

Results the use of minimally invasive surgical methods for the treatment of patients with polytrauma in the Fergana branch of the Rncemp

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Abstract. Retrospective analysis of the anatomical and functional outcomes of surgical treatment of 1024 patients with polytrauma was performed in the trauma department of the FBRSCEMA for the period from 2005 to 2020. High-tech methods of minimally invasive osteosynthesis have been increasingly used in recent years in order to improve the results of treatment of patients with polytrauma. 1340 operations were carried on 1024 (76.4%) patients. The share of minimally invasive surgical interventions was 83.4% (854 operations). In comparison with traditional osteosynthesis, the introduction of new minimally invasive osteosynthesis technologies provides the possibility of earlier performing of surgical fixation of bone fragments, reduces the likelihood of postoperative complications due to minimal surgical trauma, creates optimal conditions for accelerating the healing of fractures, provides early support for the limb and the ability to start an early stage development of movements in the joints of the injured limbs.

1 Introduction

According to World Health Organization WHO, up to 5.8 million people die annually in the world from severe injuries, of which 20-28% are affected with multiple and combined (polytrauma).

Polytrauma remains one of the leading causes of death and disability worldwide, especially in the age group younger than 40 years and has no significant downward trend in the structure of deaths by PT. (polytrauma) accounts for more than 60%, in severe cases 80-90% disability is 25-45 %

Treatment of polytrauma is a complex task, which includes the use of new technologies, new organizational forms, and the latest achievements of medical science. The scientific development of surgical tactics for the treatment of victims with polytrauma is an urgent

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problem of modern traumatology and orthopedics. Polytrauma is characterized by high mortality and is one of the three main causes of death, and under the age of 40, mortality from injuries ranks first. According to a number of researchers, the total mortality, including those who died in more distant periods after polytrauma, ranges from 30% to 35,0% [1-5]. With polytrauma, the severity of the condition of the victims is due to a large blood loss and traumatic shock, damage to internal organs, traumatic brain injury. Therapeutic tactics for injuries to the bones of the extremities, as well as performing surgical intervention are the most controversial issues [1, 6-10].

One of the important modern trends in the development of osteosynthesis is the creation of technologies for minimally invasive stabilization of fragments. The main goal of minimally invasive osteosynthesis is to preserve the viability of tissues in the fracture zone. Minimally invasive osteosynthesis is a promising method of surgical fixation of fragments both from the point of view of reducing the overall surgical injury and from the point of view of optimizing the conditions for bone tissue repair [1, 6, 10].

The introduction of new technologies into modern traumatology and the orthopedic "damagecontrol" system (damage control) has significantly improved the results of surgical treatment of patients with polytrauma.

In recent years, there has been marked progress in the use of high-tech techniques of internal minimally invasive osteosynthesis for the treatment of victims with polytrauma. This made it possible to significantly reduce the negative aspects of the use of various classical methods of internal and external fixation, especially in the treatment of fractures of the long bones of the extremities in patients with multiple and combined injuries [1, 4, 11-13].

The purpose of the study: To evaluate the results of minimally invasive methods of treatment of patients with polytrauma.

Based on the analysis of the use of minimally invasive surgical methods for the treatment of patients with polytrauma in the traumatology department of the FFRNCCEMP, to substantiate and put into practice a system of measures and recommendations aimed at increasing the effectiveness and improving the results of surgical treatment.

2 Materials and methods

An assessment of the structure and dynamics of changes in surgical activity, as well as the duration of inpatient treatment of patients with polytrauma for the specified period is given. For the period from 2005 to 2020, the analysis of anatomical and functional outcomes of surgical treatment of 1024 patients with polytrauma being treated in the traumatology department of the FFRNCCEMP was carried out. A total of 1340 patients were admitted with polytrauma, of which 1124 (83.8%) were men; 216 (26.2%) were women (Fig. 1).

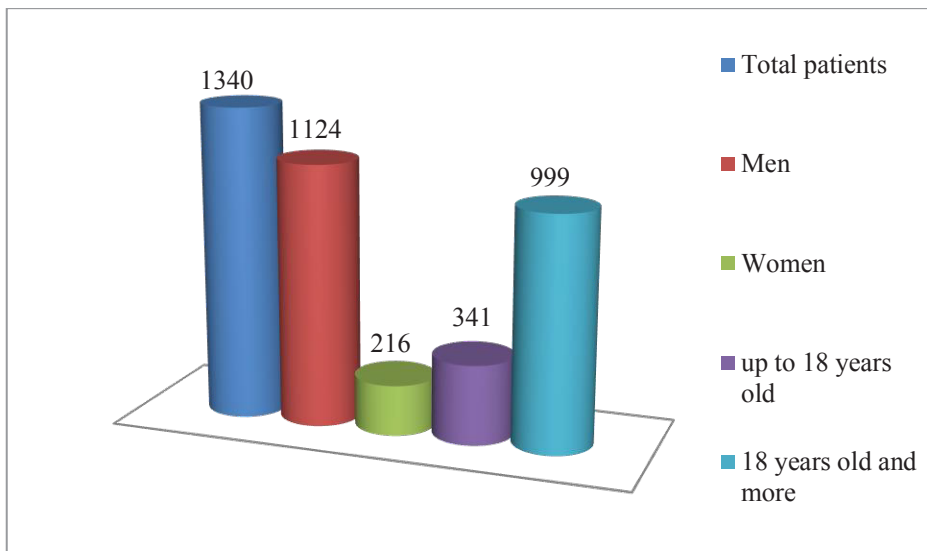


Fig. 1. The analysis of anatomical and functional outcomes of surgical treatment of 1024 patients with polytrauma being treated in the traumatology department of the FFRNCEMP.

The age of the victims ranged from 14 to 79 years, up to 18 years -341 (25.5%) adults - 999 (74.5%).

The largest percentage of victims were young people from 19 to 34 years and middle-aged people from 35 to 55 years. Persons of working age accounted for 82%, the main cause of polytrauma were road accidents - 62.6% (840 cases), catatrauma 30.1% (404 cases) and the share of industrial injuries - 4.8% (65); criminal injuries 2.9% (36) (Fig. 2).

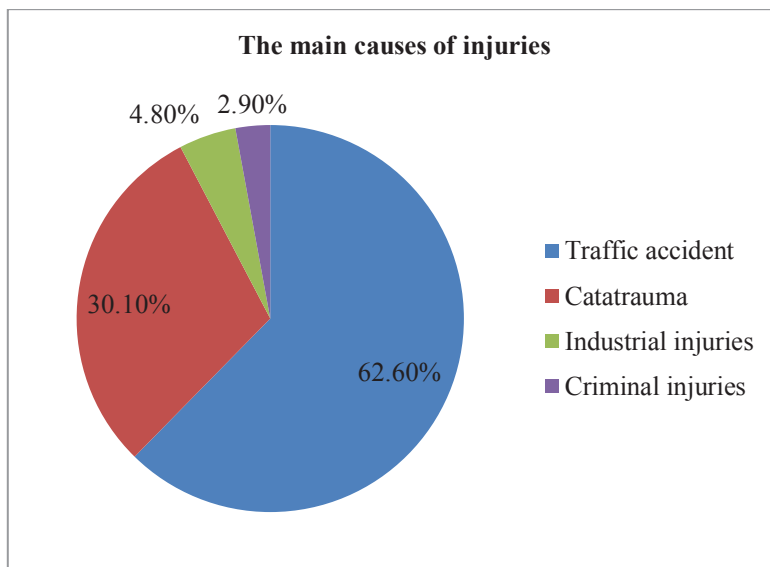


Fig. 2. The main causes of injuries.

Received by ambulance - 432 (32.1%); self-reversal - 601 (44.9%); in the direction of subfilials transferred – 307 (22.9%) patients. In total, 2638 bone fractures were diagnosed in 1340 patients. Fractures of the lower leg (32%) and hip (18%), skull bones (18%) and

fractures of the humerus (9%), fractures of the pelvic bones (5%); chest (6%); forearm (7%); hands, feet 5% prevailed. Open fractures of long bones were observed in 28% of cases, closed fractures – in 53%, a combination of open and closed fractures – in 19%, intra-articular fractures – in 21%. In 5% of cases, fractures of the bones of the extremities were combined with trauma to the pelvic bones. Due to high-energy trauma, the nature of fractures in 27.2% of the victims was complex (type C according to the AO classification), comminuted - 43.6% (type B according to the AO classification), limb fractures in combination with pelvic fractures were in 79 patients. 1024 patients were operated on, they performed 1240 operations. EKDO with Ilizarov devices - 336 (26.9%); rod devices 80 (5.9%); extramedullary osteosynthesis with plates - 210 (15.7%); Lsplatins – 74(5.5%); Intramedullary osteosynthesis with pins 202 (15.1%): Blocking intramedullary osteosynthesis BIOS (2016-2020) – 122(9.1%): Cortical minimally invasive osteosynthesis with screws and spokes – 291 (21.7%) operations. The share of minimally invasive surgical interventions was 63.7% (854 operations) (Fig. 3).

Number of operations performed by a patient with poly injuries

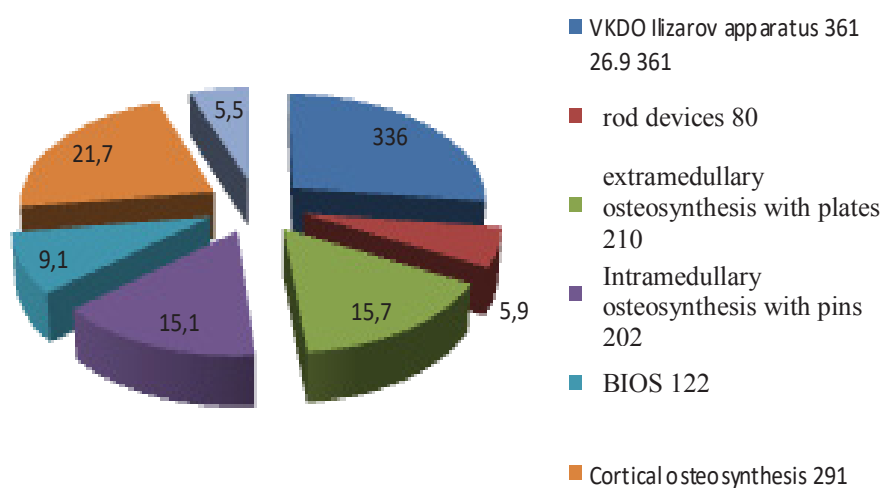


Fig. 3. Number of operations performed by a patient with poly injuries.

Erms of operations up to 6 hours – 304 (29.7%); within 6-24 hours – 142 (13.9%); after 24 hours – 578 (56.4%) operations.

3 Results and discussion

In the treatment of patients with combined and multiple trauma, one-stage or multi-stage surgical treatment tactics were used. Operations were performed sequentially by one surgical team or simultaneously by several surgical teams.

In closed fractures, early primary osteosynthesis was performed in terms of up to 10 days. The following anatomical and functional results were obtained: good – 81.9%, satisfactory - 15.2%, negative - 2.9%. The choice of the method and time of osteosynthesis was carried out differentially, depending on the severity of the victim's condition, type, type and localization of the fracture, taking into account the prevention and treatment of local and general complications of combined injuries.

Early minimally invasive operations (during the first day after stabilization of the general condition) on the segments of the ODE were performed in 202 (19.7%) patients, of which there were open fractures of 2-3 degrees and primary osteosynthesis with external fixation devices in 78 patients and cortical minimally invasive, simultaneous osteosynthesis with primary stressed Y-shaped spokes in 124 patients. Early minimally invasive stabilization of long bone fractures is an effective preventive measure for possible complications (fat embolism, pulmonary embolism, pneumonia, and others). It is necessary to stabilize the general condition of the patient, conduct medical and diagnostic measures and early activation of the patient in bed.

During the compensation period of the body, 937 operations were performed (in 707 patients), and one-stage operations during one anesthesia were performed on all segments of the limbs at once in 163 patients, in 544 patients — sequentially, with a break of 7-10 days in two stages.

It should be noted that in recent years, high-tech blocking intramedullary osteosynthesis with BIOS rods has been increasingly used. Modern minimally invasive technologies of fracture fixation – BIOS reduce the traumatic nature of manipulation, facilitates the process of fracture fixation, which makes it possible to widely use them for osteosynthesis of ODE fractures in polytrauma. A comparative analysis of the spectrum and results of the use of various osteosynthesis techniques for the period 2015-2020 showed: in diaphyseal bone fractures, there is a significant increase in the frequency of using blocking intramedullary osteosynthesis (BIOS) (from 7.9% to 39.3%) and locking plates with angular stability of screws (from 6% to 26.4%); The use of external osteosynthesis techniques as the final method of fixing bone fragments in diaphyseal fractures decreased from 23.6% to 6.4%. At the same time, there was a statistically significant ($P<0.01$) decrease in the frequency of unsatisfactory outcomes treatment from 18.3% to 7.4%. The choice of the method of osteosynthesis of limb bone fractures performed urgently is significantly affected by the severity of the condition of the victim with a combined injury on the one hand and the traumaticity of surgery on the other, because any operation is an additional injury to the body of the victim with a combined injury and can lead to deterioration of the condition. The traumaticity of the proposed surgical intervention, first of all, depends on the amount of surgical blood loss, the degree of traumatization of the soft tissues of the limb, skeletonization of bone fragments and the duration of intervention in shockogenic zones. We investigated the amount of intraoperative blood loss and the duration of surgery in 167 patients with various methods of osteosynthesis of hip fractures. The most traumatic were the standard methods - osteosynthesis with the AO plate and the Kuncher pin. Significantly less traumatic methods were - stabilization of fractures with external fixation devices, primary stressed Y-shaped spoke structures and closed blocking intramedullary osteosynthesis with nails without drilling the bone marrow canal.

4 Conclusion

1. The introduction of new minimally invasive osteosynthesis technologies provides, in comparison with traditional osteosynthesis, the possibility of earlier surgical fixation of bone fragments, as well as a reduction in the duration of postoperative inpatient treatment due to the possibility of earlier discharge without a significant risk of local complications.

Creates optimal conditions for the fusion of fractures, provides the possibility of early medical and social rehabilitation of patients with minimal economic costs. And it allowed to significantly improve the results of treatment of patients with multiple and combined injuries.

2. Analysis of the results of blocking intramedullary osteosynthesis of fractures of long tubular bones with rods with blocking without drilling proves the effectiveness of this direction for all types of fractures with the obligatory condition of closed reposition of bone fragments and elimination of the main types of dislocations.

3 The minimally invasive technique of osteosynthesis with primary stressed Y-shaped spoke structures of various types of periarticular fractures is characterized by low cost of structures and high fixation efficiency even against the background of osteoporosis, provided that all technological stages of the operation are clearly performed.

4. In open comminuted diaphyseal and metaepiphyseal fractures, with a violation of the integrity of the covering soft tissues, the method of choice is to use external fixation devices. The advantages of early minimally invasive surgical fixation with an external fixation device include: low trauma, short duration of surgery, absence of intraoperative blood loss and early activation of the patient.

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