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TO DETERMINE THE OPTIMAL OPTIONS AND THE VOLUME OF TRANSOSSEOUS OSTEOSYNTHESIS DEPENDING ON THE SEVERITY OF LOWER LIMB INJURIES

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✓ ***Resume***

Treatment of victims with multiple and combined limb bone fractures is one of the urgent problems of traumatology, since the number of victims with such injuries tends to increase and, according to a number of authors, ranges from 8.6% to 64.7% of the total fracture structure. The first place among them is occupied by fractures of the lower extremities.

Keywords. transosseous osteosynthesis, lower limb injuries, transosseous osteosynthesis according to Ilizarov.

ОПРЕДЕЛИТЬ ОПТИМАЛЬНЫЕ ВАРИАНТЫ И ОБЪЁМ ЧРЕСКОСТНОГО ОСТЕОСИНТЕЗА В ЗАВИСИМОСТИ ОТ ТЯЖЕСТИ ПОВРЕЖДЕНИЙ НИЖНИХ КОНЕЧНОСТЕЙ

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✓ ***Резюме***

Лечение пострадавших с множественными и сочетанными переломами костей конечностей - одна из актуальных проблем травматологии, так как количество пострадавших с такими повреждениями имеет тенденцию к увеличению и, и составляет по данным ряда авторов от 8,6% до 64,7% в общей структуре переломов. Первое место среди них занимают переломы нижних конечностей.

Ключевые слова. чрескостного остеосинтеза, повреждений нижних конечностей, чрескостного остеосинтеза по Илизарову.

ОЁҚ-ҚЎЛ ЖАРОҲАТЛАРИНИНГ ОҒИРЛИГИГА ҚАРАБ ТРАНСОССЕОУС ОСТЕОСИНТЕЗНИНГ ОПТИМАЛ ВАРИАНТЛАРИ ВА ҲАЖМИНИ АНИҚЛАШ

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✓ ***Резюме***

Кўп ва комбинацияланган оёқ-қўл суяклари синган беморларни даволаш травматологиянинг долзарб муаммоларидан биридир, чунки бундай жароҳатлар билан жабрланганлар сони ортиб бормоқда ва бир қатор муаллифларнинг фикрига кўра, 8,6% дан 64,7% гача умумий синиш тузилиши. Улар орасида биринчи ўринни пастки екстремиталарнинг синиши эгаллайди.

Калит сўзлар. Илизаров бўйича трансоссеоус остеосинтез, оёқ-қўлларнинг шикастланиши, трансоссеоус остеосинтез.

Relevance

The increase in the number of patients with multiple bone injuries of these locations over the past three decades is directly related to the rapid growth of the fleet of vehicles and their speeds. Up to 82% of victims are injured due to road accidents. The severity of the injured depends not only on the mechanism and amount of damage, but also on disorders of musculoskeletal homeostasis. Shock phenomena with multiple fractures are observed in 21% - 81.9% of victims. At the same time, there is always a fat embolism (85%), although it is clinically manifested in 2.1% - 10.0% of the examined patients. The difficulty of treating patients with multiple fractures of the lower extremities is often due not only to the severity of bone damage, but also to soft tissues, and concomitant injuries and diseases. The duration of treatment of patients after conservative and surgical methods ranges from 1 to 1.5 years and is not unrelated to the choice of treatment method and tactics. When using conservative treatment methods, it is not always possible to achieve a complete closed comparison of bone fragments, with surgery additional trauma to soft tissues, bone and bone marrow is inflicted, which leads to delayed consolidation or non-fusion of fractures with the formation of false joints, the latter, according to a number of authors, range from 4.8 to 45% of cases. The percentage of unsatisfactory treatment results continues to be high (up to 75%). In addition, open reposition and fixation of bone fragments with internal fixators is associated with the development of wound infection, reaching 32% or more [1.3.5.7.9.11].

According to most researchers, primary disability in multiple fractures of the lower extremities ranges from 50% to 76.4%. Mortality ranges from 1.3% to 51.6%. All this necessitates the search for more advanced treatment methods aimed at reducing the duration of disability, reducing disability and improving anatomical and functional outcomes. The analysis of numerous dissertation studies, monographs and publications in thematic collections of scientific papers indicates that to optimize the treatment process for multiple fractures of the lower extremities, the use of such a type of osteosynthesis is required, in which it would be possible to carry out complete simultaneous reposition and stable fixation of bone fragments for the entire period of treatment, without excluding the active function of the limbs. Our long-term experience in the treatment of such fractures gives us the right to assert that the complex of all these requirements for all types of fractures, locations and degrees of severity allows us to carry out the Ilizarov method of transosseous osteosynthesis, taking into account improvements in recent years. At the same time, the tactical, technical and individual therapeutic issues of using this method, as well as the organization of specialized assistance to victims, are insufficiently covered in the literature. There is no in-depth analysis of the results of treatment of patients, possible errors and complications, there is no information about the rational arrangements of the Ilizarov apparatus depending on the type and severity of the fracture and treatment tactics depending on the time since the injury. To date, there is no consensus on the choice of surgical intervention and fixation methods for multiple fractures of the hips and lower legs simultaneously in various combinations, and the tactics of postoperative management of such patients have not been determined. The features of fusion of bone fragments in fractures of two, three and all four segments of the lower extremities have not been studied. All this served as the basis for conducting this study and determining its purpose: to substantiate the system of treatment of patients with multiple fractures of the lower extremities by the method of transosseous compression-distraction osteosynthesis, which ensures a favorable course of traumatic disease, optimal conditions for tissue regeneration and restoration of the supporting and motor functions of the limbs. Patients with multiple fractures of the lower extremities resulting from severe mechanical trauma and accompanied by anatomical abnormalities in the damaged segments and functional changes in vital organs and body systems are difficult to treat and require a special approach in the application of Ilizarov controlled percutaneous compression and distraction osteosynthesis in combination with the complex treatment of victims with polytrauma. The system of treatment of traumatological patients with multiple fractures of the lower extremities, developed on the basis of transosseous osteosynthesis according to Ilizarov, provides the most favorable conditions for fusion of fragments at all levels, the course of traumatic illness and restoration of musculoskeletal functions of the limbs of the victims [2.4.6.8.10.12].

Purpose of the study: to determine the optimal options and the volume of transosseous osteosynthesis depending on the severity of lower limb injuries.

Materials and methods of research

The work is based on an in-depth analysis of the treatment results of 284 patients aged 5 to 68 years with multiple fractures of the bones of the lower extremities (double fractures of the hip and shin; simultaneously - two hips; two legs; thigh and shin; two hips and one shin; two legs and one hip), who had 421 fractures.

Clinical, radiological, biochemical, densitometric, radionuclide, biomechanical, physiological and statistical research methods were used. For the first time, based on a sufficient number of clinical observations based on the mechanobiological patterns of reparative regeneration of bone tissue in case of damage to two or more segments of the lower extremities and assessment of the biomechanical parameters of the operated limb, the functional state of the cardiovascular system, a set of therapeutic and rehabilitation measures using the Ilizarov apparatus in this category of patients was developed.

Result and discussions

The possibility of emergency surgical treatment of patients after injury has been proved and justified, and the most optimal layout options for the Ilizarov apparatus have been proposed, depending not only on the location and number of fractures, but also on the number of segments and the nature of displacement of bone fragments, as well as the sequence of osteosynthesis. Devices and methods for repositioning multiple fractures of long tubular bones have been proposed and introduced into clinical practice. Methods of treatment for multi-fractured and slow-healing fractures of the hip and lower leg have been developed, for which five patents for inventions and utility models, two copyright certificates for inventions have been obtained. Based on radiological and clinical data, as well as data from densitometric and radionuclide monitoring of bone formation, the timing and detailed options for the gradual removal of the device were developed. Measures are proposed to prevent and eliminate possible errors and complications. Due to its low injury rate, the method of transosseous osteosynthesis is indicated for almost all stable patients with multiple fractures of the bones of the lower extremities and should be performed according to the principle of emergency specialized traumatological care for all damaged limb segments. After a comprehensive examination, preoperative preparation, stabilization of the functioning of vital organs and assessment of the general condition of the patient, issues of anesthesia and the amount of percutaneous osteosynthesis, which are fundamental in the complex treatment of patients with polytrauma, are resolved. With the general satisfactory condition of the patient, transosseous osteosynthesis is performed in full volume with the achievement of accurate reposition and stable fixation of fragments at all levels. The unstable condition of patients due to injury or concomitant diseases allows osteosynthesis to achieve stable fixation, and the final accurate reposition in these cases is achieved after stabilization of the general condition. In case of severe dysfunction of vital organs and systems, a fixation variant of transosseous osteosynthesis is used. Methods of transosseous osteosynthesis in patients with multiple fractures of the bones of the lower extremities are determined by the general condition, depth and severity of damage to the bone marrow, diaphyseal bone and soft tissues at each level. The use of the developed methods of transosseous osteosynthesis in isolated fractures and their improvement in multiple fractures makes it possible to create optimal comfortable conditions for fusion of fragments and early functional treatment. In the postoperative period, there is a change in the types of hemodynamics with a predominance of hypocirculatory, which is characterized by a decrease in the pumping function of the heart, an increase in peripheral vascular resistance, which is a compensatory and adaptive reaction of the body in response to severe trauma, which proceeds more favorably with early activation of patients. The body's adaptive response to multiple fractures of the lower extremities is the development of a catabolic acute phase, which lasts 15-20 days depending on the severity of the injury. In the early period after injury, inhibition of the protein-forming function of the liver occurs, accompanied by a decrease in the albumin-globulin coefficient. The processes of calcium and phosphorus deposition in bones and their urinary excretion are balanced. During treatment with the use of a transosseous fixation device, the positive dynamics of the process of restoring the limb's ability to support are noted in all patients. By 1.5 months of treatment, there is an increase in the load on the affected limb by 30-40%, which reaches 68.2±7.3% by the end of treatment. A good result of the treatment corresponds to the restoration of the support capacity of the operated limb by 70%, and muscle strength by 50% of the norm. Transosseous osteosynthesis with the Ilizarov apparatus in multiple fractures of the lower extremities creates favorable conditions for the course of recovery processes in

the fracture zone, as evidenced by the data of the radioisotope method of investigation. The accumulation of osteotropic labeled compounds makes it possible to establish clearly defined patterns indicating the activity of metabolic processes in bone tissue. In the initial period, their value increases, and then, reaching a maximum, decreases.

Conclusion

The dynamics of metabolic processes in the fracture zone largely depends on the location and severity of the injury and, consequently, on the degree of preservation of blood supply to the bone. The duration of fixation in the treatment of patients with multiple fractures of the bones of the lower extremities depends on the nature of the fractures, their number, severity, amount of functional load, intensity of the motor regime and ranges from 85 to 150 days for closed and from 100 to 197 days for open fractures. The proposed system of patient treatment, consisting in adequate preoperative preparation of patients, differentiated use of optimal arrangements of the transosseous fixation apparatus, rational patient management tactics, allows achieving high treatment efficiency (up to 98.7%), restoring the anatomical integrity of limb segments and its function. Errors encountered during the treatment process, if they are eliminated in a timely manner, do not affect the final result.

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