

OUR EXPERIENCE OF SURGICAL TREATMENT OF UNKNOWN FRACTURES AND FALSE JOINTS OF THE SHIN BONES

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Annotation. *The results of locked intramedullary osteosynthesis in 48 patients with pseudarthrosis and nonunion of the tibia, from 6 months to 4 years, have been observed. In 27 cases the patients had been previously operated by means of external fixation with Ilizarov apparatus, and with plates. We achieved union in 44 patients (91,6%) at 10 - 1,3 months, including 4 from 6 patients with bone defects and osteomyelitis of the tibia with remission. The results of treatment allow the application of locked intramedullary osteosynthesis in complicated pseudarthrosis.*

Keywords: *tibia, pseudarthrosis, nonunion, intramedullary osteosynthesis.*

Introduction. Among the pseudarthrosis of long tubular bones, pseudarthrosis of the tibia is most common (in 25-58%) [1, 2]. In the structure of disability, patients with impaired consolidation of the shin bones account for 36-75.3%, and unsatisfactory outcomes in the treatment of pseudarthrosis reach 54.4%, that is, 1.5-2 times more often than with fresh fractures [7].

Osteosynthesis with external fixation devices remains in Russia a priority method for treating nonunion and pseudarthrosis of the lower leg bones. The number of good and satisfactory results when using them reaches 89-100% [5, 10].

Despite the success of using the hardware method, its shortcomings (the duration of wearing the apparatus and the recovery period, inflammation in the area of the wires, contractures of adjacent joints) at the present stage make intramedullary osteosynthesis with blocking more preferable due to its low trauma and rapid social rehabilitation of patients [3, 4, 7,].

However, there are conflicting opinions on the use of intramedullary osteosynthesis. Some authors [6] use intraosseous osteosynthesis in open infected fractures of tubular bones, as well as in no united fractures and pseudarthrosis complicated by infection, others [8] are opponents of

this method, since the presence of infection and a bone defect has long been considered a contraindication to intramedullary osteosynthesis ...

The aim of this study is to analyze the results of treatment of patients with nonunion and pseudarthrosis of the tibia by the method and intramedullary osteosynthesis with blocking.

Material and methods. In the RSNITMTO of the Samarkand branch, during the period from 2016 to 2020, 48 patients were operated on for chronic tibial fractures using intramedullary osteosynthesis with blocking: 8 patients had an ununited fracture, 40 - a pseudarthrosis. In accordance with the X-ray picture, in 9 cases the pseudoarthrosis were normotrophic (tight), in 21 - hypotrophic, in 10 - hypertrophic. The time after injury in 10 patients was up to 6 months, in 34 - from 6 to 12 months, in 6 - from one to 3 years. There were 34 men and 14 women among the injured. 38 of them had high-energy trauma (direct blow with extensive soft tissue contusion and comminuted fracture). In 10 cases, the fracture was open. In 4 patients, the pseudarthrosis was operated on against the background of osteomyelitis in remission, in 2 - in the presence of a bone defect.

The diagnosis according to the AO classification was established in 14 patients: type L fractures - in 8 cases, type B - in 4, types C1 and C2 - in one case.

Before admission to the hospital, 27 patients had already undergone surgical treatment: 11 - osteosynthesis of the tibia with a plate, 13 - with an Ilizarov apparatus, 2 - with screws, 1 - with a plate and then with an apparatus. In 21 patients, intramedullary osteosynthesis was preceded by conservative treatment: skeletal traction followed by the use of plaster casts.

At the same time, most of hypotrophic pseudoarthrosis (17) were detected after osteosynthesis with plates, 4 - after hardware treatment of open fractures obtained with high-energy trauma.

Normotrophic false joints were observed after conservative and instrumental treatment, hypertrophic - after osteosynthesis with screws and conservative treatment.

In 43 (89.6%) cases, the bone marrow canals of the fragments were reamed to the appropriate diameter of the nail. In 5 patients, the canals in the area of the pseudarthrosis were freely passable, and closed intramedullary osteosynthesis was carried out without their reaming.

In 23 patients, the bone marrow canals of bone fragments were opened antegrade; and in 18 patients of them, the canals were drilled without exposing the pseudarthrosis to the required diameter of the rod (9 or 10 mm) using mills on a flexible drive; We did not note the dependence of closed intramedullary osteosynthesis on the duration of injury, since it was possible to carry out it both with a relatively "young" pseudarthrosis (6-10 months), and in old cases (from 1 to 2.5-4 years after injury). In the case of integrity (or fusion) of the fibula, its oblique osteotomy or segmental resection was performed over a length of 0.5-1 cm to eliminate the "spacer" effect. In 11 cases of hypotrophic pseudoarthrosis with closed osteosynthesis, in order to stimulate the processes of callus formation, the ends of the tibial fragments were percutaneously tunneled in oblique directions with a drill 2.8 mm in diameter.

In 20 cases, an open intervention was required in the area of the pseudarthrosis of the tibia: in 9 - due to the impossibility of a closed juxtaposition of the fragments with severe tissue rigidity; at

11 - due to the need to remove previously installed extra-bone implants: plates, screws. In this case, with an antero-external incision, at least 8-10 cm long, along a large outer radius, a full-layer fascial skin flap was formed, the base turned inward, and the pseudarthrosis area was exposed, exfoliating the anterior group of tibial muscles outward.

Separation of tibial fragments was performed, opening and antegrade reaming of the bone marrow canals for about 4 cm in each fragment for the corresponding diameter of the rod.

In all cases, after osteosynthesis with the plate, pronounced metallosis of the tibia and soft tissues, osteonecrosis of the ends of the fragments, a significant violation of the blood supply to the outer cortical layer of the bone under the plate were observed. After removal of the implant, the soft tissues and bone affected by the scrap metal were thoroughly sanitized.

Free bone autoplasty was used in two cases in the presence of a defect in the tibial wall in the pseudarthrosis area. In this case, a tubular or semi-tubular fragment of the resected fibula (0.5-1 cm long) was used, which was fixed with a screw, overlapping the osteosynthesis zone. We did not use proximal static blocking of the rod, since already 2-3 weeks after the operation, the patients were allowed to walk with partial support on the leg and a gradual increase in the load. Rotational stability was sufficient due to the use of thick rods (9 and 10 mm in diameter), one locking screw (dynamic) and a constructive proximal bend of the fixator.

Results and discussion. Of the 48 patients operated on for nonunions and pseudarthrosis of the tibia by intramedullary osteosynthesis,

consolidation was registered in 44; in two cases, the observation has not yet been completed; fusion did not occur in two patients.

The general terms of fusion after surgery in 44 patients ranged from 4 to 14 months (on average, 10 ± 1.3). The terms of consolidation when using intramedullary osteosynthesis, depending on the method of previous fixation, were: after external osteosynthesis - 10 ± 1.4 months, osteosynthesis with the Ilizarov apparatus - 9 ± 1.9 , after conservative treatment - 8 ± 1.3 . Thus, there was no significant difference in the timing of consolidation among patients previously operated on using different methods of osteosynthesis, and the dependence on the radiographic type of pseudarthrosis.

Of 4 cases of closed intramedullary osteosynthesis against the background of chronic osteomyelitis in remission in the presence of sequestrs or foreign bodies (fraction), consolidation occurred in 3 within 10-12 months.

In one out of 4 patients with infected pseudoarthrosis, fusion did not occur, which required removal of the rod and reosteosynthesis with the Ilizarov apparatus.

The use of intramedullary osteosynthesis and free bone autoplasty in the pseudarthrosis zone with a defect of half of the tibial diameter and the previous osteosynthesis with a plate ended in consolidation in one case, in the other the fracture did not heal, which also required reosteosynthesis with the Ilizarov apparatus.

Analysis of the timing of the fusion of the pseudoarthrosis, depending on the method of reduction, did not reveal significant differences. Thus, with closed intramedullary osteosynthesis, the consolidation period was 8.5 ± 2.1 months, and with open (including removal of extramedullary implants) - 7.6 ± 1.9 months.



Free Figure 1 - Radiography Patient G. 1973 gr. False joint of the left leg 8 months old



Figure 2- Stage of surgical treatment Blocked intramedullary osteosynthesis of the left tibia.



Figure 3 - Radiography of Patient G. 1973 gr. After blocking intramedullary osteosynthesis.

It should be taken into account that the timing of adhesion is influenced not only by the mechanism of injury, surgical tactics, the qualifications of doctors who provide first aid and specialized care, but also by many other factors: the general somatic state of the patient, the presence of bad habits, his behavior and mood in the postoperative period, when it is required to focus efforts on recovery and further training of the limb muscles.

Even such a low-traumatic method, which is intramedullary osteosynthesis, is not without the risk of complications. In the treatment of false joints, we encountered both intraoperative and postoperative complications. In three cases, there was damage to the tibiofibular vascular bundle during osteotomy of the fibula. It could not be avoided due to the "intimate" soldering of scar-altered soft tissues and bones, and it was necessary to expand the surgical wound and suture the vessels. Subsequently, in order to prevent a possible complication, segmental osteotomy of the fibula began to be performed in the middle third of the leg in the area of the healthy bone - outside the scar process.

In the postoperative period, hematomas of the soft tissues of the lower leg were diagnosed in 8 cases, which were removed on the 3-5th day by puncture or through small incisions. In three cases, the hematoma was removed 1-1.5 months after surgery due to late infection. In one case, a purulent process was localized in the area of the "heads" of distal static screws along the inner surface of the lower leg, which required removal of the screws 3 months after osteosynthesis in the presence of signs of tibial fusion.

When analyzing cases of nonunion after intramedullary osteosynthesis, it was revealed that both patients had hypotrophic pseudoarthrosis (one infected, the other with a bone defect) after a high-energy open injury treated using extramedullary osteosynthesis with non-certified plates, which led to the development of severe metallosis and superficial bone necrosis and further aggravated the disruption of her blood supply.

Conclusion. Thus, during the treatment by the method of intramedullary osteosynthesis of 48 patients with nonunited fractures and pseudarthrosis of the tibia, consolidation occurred in 44 (91.6%). This suggests that the method is able to provide fusion in conditions of impaired bone consolidation both during primary osteosynthesis and after various options for ineffective surgical treatment, including in the presence of a bone defect or chronic infection, if the remission period was long enough.

Activation of the local infectious process is not an indication for immediate removal of the intramedullary fixator. On the contrary, its preservation maintains the stability of the fragments with their possible subsequent fusion under conditions of infection.

Bibliography.

1. Efremov I.M., Sibaev F.Ya., Shevalaev G.A. Two-stage reosteosynthesis in a patient with a pseudarthrosis of the tibia complicated by chronic postoperative osteomyelitis. *Traumatology and Orthopedics of Russia*. 2018.-N 1.-C.108-114. Bibl. 12 titles
2. Tishkov N.V., Rudakov A.N., Puseva M.E. Clinical application of the transosseous apparatus Ortho-SUV in the treatment of pseudoarthrosis of the lower extremities // *Bulletin of the VSNTS SO RAMS*. 2016.Vol. 1, No. 4 (110). S. 78-84.
3. Shapoval A.I., Podkosov O.D., Tareev Yu.V., Krestnikov A.N., Ziyabaev Sh.A. Treatment of nonunited fractures, pseudoarthrosis and lower leg bone defects complicated by osteomyelitis in conditions of distraction-compression osteosynthesis. *Surgeon*. 2014.-N 4.-S. 80-85. Bibl. 6 titles
4. Borzunov D.Y., Chevardin A.Y., Mitrofanov A.I. Management of congenital pseudarthrosis of the tibia with the Ilizarov method in a paediatric population: influence of aetiological factors // *Int. Orthop*. 2016. Vol. 40, No 2. P. 331-339. DOI: 10.1007/s00264-015-3029-7.
5. Khan M.S., Rashid H., Umer M., Qadir I., Hafeez K., Iqbal A. Salvage of Infected Non-Union of the Tibia with an Ilizarov Ring Fixator. *J. Orthop. Surg (Hong Kong)*. 2015; 23(1): 52-55. Epub 2015/04/30. PMID: 25920644.
6. Ranjan P., Dasarath K., Divya M., Naresh K.P., Management of Infected Non-Unions of Long Bones Using Limb Reconstruction System (LRS) Fixator. *International Journal of Research in Orthopaedics* Patra SR, et al. *Int. J. Res. Orthop*. 2017 Mar; 3(2): 213-219 <http://www.ijoro.org>. DOI: <http://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20170540>.