9. Molchanova OO, Dzerzhynska NO. Neirobiolohiya kohnityvnykh porushen u khvorykh na shyzofreniyu. Arkhiv psykhiatriyi. 2016; 22(2): 60-64. [in Ukrainian]
10. Odinak MM. Kriterii diagnostiki i klassifikatsiya posttravmaticheskikh kognitivnykh narusheniy. Vestn. Ross. voen.-med. akad. 2014; 48 (4): 12–17. [in Russian]
11. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. J. Psychiatr. Res. 1975; 12 (3): 189-198.
12. Hermens DF, Lagopoulos J, Tobias-Webb J et al. Pathways to alcohol-induced brain impairment in young people: A review. Cortex 2013; 49(1): 3-17.
13. Jellinger KA. Pathogenesis and treatment of vascular cognitive impairment. Neurodegenerative Disease Management. 2014; 4(6):471-490.
14. Sachdeva A, Chandra M, Choudhary M et al. Alcohol-Related Dementia and Neurocognitive Impairment: A Review Study. 2016; 5(3): e27976.
15. Vahnina N, Gromova D. Mild Cognitive Impairments: Diagnostics and Treatment. Effect Psychother Neurol Psychiatry. 2016; 25(3):18-24.

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ALGORITHM FOR TACTICS OF SURGICAL TREATMENT IN PATIENTS WITH PROXIMAL TIBIA FRACTURES

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The purpose of the study performed was: to develop an algorithm for tactics for surgical treatment of patients with fractures of the proximal tibia. The algorithm was based on the analysis of domestic and foreign literature sources, the results of own clinical studies on the treatment efficacy in 125 patients with proximal tibia fractures, who were treated at the clinic of the SI "ITO NAMS of Ukraine" and the Traumatology Department of KNMP "Globyne Central District Hospital" in 2008-2017, and biomechanical studies to determine the strength of fixation using different methods of osteosynthesis in proximal tibia fractures. Based on our own clinical and biomechanical studies, analysis of literature sources, an algorithm for surgical treatment tactics in patients with proximal tibia fractures has been developed, which will permit effective treatment of this severe orthopedic pathology at all stages of surgery. The developed algorithm permits a differentiated selection of surgical accesses, repositions and methods of bone fragments fixation, improves the efficacy of surgical treatment in patients with proximal tibia fractures and can be recommended for implementation in our country.

Key words: proximal tibia fractures, surgical treatment, algorithm.

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АЛГОРИТМ ТАКТИКИ ОПЕРАТИВНОГО ЛІКУВАННЯ ХВОРИХ З ПЕРЕЛОМАМИ ПРОКСИМАЛЬНОГО ВІДДІЛУ ВЕЛИКОГОМІЛКОВОЇ КІСТКИ

Метою проведеного дослідження було: розробка алгоритму тактики оперативного лікування хворих з переломами проксимального відділу великогомілкової кістки. Базисом для створення алгоритму став аналіз літературних джерел вітчизняної та зарубіжної літератури, результати власних клінічних досліджень з ефективності лікування 125 хворих з переломами проксимального відділу великогомілкової кістки які проходили лікування в клініці ДУ «ІТО НАМН України» та відділенні травматології КНМП «Глобинська ЦРЛ» в період 2008-2017 рр. та біомеханічні дослідження з визначення міцності фіксації при використанні різних методів остеосинтезу за переломів проксимального відділу великогомілкової кістки. На основі власних проведених клініко-біомеханічних досліджень, аналізу літературних джерел розроблений алгоритм тактики оперативного лікування хворих з переломами проксимального відділу великогомілкової кістки, що дозволить проводити ефективне лікування даної тяжкої ортопедичної патології на всіх етапах проведення оперативного втручання. Розроблений алгоритм дозволяє проводити диференційований підбір операційних доступів, репозиції та методик фіксації кісткових уламків, збільшує ефективність оперативного лікування пацієнтів з переломами проксимального відділу великогомілкової кістки і може бути рекомендований для впровадження на теренах нашої держави.

Ключові слова: переломи проксимального відділу великогомілкової кістки, оперативне лікування, алгоритм

The work is a fragment of the research project "To develop tactics of surgical treatment for patients with post-traumatic tibia osteomyelitis depending on the trophic severity disorders", state registration No. 0117U003012.

Fractures of the proximal tibia (PTF) are severe injuries of the lower extremities and range from 2 to 5% among all skeletal bone fractures [2]. This type of injury is frequently accompanied by the impression of bone tissue near the joint surface and damage to important soft tissue structures, resulting from the complexity of the kinematics and features of the knee joint structure (close location of the major vessels, nerves, lack of significant muscle mass) [12]. The urgency of treating patients with proximal tibia fractures is determined not only by the high prevalence of this localization fractures, but also by the high frequency of unsatisfactory

results of their treatment (from 10 to 54%) [13]. Frequently in the remote period after the injury deformed gonarthrosis, contractures, instability of the knee joint develops, with the output of disability reaches 5.9-9.1% [5]. All this determines the great medical and social significance of this problem, and determining the most effective method of this pathology treatment is an urgent issue of modern traumatology.

A large number of surgical techniques have been proposed for the treatment of proximal tibia fracture (PTF). The literature analysis of the indications for surgical treatment of proximal tibia fractures reveals a lack of consensus on the treatment tactics and methods for this category of patients.

To date, the generally accepted "gold standard" for extra-articular PTF, the blocked intramedullary osteosynthesis (fixation) (BIOS) is used; for intra-articular PTF – the plates and screws are applied [7]. Some authors are in favor of using external fixation devices (EFD) for surgical treatment. To optimize treatment and achieve complete anatomical restoration of the joint surfaces with early functional load, the Volkov-Oganesyan apparatus with a caliper traction device was frequently used [1].

In recent years, there has been a discussion in foreign literature about traditional or suprapatellar access to the point of the intramedullary rod introduction [8, 10]. Indications for suprapatellar or traditional access to date are not definitively clarified. In intra-articular PTF, surgical accesses should ensure the possibility of accurate repositioning, and depend on the injury location, but generally accepted recommendations for the use of certain surgical approaches for fractures of this location have not been developed [6, 11].

Thus, analyzing the literature data, it can be determined that despite the great medical and social problem of PTF treatment and the number of different methods and types of osteomethalosynthesis, the tactics of surgical treatment in this severe traumatic pathology have not been finally developed (taking into account the type of osteosynthesis, type of intramedullary rod introduction, type of operational access, etc.).

The purpose of the study was to develop an algorithm for tactics of surgical treatment in patients with proximal tibia fractures.

Materials and methods. The basis for the algorithm was the analysis of literature sources of domestic and foreign literature [2, 5, 6, 9, 14] and the results of our own clinical studies on the treatment efficacy in 125 patients with PTF who were treated at the clinic "ITO NAMS of Ukraine" and in the Traumatology Department at KNMP "Globyno Central District Hospital" in the period of 2008-2017 [3]. Studies have shown that the most effective way to treat patients with fractures of the proximal tibia is the use of modern methods of osteosynthesis (BIOS, LCP plates), the percentage of good and excellent results was 88.33%, negative results were within 3.34%, which is statistically reliably ($p \leq 0.01$) differs from the results of treating the patients who underwent conservative treatment and traditional methods of osteomethalosynthesis (DCP plates, EFD and screws). Refusal of surgical treatment leads to unsatisfactory treatment results in patients with fractures of the proximal tibia in 45.16% (by the Oxford scale) and 58.06% (by the Neer-Grantham-Shelton scale) of cases. Biomechanical studies to determine the strength of fixation using different methods of PTF osteosynthesis [4] proved that the deformation and stress on the Fixing Metal Anchor, bone tissue and ligaments is within normal limits, and is statistically reliably ($p \leq 0.05$) lesser than the stresses on the elements of models using LCP-plates unilaterally medially and laterally in models of bone fragments fixation by means of BIOS and LCP-plates located bilaterally, which indicates sufficient stability of fragments and methods of osteosynthesis in general. The use of LCP-plates for the PTF fixation unilaterally medially or laterally can lead to fracture of the Fixing Metal Anchor, development of reparative osteogenesis disorders.

Clinical trials have been performed in compliance with ethical principles stated in the Declaration of Helsinki; all patients gave the informed consent to participate in the study.

Results of the study and their discussion. To improve the treatment of patients with proximal tibia fractures, we have developed an algorithm for choosing the tactics of their surgical treatment, which includes the use of various methods of osteosynthesis, selection of implants, optimal access for their placement, repositioning of fragments, etc. (figs. 1-4).

The application of the algorithm is based on the answers to the following questions:

1. What is the type of fracture according to the AO and Gustilo-Anderson classification [6]?
2. Is the fracture open or closed?
3. Is there a fracture of the fibula?
4. What is the length of the proximal tibia fragment?
5. Are there any severe concomitant injuries (damage to internal organs, craniocerebral injury)?
6. Is there systemic osteoporosis?
7. What is the patient's age?
8. Is there a need for osteoplasty?
9. What is the condition of the skin in the area of surgical access?

Accordingly, the algorithm for choosing the tactics of surgical treatment in patients with PTF is divided into the following stages:

Stage I. General surveying and examination of the patient (to determine the main clinical and instrumental methods of examination, tactics of surgical treatment depending on the concomitant injuries presence, the condition of the patient and skin with open fractures by the Gustilo-Anderson scale [6], the presence of compartment syndrome.

Stage II. Preoperative planning (choice of fixation methods), which in turn is divided into the following sub-stages:

Sub-stage 2.1. The choice of fixation method depending on the presence and severity of of the tibial fracture.

Sub-stage 2.2. The choice of fixation method depending on the size of the proximal fragment in the tibia and possibility of the fibula fixation.

Sub-stage 2.3 Choice of fixation method depending on the type of fracture according to the AO classification [6], the presence of severe concomitant injuries and systemic osteoporosis.

Sub-stage 2.4 Choice of fixation method depending on the need for osteoplasty.

Stage III. Preoperative planning (choice of operational access), which in its turn is divided into the following sub-stages:

Sub-stage 3.1. Choice of operational access when performing BIOS.

Sub-stage 3.2. Choice of surgical access when performing bone osteosynthesis.

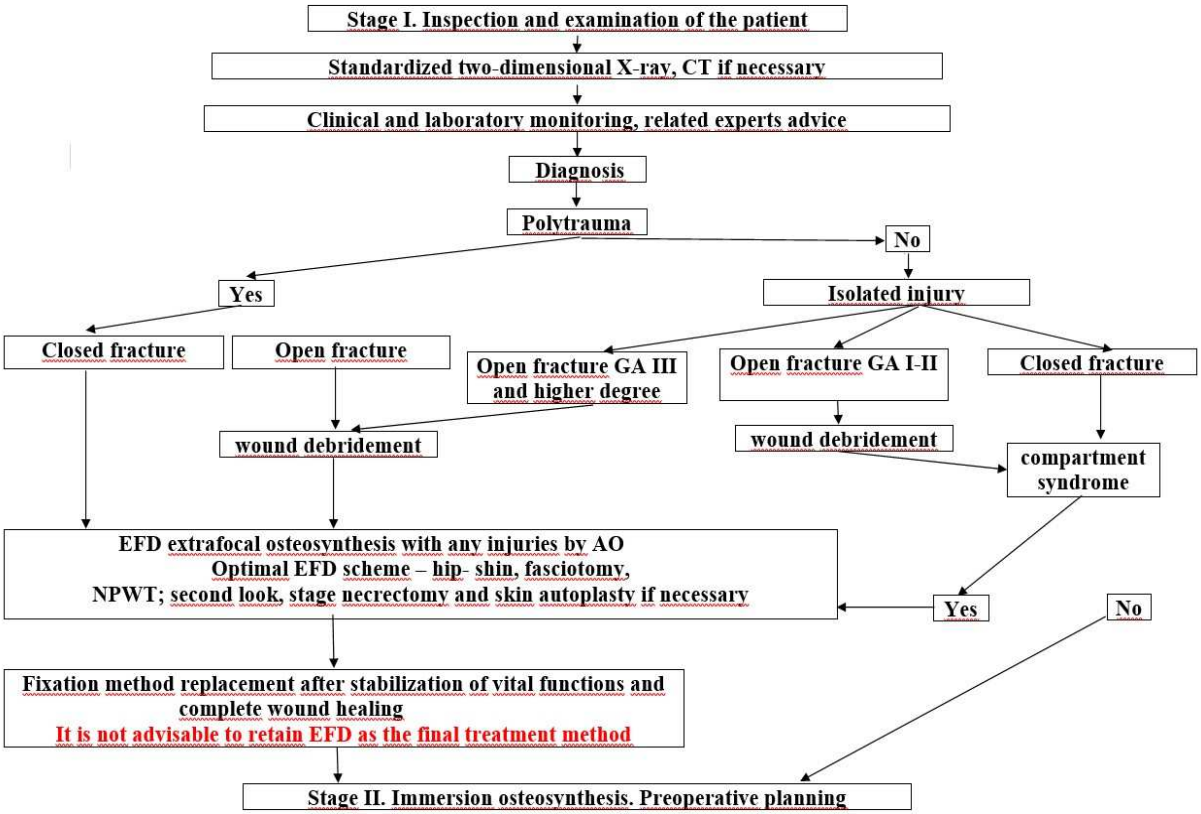

Fig.1. Algorithm for choosing the tactics of surgical PTF treatment. Stage 1: surveying and examination of the patient

Stage I. On the day of hospitalization after medical and diagnostic measures, patients, if it was impossible to perform surgical treatment on the first day, patients underwent skeletal traction of the calcaneal bone, were prescribed anti-inflammatory and analgesic drugs.

To prevent thromboembolic complications, indirect anticoagulants were prescribed in prophylactic doses. If necessary, an additional examination, examination by a physician, surgeon, anesthesiologist-resuscitator and other related specialists was performed with the definition of concomitant injuries and the general condition of the patient. Preoperative planning included X-ray examination of the damaged and undamaged tibia in 2 projections with centering on the proximal and distal parts; if necessary, CT examination of the affected segment was carried out.

We believe that with polytrauma, severe condition of the patient due to comorbidities, open PTF of the IIIrd degree according to the Gustilo-Anderson classification [6] and also in the presence of a compartment syndrome it is expedient to use temporary fixation of fragments by the external fixing device as

the first stage, further – replacement of fixing methods using immersion osteosynthesis techniques (fig. 1). Immersive osteosynthesis is possible with isolated closed and open proximal tibia fractures of I-II degrees according to the Gustilo-Anderson classification [6].

Stage II. If the tibia is damaged, it is recommended to restore it for better stability of the knee joint and tibia fragments and to maintain reposition in the postoperative period. If the length of the proximal tibia fragment is more than 3 cm, it is better to fix it with an intramedullary rod. With a fragmentary fracture and height of a proximal fragment less than 3 cm – osteosynthesis with a plate is recommended. Osteosynthesis with a tibial screw is recommended in a simple type of fracture and the height of the proximal fragment less than 3 cm [5, 10] (fig. 2).

If the length of the proximal tibia fragment is 8 cm or more from the articular surface, the type of fracture being A2 or A3, it is advisable to use intramedullary osteosynthesis. In the absence of injury or planned fibula restoration and the length of the tibial fragment being lesser than 8 cm, it is possible to use the plate in the medial support column, since the fibula by means of the interosseous membrane and ligament provides partial external support. It is also possible to use two plates on the medial and lateral sides of the tibia, which is confirmed by our biomechanical studies [4] (fig. 3).

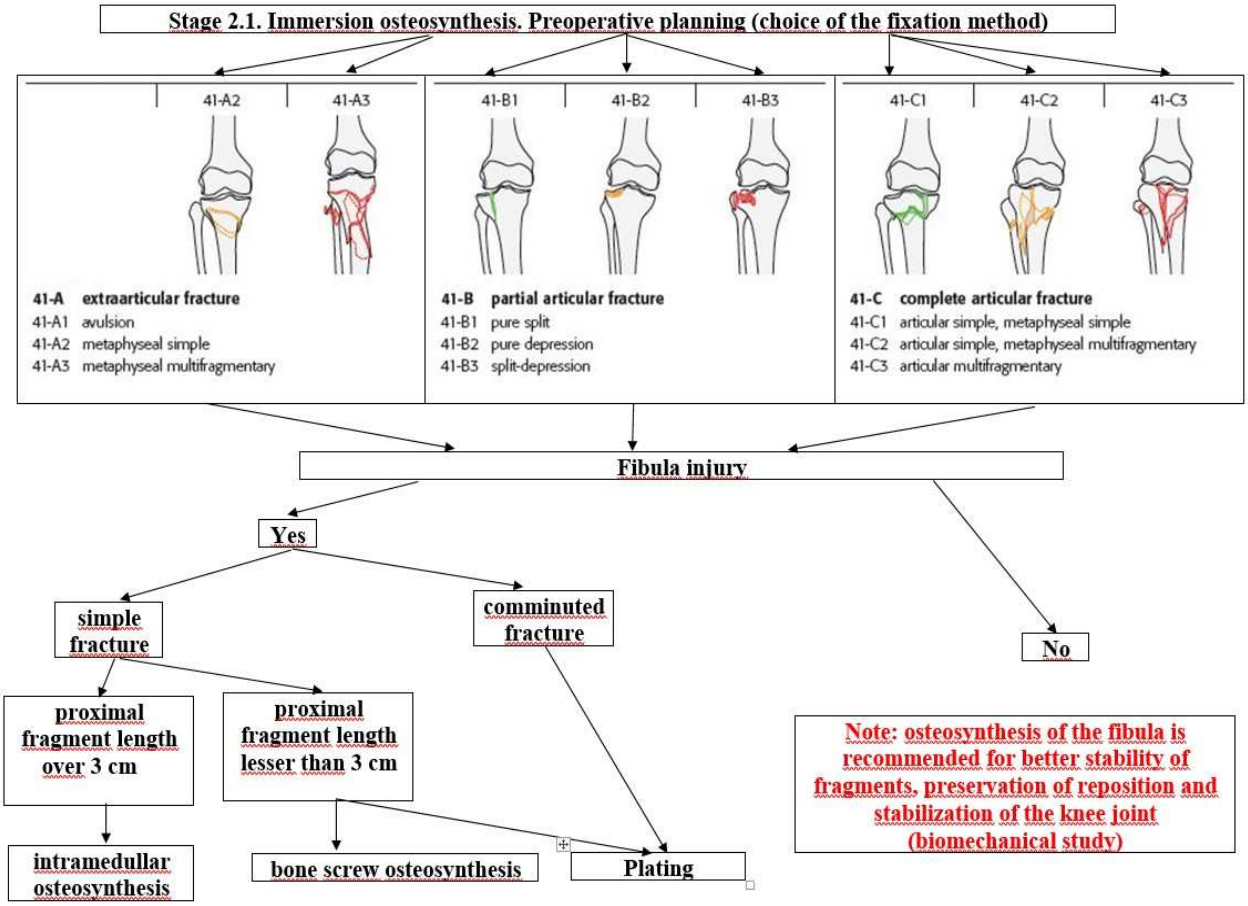

Fig.2. Algorithm for choosing the tactics of PTF surgical treatment. Sub-stage 2.1: choice of fixation method depending on the presence and severity of tibial fracture.

In the presence of a proximal fragment longer than 8 cm, type of fracture A2 and A3, the presence of severe concomitant injuries and systemic osteoporosis, in our opinion, it is most appropriate to use an external fixation device. Subsequently, after stabilization of the patient's condition it is advisable to perform BIOS using the static method. If the A2 type fracture is at the distance of more than 8 cm from the surface of the knee joint, in the absence of severe concomitant injuries and systemic osteoporosis, it is recommended to perform a BIOS using the dynamic method. In case of type A2 fracture, in the absence of severe concomitant injuries, in the presence of systemic osteoporosis, it is feasible to perform BIOS by the static method. In case of A3 type fracture without concomitant injuries, it is advisable to immediately use BIOS using the static type of distal blocking (fig. 4).

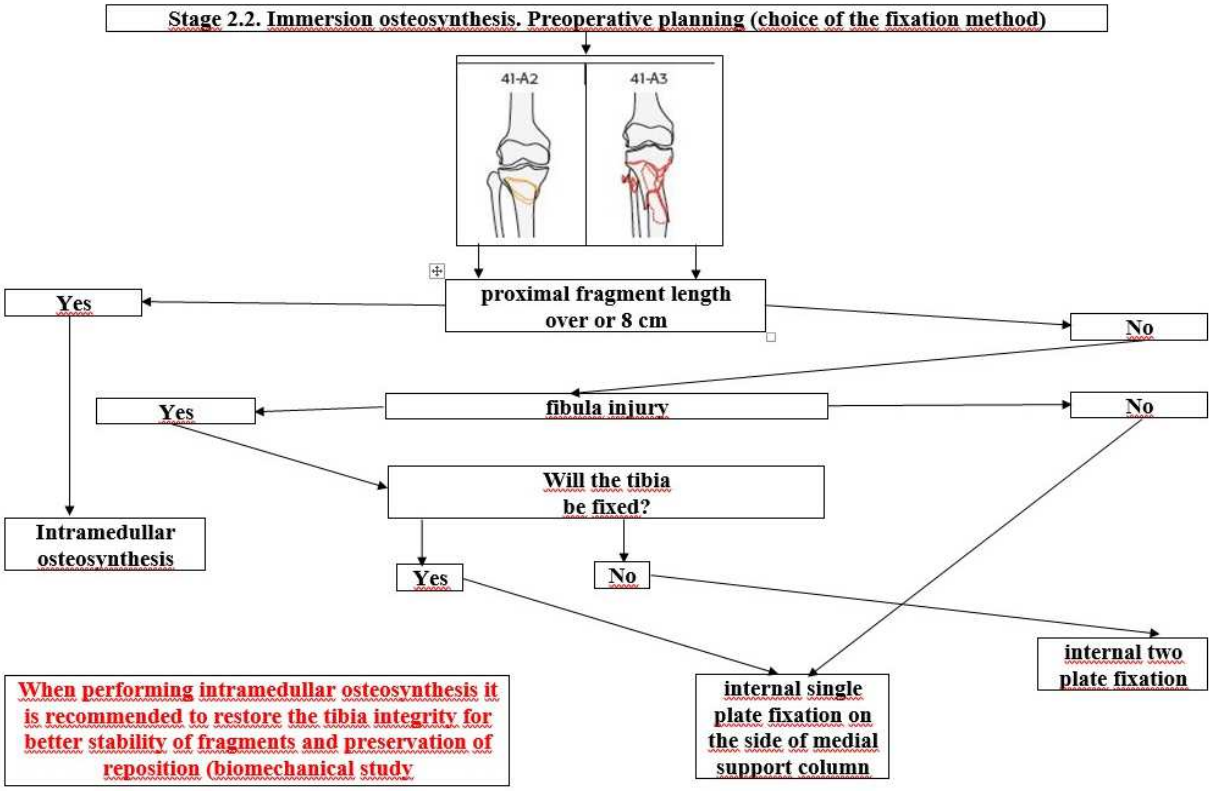

Fig.3. Algorithm for choosing the tactics of PTF surgical treatment. Sub-stage 2.2: choice of fixation method depending on the size of the tibia proximal fragment and the possibility of the fibula fixation.

In fractures of A2, A3 type with the length of a proximal fragment lesser than 8 cm, in the presence of systemic osteoporosis it is necessary to use LCP type extramedullary fixator. In type A2 fracture in patients without concomitant injuries and in the absence of systemic osteoporosis, DCP can be used as metal fixators. If patients have concomitant injuries with A2, A3 type fractures, it is advisable to use external fixation device (EFD) followed by replacement of the fixation method with LCP, despite the presence or absence of systemic osteoporosis in order to better maintain reposition in the postoperative period (fig. 4).

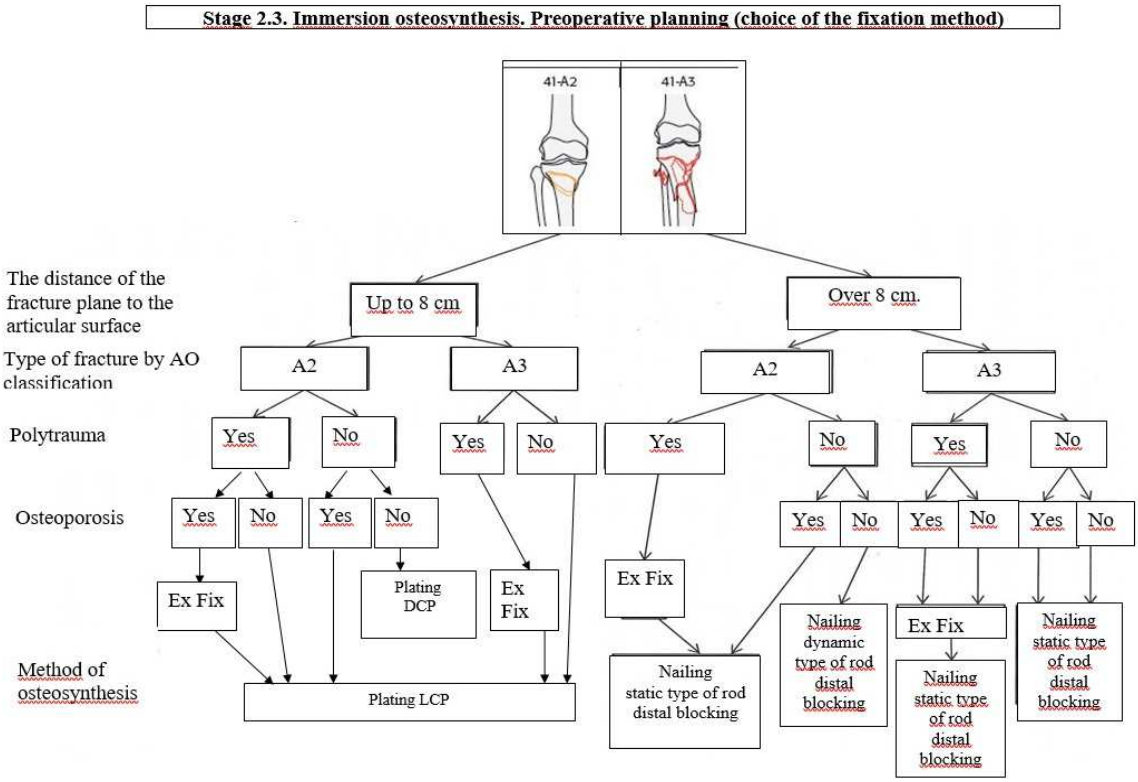

Fig. 4. Algorithm for choosing the tactics of surgical PTF treatment. Sub-stage 2.3: the choice of fixation method depending on the type of fracture according to the AO classification [2], the presence of severe concomitant injuries and systemic osteoporosis.

In intra-articular fractures of B and C type, there is frequently a need for osteoplasty. If the patient's age is less than 40 years with a B1 fracture, it is possible to use a dynamic compression plate. In all other cases, in our opinion, the optimal fixator is a plate with angular stability.

Stage III. When choosing access to perform the BIOS, in our opinion, suprapatellar access is less difficult, because it is easier to achieve reposition on the unbent knee because the proximal fragment of the tibia is not effected by sartorius extensor forces, thereby significantly reducing the need for using deflection (polar) extension wire and screws.

The absolute indications for performing suprapatellar access are: 1) the presence of skin damage in the area of the patient's own patellar ligament; 2) extensor contracture of the knee joint. When choosing access to periosteal osteosynthesis, it is necessary to take into account: 1) the condition of the skin in the access area; 2) the presence of skin plastics in the access area. 3) severe comorbidities of the patient, which increases the risk of infectious complications. Regarding access to the point of of the intramedullary rod insertion, it is proved that with traditional access when inserting the rod, the limb is bent at an angle of more than 90 degrees at the knee joint, which in its turn leads to the fragments displacement in proximal tibia fractures [15] in 80% of cases, which is not observed with suprapatellar access. Data of experimental work on corpses also confirm that suprapatellar access is less traumatic than the traditional one[9]. However, the debate over the choice of rod insertion point continues up to now. When choosing surgical access, the greatest interest is drawn to external access with laying the emphasis on the tibial nerve and tibial osteotomy at the level of the neck, with dissection of the proximal tibial syndesmosis. This access permits to relax the external lateral ligament when moving the tibial head up, which in its turn permits to rotate the shin inward and to open access to the posterior joint. The advantage of this method is a significant reduction of the tibial nerve paresis occurrence [13]. In their works, P. Lobenhoffer, T. Gerich (1997) described posteromedial access in fractures of the internal process and transfibular access to the posterior external tibial plateau. Posteromedial access permits visual inspection in the posterior part of the articular surface of the internal process and is performed by incision between the inner lateral and external oblique ligaments of the knee joint. However, there was no unequivocal opinion about the choice of surgical access in patients with PTF [14].

Thus, based on our own clinical and biomechanical studies, analysis of literature sources, an algorithm for choosing surgical treatment tactics for PTF patients was developed, which will permit effective treatment of this severe orthopedic pathology at all surgery stages. It differs from the existing published data [2, 9] in systemicity and discreteness, which provides step-by-step compliance with the surgical treatment technology.

Conclusions

1. Based on our own clinical and biomechanical studies and the analysis of literature data, the algorithm of surgical treatment tactics for patients with proximal tibia fractures is developed.

2. The developed algorithm permits a differentiated selection of surgical approaches, repositioning and methods of bone fragments fixation, increases the efficacy of surgical treatment in PTF patients and can be recommended for large-scale implementation.

References

1. Boymuradov GA, Dursunov AM, Shodiev BU. Spitse-sterzhnevoe ustroystvo dlya osteosinteza pri vnutri- i okolosustavnykh perelomakh kolennogo sustava. Geniy ortopedii. 2010; (2): 79-80. [in Russian]

2. Gilev MV, Volokitina EA, Antoniadi Yu.V, Chernitsyn DN. Novyie podkhody k lecheniyu vnutrisustavnykh perelomov proksimalnogo otdela bolshebertsovoy kosti. Uralskiy meditsinskiy zhurnal. 2012; (6): 121-127. [in Russian]

3. Kalashnikov AV, ChIp EE, Kalashnikov OV, Chalaydyuk TP. Viznachennya efektivnosti riznykh metodiv likuvannya perelomiv proksymalnoho viddilu velykogomilkovoyi kIstki. Visnyk travmatolohiyi ta ortopediyi. 2019; (4): .28-34. [in Ukrainian]

4. Lazarev IA, ChIp EE, KalashnIkov AV, Skiban MV. Biomehanichnyi analiz nadiynosti fIksatsiyi kistkovykh vidlamkiv pry osteosintezi perelomiv proksymalnoho viddilu velykohomilkovoyi kIstky LCP-plastynoyu ta intramedulyarnym blokovanym stryzhnem. Travma. 2020; (3): .3-12. [in Ukrainian]

5. Chelnokov AN, Bekreev DA. Intramedullyarnyi osteosyntez pri perelomakh verkhney treti bolshebertsovoy kosti – tekhnika na osnove chreskostnogo osteosinteza. Geniy ortopedii. 2011; (2): 102-6. [in Russian]

6. Shapovalov VM, Hominets VV. Vozmozhnosti posledovatelnogo osteosinteza pri lechenii ranenykh s ognestrelnymi perelomami dlinnykh kostey konechnostey. Geniy ortopedii. 2010. (3): 5-12. [in Russian]

7. Brunner A, Horisberger M, Ulmar B, Hoffmann A. Classification systems for tibial plateau fractures; does computed tomography scanning improve their reliability? Injury. 2010; (2): 173–78.

8. Garnavos C. Intramedullary nailing with a suprapatellar approach and condylar bolts for the treatment of bicondylar fractures of the tibial plateau. JBJS Open Access. 2017; (2): 14-17.

9. Hak DJ. Intramedullary nailing of proximal third tibial fractures: techniques to improve reduction. Orthopedics. 2011; (34): 532-35.

10. Liporace FA, Stadler CM, Yoon RS. Problems, tricks, and pearls in intramedullary nailing of proximal third tibial fractures J. Orthop. Trauma. 2013; (1): 56-62.

11. Masrouha KZ, Anderson DD, Thomas TP. Acute articular fracture severity and chronic cartilage stress challenge as quantitative risk factors for post-traumatic osteoarthritis: illustrative cases. Iowa Orthop. J. 2010; (30): 47-54.
12. Mankar SH, Golhar AV, Shukla M, Badwaik PS, Faizan M, Kalkotwar S. Outcome of complex tibial plateau fractures treated with external fixator. Indian J. Orthop. 2012; (5): 570-74.
13. Melvin JS. Open tibial shaft fractures: I. Evaluation and initial wound management .J. Am. Acad. Orthop. Surg. 2010; (1): 10-19.
14. Jain D, Selhi HS, Mahindra P, Kohli S, et al Results of proximal tibial fractures managed with periarticular locking plates: A series of 34 cases. Original Research Paper. IJRRMS. 2012; (4): 1-5.
15. Seong-Man Lee, Chang-Wug Oh, Jong-Keon Oh, Joon-Woo Kim. Biomechanical Analysis of Operative Methods in the Treatment of Extra-Articular Fracture of the Proximal Tibia. Clinics in Orthopedic Surgery. 2014; (6): 312-17.

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FEATURES OF DIAGNOSIS AND CORRECTION OF IRON DEFICIENCY ANEMIA IN FOOD PROTEIN-INDUCED ENTEROCOLITIS SYNDROME IN INFANTS

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The state of iron metabolism in infants with food protein-induced enterocolitis syndrome was determined and the efficacy and safety of ferrous bisglycinate chelate for the correction of iron deficiency anemia in this group of children were studied. 40 children aged 6 months to 3 years with a chronic food protein-induced enterocolitis syndrome were examined. Signs of iron deficiency anemia were found in 80% of children. Administration of ferrous bisglycinate chelate at a dose of 0.5 mg of elemental iron/kg/day for 1 month contributed to the normalization of red blood cells and iron metabolism in the organism, which testified to the high bioavailability and effectiveness of this form of ferrous iron in chronic inflammatory processes in the intestine.

Key words: infants, food protein-induced enterocolitis syndrome, iron deficiency anemia, ferrous bisglycinate chelate.

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ОСОБЛИВОСТІ ДІАГНОСТИКИ ТА КОРЕКЦІЇ ДЕФІЦИТУ ЗАЛІЗА ПРИ ІНДУКОВАНОМУ ХАРЧОВИМИ БІЛКАМИ ЕНТЕРОКОЛІТИЧНОМУ СИНДРОМІ У ДІТЕЙ РАННЬОГО ВІКУ

Визначено стан обміну заліза у дітей раннього віку з індукованим харчовими білками ентероколітичним синдромом та досліджена ефективність і безпека застосування хелату бісгліцінату заліза для корекції залізодефіцитних станів у даного контингенту дітей. Обстежено 40 дітей віком від 6 місяців до 3 років з хронічним перебігом білок індукованого ентероколітичного синдрому. У 80% дітей було виявлено ознаки дефіциту заліза в організмі. Призначення хелату бісгліцінату заліза в дозі 0,5 мг елементарного заліза/кг/добу протягом 1 місяця сприяло нормалізації показників червоної крові та метаболізму заліза в організмі, що свідчило про високу біодоступність та ефективність застосування цієї форми двовалентного заліза за умов хронічного запального процесу в кишечнику.

Ключові слова: діти раннього віку, індукований харчовими білками ентероколітичний синдром, залізодефіцитні стани, хелат бісгліцінату заліза.

The work is a fragment of the research project "To study the pathogenetic mechanisms of the formation of allergic lesions in the gastrointestinal tract in young children" (state registration No. 0117U004534)

All over the world there is a rapid increase in the prevalence of allergic diseases, which often debut at a young age in the form of food-related reactions [1, 2]. Clinical manifestations of food allergy can be observed from various organs and systems, but in 47-65% cases [3], gastrointestinal tract (GIT) is the effector organ, which is in direct contact with allergens. These manifestations of food allergy have common features of pathogenesis, but are differentiated by the main clinical manifestations: delayed vomiting, the presence of blood in the stool and chronic diarrhea. Pathogenesis similarity is manifested in the presence of mainly eosinophilic inflammation of certain parts of the gastrointestinal tract, which leads to increased permeability of the intestinal wall, damage to the cilia, localized aphthous ulcers and nodular lymphoid hyperplasia [4].

Food protein-induced enterocolitis syndrome (FPIES), which develops as a result of cell-mediated immune mechanisms, is common at an early age and is clinically characterized by vomiting after ingestion of causative products and diarrhea with mucus and/or blood, which can lead to dehydration and hypotension [5]. The first symptoms of FPIES manifest at the age of 2 to 7 months, when a formula or complementary foods are added to the child's diet. The most common causal products of FPIES are dairy products and soy formulas, but there are reports that eating solid these foods: rice, oats, eggs, barley, potatoes, chicken, turkey, peas, bananas, fish, mutton and corn can also cause FPIES [6].