condyles, and insertion of the rod were performed. The point of entry of the rod is standard, in the intercondylar zone of the thigh. In one case, a primary dynamic BIOS was performed, in all the others, a static BIOS of the distal femur was performed, followed by dynamization. The orthopedic regimen included early active function in the knee joint (3–4 days after surgery), limited load on the limb. Drug therapy is standard for trauma patients with fractures of the lower extremities.

RESEARCH METHODS

In our work, we used X-ray, MSCT and clinical research methods. For early prevention and diagnosis of vein thrombosis, Dopplerography of the lower extremities was performed to study the blood flow of the iliac vein (IVC), common vein (CVI), great iliac vein (GSV), superficial femoral vein (FSV), popliteal vein (PCV) and deep veins of the leg (GVG). According to the results of duplex scanning before surgery, venous thrombosis (TV) was detected in (27.5%) patients. Signs of post-thrombophlebic disease were revealed in (6.7%) patients.

RESULTS AND ITS DISCUSSION

The results of the treatment of patients were studied according to the Mattis scale. A three-point system (good, satisfactory, unsatisfactory) was used to assess the outcomes of treatment. All scores were summarized for evaluation. At the same time, the minimum score for all indicators is 20 points; and the maximum is 100 points, which corresponds to the anatomical and functional norm. The follow-up period for patients is up to 2 years after surgery. All patients showed good recovery of joint function due to the better biomechanics of the intraosseous fixator in these types of fractures. In patients, earlier activation of patients was observed, which had a positive effect on the dynamics of restoration of the activity of the injured limb. Of the 147 patients who underwent surgical treatment, 30 (20.4%) experienced early complications in the following order: inflammation of the soft tissues around the pins and rods, skin necrosis around the wounds, fixator migration, excessive length of the locking screws, fracture of the fixator, migration of the distal screws, a fracture of the nail against the background of an accreting fracture and bedsores

Contractures of the knee and ankle joints with fractures of the femur and lower leg bones were observed in 4 patients.

The average range of motion in the knee joint one month after surgery in patients with diaphyseal fractures was 98.9±4.6 degrees. Within one year, these figures increased to 133.4±2.5, 134.1±4.4, respectively. and 126.7±7.5 degrees.

With blocking intramedullary osteosynthesis, a year later, the average amplitude was 132.5±2.8 degrees.

Removal of the static screw in 12 patients after 2-3 months with blocking intramedullary osteosynthesis made it possible to perform physiological compression in the area of the fracture, with a decrease in the risk of segment shortening in comminuted and fragmentary fractures of the tibia.

MISTAKES IN PERFORMING OSTEOSYNTHESIS.

At the beginning of the introduction of new developments, especially during the development of the method, technical difficulties and inconsistencies in the preliminary installation of the rod on the external navigator were observed. Due to the difficulty of inserting the screws, the duration of the operation was lengthened.

Radiological union of the fracture was obtained in (85.7%) patients out of 14 in the standard terms, usual for a fracture of this type and localization. In 2 patients the following complications were observed: • one patient (7.1%) had a fatigue fracture of the screw and self-dynamization of the rod. Secondary displacement and violation of the axis of the limb was not observed.

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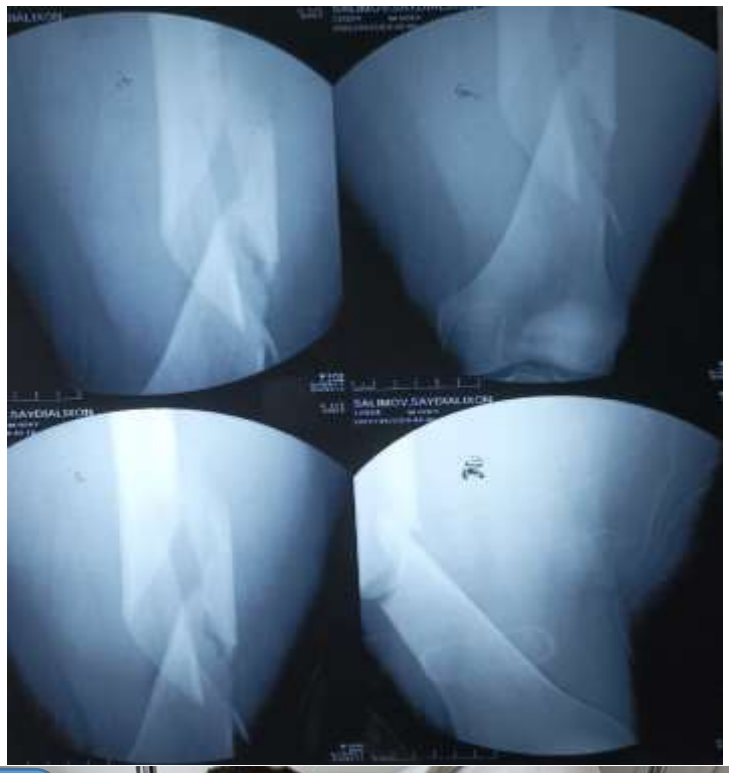
One patient (7.7%) with a double hip fracture had a nail fracture followed by reosteosynthesis. Infectious complications were not observed in any group of patients.

CLINICAL EXAMPLES.



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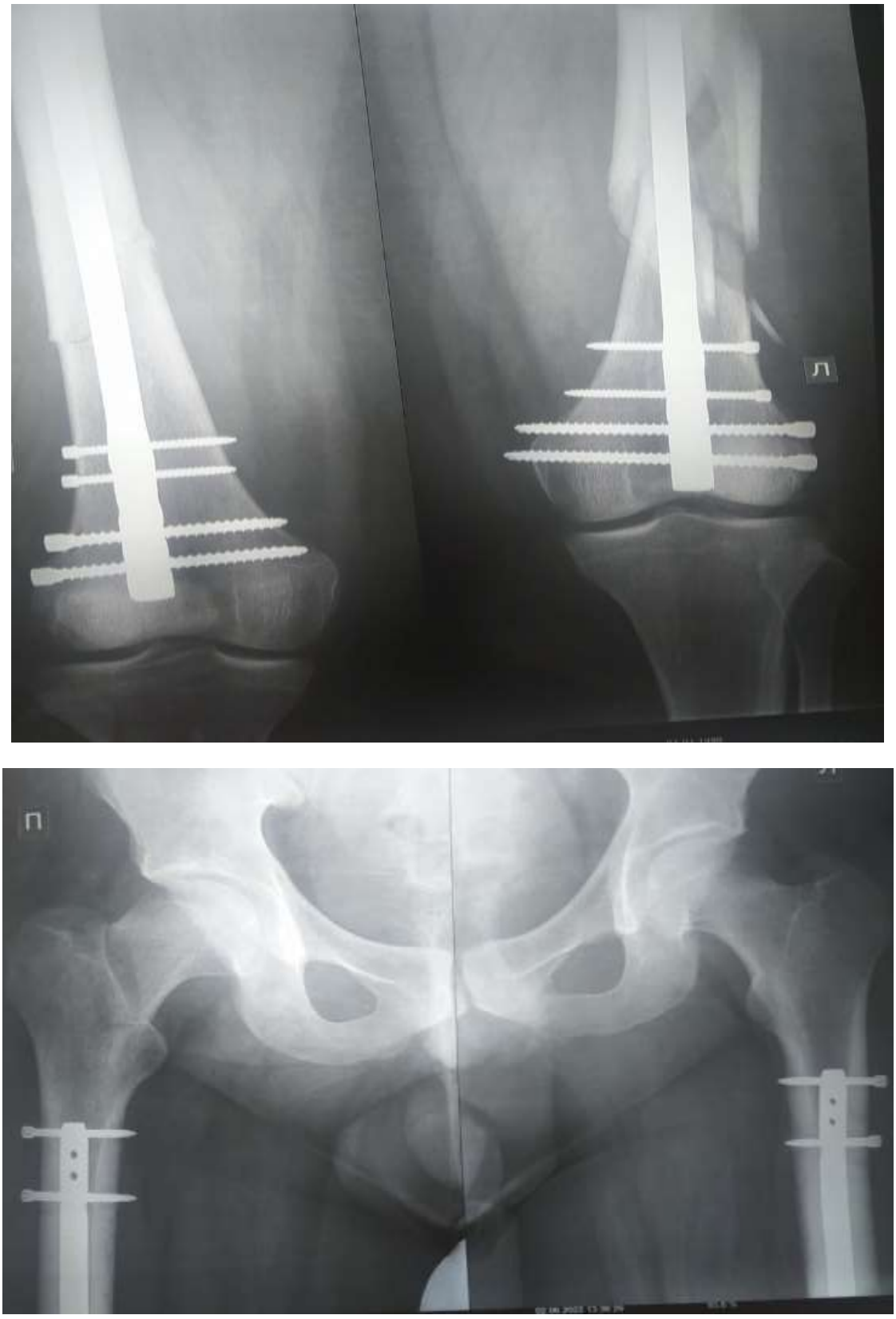

Picture. 1. Clinical example: Patient A, 38 years old, comminuted supracondylar fracture of both femurs. a-before surgery b.after closed intramedullary blocking osteosynthesis

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CLINICAL EXAMPLE: Patient A., 38 years old, was admitted to the intensive care unit after a road injury (hit by a car) (Fig. 1). After anti-shock therapy, as well as on the basis of the results of clinical and radiological studies, the following diagnosis was made:

Closed comminuted fracture of the left femur at the border of the middle and lower third with displacement of bone fragments, closed fracture of the middle and third of the right tibia with displacement of fragments, closed two ankle fracture of the left tibia with subluxation of the foot outward. On the 2nd day after hospitalization, symptoms of a fat embolism appeared (drowsiness, petechial rash on the lateral surface of the chest, fat was found in the urine). Conducted enhanced infusion therapy with the use of lipotropic drugs. After stabilization of the general condition of the patient (3 days after the injury), a closed BIOS of the left femur with static fixation and a BIOS of the left tibia with dynamic blocking were performed. Active movements in adjacent joints started on the 2nd day after surgery. From the 3rd day, the patient was activated, started walking with the help of crutches with a partial load on the diseased limb. Postoperative wounds healed by primary intention, the patient was discharged for outpatient treatment at the place of residence.

Picture. 2. Patient B, 44 years old, False joint of the distal part of the right femur of the femur. a - before surgery. b. after surgery - intramedullary blocking osteosynthesis in a year.

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Thus: the use of intramedullary osteosynthesis with retrograde insertion of a locking nail in extra-articular metadiaphyseal fractures is more stable and allows earlier activation of patients.

CONCLUSIONS. 1. In case of extra-articular metadiaphyseal fractures, fixation of the BIOS with a closed reduction of the fracture is more preferable due to greater stability and less traumatization of soft tissues. 2. Retrograde osteosynthesis in patients with fractures of the distal femur facilitates reposition; there is no need to bring the limb as with the antegrade method of administration, which is especially important in case of bilateral injury; the maximum number of blocking screws in the distal fragment, blocking is performed through the conductor, which significantly reduces the time of the operation and radiation exposure to the operating team.

CONCLUSION : The article examines the results of treatment in 27 patients with fractures of the distal part of the femur and fracture complications with artificial joints. Complications and shortcomings in the treatment process were studied in patients. Retrograde osteosynthesis surgery with blocking intramedullary stent was performed in 27 patients with fractures of the lower third of the femur, and the results of the treatment were studied. The results of the treatment were evaluated according to the Matisse criteria.

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