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# TRAUMATIC AND POSTOPERATIVE PURULENT OSTEOMYELITIS WITH COMBINED AND MULTIPLE INJURIES OF THE LOWER EXTREMITIES.

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Due to the large number of purulent complications during operations on the musculoskeletal system, we decided to study the causes leading to the development of chronic osteomyelitis and develop measures for their prevention, as well as comprehensive treatment of chronic traumatic and postoperative purulent osteomyelitis in compliance with the basic principles.

**Keywords:** traumatic disease, combined trauma, traumatic and postoperative purulent osteomyelitis.

# ТРАВМАТИЧЕСКИЙ И ПОСЛЕОПЕРАЦИОННЫЙ ГНОЙНЫЙ ОСТЕОМИЕЛИТ ПРИ СОЧЕТАННЫХ И МНОЖЕСТВЕННЫХ ПОВРЕЖДЕНИЯХ НИЖНИХ КОНЕЧНОСТЕЙ

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В связи большим количеством гнойных осложнений при операциях на опорно-двигательном аппарате мы решили изучить причины, приводящие к развитию хронического остеомиелита и выработать меры их профилактики, а также комплексное лечение хронического травматического и послеоперационного гнойного остеомиелита с соблюдением основных принципов.

**Ключевые слова:** травматическая болезнь, сочетанная травма, травматический и послеоперационный гнойный остеомиелит.

One of the formidable complications of fractures of the long bones of the lower extremities in patients with combined and multiple trauma, often leading to significant permanent disability, is traumatic and postoperative osteomyelitis. The problem of osteomyelitis, as well as malignant tumors, belongs to the category of eternal problems of mankind. As long as there are humans and pyogenic microorganisms, this disease will disrupt human life. Traumatic osteomyelitis (TO) refers to a chronic inflammatory process that has arisen after open bone injuries. The reasons contributing to the

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development of TO are extensive crushing of bones, soft tissues, impaired blood supply to bone fragments, surrounding muscles, lack or inferiority of transport and therapeutic immobilization, insufficiently radical or delayed primary surgical treatment of wounds, leaving displaced bone fragments open on the surface of the wound, refusal of washing and active drainage of the wound, the spread of infection through the bone marrow canal and paraossal tissues. Before the formation of granulations, fistulas, bone sequestration, determined clinically and radiologically, it should be about infection of the wound and not about traumatic osteomyelitis. Only after 1-1.5 months, the formation of chronic osteomyelitis becomes reliable. Its pathoanatomic essence is diverse. Leading at the same time it is a purulent inflammation in the fracture zone, which is supported by free bone fragments or dead ends of fragments of damaged bone. The name "postoperative osteomyelitis" (PO) was first introduced by S.S.Girgolav in 1938. Currently, PO refers to purulent complications that arose after surgical treatment for closed fractures and orthopedic diseases. The definition of osteomyelitis in these cases as postoperative is not not only clearly reflects its connection with the performed operation, but also increases the responsibility of surgeons for the quality of the operation itself and the prevention of this complication. The occurrence of PO refers to the phenomena of surgical iatrogenism and requires special analysis in each case as a complication or medical error. Postoperative osteomyelitis should be treated in the same clinics where a "clean" osteosynthesis operation was performed, complicated by suppuration.

The clinical picture of various forms of chronic osteomyelitis is diverse and it depends on the virulence of the pathogen, the reactivity of the organism, the age of the patient, localization, prevalence and duration of the process, the presence of complications. One of the characteristic features of chronic osteomyelitis is a protracted disease lasting for years.

The purpose of this work was to study the causes leading to the development of chronic osteomyelitis, to develop measures for their prevention and treatment in patients with multiple and combined injuries of the lower extremities.

**Research methods**

In 2014-2022, 1200 patients with traumatic and postoperative osteomyelitis of the long tubular bones of the lower extremities were under our supervision in the Department of Traumatology and Orthopedics of the Andijan Regional Hospital. Men were 85.2%, women 14.8%, osteomyelitis prevailed in people of young working age 20-45 (73.1%) years. Traumatic osteomyelitis (TO) was detected in 967 (80.6%) victims, postoperative osteomyelitis (PO) was found in 233 (19.4%) patients. In 78.4% of the victims, TO and PO occurred against the background of severe combined and multiple injuries of the lower extremities.

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Before applying to specialized clinics, 65% of patients had unsuccessfully operated several times (up to 18), which indicates the persistence of the disease and the difficulty of treatment. The majority of patients (92.3%) were admitted as planned and only 7.7% were in the acute stage. The incidence of damage to the bones of the lower leg and thigh at THAT was 82.3 and 17.7%, and at PO – 61.6 and 38.4%, respectively.

All patients underwent a comprehensive examination, including clinical, radiological, microbiological, immunological, morphological, biochemical and statistical methods of research. In order to study the state of blood circulation in the affected limbs, ultrasound Dopplerography and duplex scanning of the main vessels were performed.

X-ray diagnostics as the main method of investigation in most cases was performed comprehensively, that is, not one but several X-ray techniques were used, including film radiography, electrorentgenography (ERG), tomography and fistulography in various modifications.

**Results and their discussion**

In order to reasonably prevent the development of chronic osteomyelitis we conducted a targeted study of the causes of purulent-inflammatory complications. All identified causes were divided into five groups: organizational, tactical, technical, sanitary-epidemiological and somatic.

Organizational reasons were associated with shortcomings in the organization of full-fledged treatment of traumatological patients and were observed in 8.7% of cases.

Tactical errors caused by incorrectly chosen treatment method patients were observed in 9.4% of patients. These include repeated and unjustified attempts to reposition bone fragments, untimely surgery performed in the presence of emergency indications or excessive expansion of indications for it and unqualified management of the postoperative period.

Technical reasons directly related to the execution of the operation itself were most common (42.1%). These included traumatic surgery, unstable osteosynthesis, incorrect selection of metal structures, abandoned foreign bodies, insufficient hemostasis and incomplete immobilization in the postoperative period.

Sanitary and epidemiological reasons were associated with the sanitary and epidemiological state of the hospital. These include insufficient adherence to asepsis, the carriage of hospital strains of microorganisms, contamination air and objects of the external environment, the duration of the operation. These causes were observed in 30.2% of patients. Prevention of wound infection can be carried out with the development of a set of measures aimed at all links of the epidemic chain: the source of infection, transmission routes, susceptible organism.

Somatic causes associated with the state of immune reactivity of patients against the background of severe combined and multiple trauma, the presence of local trophic disorders in the operated limb. In the course of the study, cellular and humoral

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immunity indicators were studied in 30 patients with combined and multiple injuries. In 26 cases, this study was conducted with complications arising after various manipulations. The results showed that both groups of patients had an immunological deficiency with a significant decrease in the reactivity of the body.

The complex treatment of chronic traumatic and postoperative osteomyelitis was based on the following basic principles: radical surgical treatment of osteomyelitis foci; bone cavity plastic surgery; full-fledged immobilization of the operated limb; fighting the microflora of the purulent focus; increasing the defenses of the patient's body; restorative treatment. Radical surgical treatment of the lesion consisted in the removal of necrotic and non-viable tissues, foreign bodies within intact tissues from the purulent lesion. In most of the cases (72%) were performed with plastic filling of the formed cavity.

Thus, most often (in 40.8% of cases) the formed cavity was filled with a muscle flap formed from adjacent muscles or from another limb (trans-myoplasty). To fill large and complex cavities, especially on the thigh and lower leg, 2-3 muscle flaps were often used. Skin grafting was used in 9.8% of patients with extensive scarring of the skin in the circumference of the osteomyelitic focus and osteomyelitic ulcers, as well as to close the skin defect.

Bone grafting in the treatment of osteomyelitic cavities and false joints complicated by osteomyelitis was used in 21.3% of patients in the form of autoplasty and demineralized bone grafts. Plastic replacement of bone wounds (defects) with blood-supplied fat flaps was used in 1.4% of cases when there was no possibility of muscle flap formation.

Plastic surgery with several tissues (muscle, bone, adipose and skin flaps) was successfully used to fill large and complex cavities in 14.8% of patients. In 11.7% of cases use out-of-focus compression-distraction osteosynthesis.

Limb amputation was performed in only 8 patients after prolonged unsuccessful surgical treatment with pronounced trophic changes or sepsis phenomena.

The postoperative period in the treatment of patients with chronic osteomyelitis should be considered as one of the most important components of complex treatment. Immobilization of the operated limb was mainly carried out with a plaster cast and an external fixation device.

With muscle, tendon, fat and skin plasty, immobilization lasted for 3-4 weeks, with bone – 5-6 weeks.

Conservative treatment was carried out in 6.0% of patients with sluggish rare exacerbations of osteomyelitis, with the futility of surgical treatment and the presence of contraindications to surgery. It consisted in a local effect on the purulent focus (washing, UV, laser therapy) and strengthening the general condition of the patient.

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The immediate and long-term results of treatment were studied in 850 patients. Positive results were noted in 89.7% of patients. Good immediate results were achieved in 65% of treated patients, satisfactory in 24.2%. In 10.3% of patients, there was no noticeable improvement, despite the treatment.

With surgical treatment, the results were significantly better than with conservative treatment. Thus, a positive effect during surgical treatment was achieved in 91%, with conservative, only 39%. The best results were obtained with the plasty of osteomyelitic cavities with blood-supplied soft tissues (92.2%), slightly worse with bone grafting (90.5%) and the least effective was secondary surgical treatment of a purulent focus without plastic surgery (81%).

## Conclusions

Strict compliance with the stated requirements for the organization, treatment tactics,

surgery technique, sanitary and epidemiological condition of the hospital, as well as the use of therapy aimed at increasing the immune reactivity of the body will significantly reduce the frequency of traumatic and postoperative osteomyelitis.

When choosing the tactics of primary surgical treatment in patients with open comminuted and fragmented bone fractures in victims with multiple and combined injuries, it is necessary to be guided by the principles aimed at prevention of postoperative infectious complications.

Only an integrated approach to the treatment of chronic traumatic and postoperative osteomyelitis in compliance with the above basic principles in most cases makes it possible to achieve the cure of osteomyelitis. At the same time, correct clinical assessment of the patient's condition and the affected segment, appropriate selection of treatment tactics, timely correction of disturbed processes in the body are the key to the treatment of patients with chronic osteomyelitis.

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