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THE IMPROVEMENT WAYS OF TREATMENT RESULTS OF PATIENTS WITH SEVERE JOINT TRAUMA

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GENERAL PROPERTY OF THE WORK

The actuality of the research theme. One of the most topical problems in modern medicine is heavy joint trauma, which maintains an increase in the frequency of injury. The high number of traumatized populations and the number of deaths after such trauma among populations make this problem a state problem.

In recent decades, the percentage of severe joint trauma (SJT) and polytrauma (PT) injuries in the structure of traumatism continues to increase. Due to the lack of a unified classification of such traumas, there is the disagreement of the conduction of the diagnostic and treatment activities, including timing, volume, and sequence of surgical treatment, as well as surgical and over the implementation of emergency care. Treatment of SJTs and PTs should be carried out quickly and in full to prevent the transition of vital functions to the decompensation phase. Otherwise, there is an increased likelihood that this treatment attempt will result in a lethal end.

One of the most topical problems of modern traumatology and orthopedics is the formation of scientifically-based treatment tactics of joint trauma injuries. In the result of SJT and PT, fracture of long tube bones occurs in 55-82% of cases which complicates the overall condition of the patients and complicates the diagnosis and treatment of internal organs, pelvis, and spinal cord, chest, and skull injuries.

Modern treatment of SJTs should be carried out quickly and in full to prevent pathological processes before the decompensation phase in the function of vital organs [Gumanenko E.K. et al., 2011]. It was created the EMSS (Emergency Medical Service System) as a novelty in the treatment of severe joint trauma [Bode R.J. et al., 1999]. This allows the formation of the "gold clock" principle [Fitzharris M. et al., 2011] before clinical care is called "10 platinum minutes" [Brown R.A., 1993]. The protocol of Advanced Trauma Life Support (ATLS) – American College of Surgery is regarded as the gold standard for SJT recipients in Europe.

In the 1980s, the Hanover School of Polytrauma proposed a system called “damage control” or “control for injury”, whereby multidiscipli-

nary surgical treatment is considered [Norrls F.H., et al., 2013; Pape H.J., 2002; 2014].

Shock, polyorgan deficiency (POD) as a result of internal and external bleeding, thromboembolism in small and large blood circulatory systems, and compulsory condition after numerous injuries – acute respiratory distress syndrome (ARDS) as result of inaction, pneumonia, bedsores, phlebothrombosis, etc. complications occur. As a result, the resuscitation events end ended lethality [Tulupov A.N. 2012; Suprun A.Yu., 2012].

ARDS cases have been increasing in recent years. These processes associated with increased use of technological factors, road traffic injuries, terrorism, aggressive and invasive diagnostic and monitoring methods, environmental degradation, and increased surgical activity [Vlasenko A.V., 2012; Derkach R.V., 2015; Casar-Pullichino et al., 2009; Maier et al., 2009]. High rates of postoperative complications, long-term hospitalization, and loss of ability to work, and high rates of disability and mortality have made this problem a priority for each state. Therefore, it is important to continue research to formulate more advanced treatment and diagnostic measures. Joint injuries are not only a medical problem: there are closely intertwined multidisciplinary social and scientific issues. The seriousness of the problem requires integrated scientific research and new progressive approaches to its solution.

The aim of the research. Achieving a reduction in traumatic disease, disability, and lethality formulating a modern effective treatment and diagnostic algorithm based on the development and implementation of a new principle of treatment and diagnostics with the early restoration of the function of the musculoskeletal system and improvement of treatment results in patients with SCT.

Tasks of the research. To achieve this goal the following tasks have been set and solved:

1. To study the structure of severe joint trauma on the basis of retrospective and prospective research and to characterize the severity on the basis of modern classification;
2. To study the correlation between pre-clinical period and intra-clinical lethality among patients with severe joint trauma;

3. Early detection of aggravating factors in severe joint trauma, improvement of the principles of specialized care in patients with severe joint trauma;
4. Retrospective study of the results of surgical and traumatological care after severe joint trauma and development of treatment-diagnostic algorithm based on the “damage control” system improved by us in clinical practice;
5. Carrying out a comparative analysis of the results and complications of treatment on the main and comparative groups, demonstrating the effectiveness of treatment on the basis of an improved "damage control" system;
6. Less invasive osteosynthesis in the treatment of patients with severe joint trauma, including the study of the effectiveness of the early development of external fixation devices;
7. Early detection of acute respiratory distress syndrome in patients with severe joint trauma, improvement of treatment tactics in patients with acute respiratory distress syndrome , dynamic study of the results of treatment on the basis of the established system;
8. Analysis of long-term results and study of quality of life.

The research methods: Clinical examination (complaint analysis, disease anamnesis, results of objective studies); roentgenography, roentgenoscopy, contrast CT examination, angiography, ECG, USE, ExoEEG, intravein urography, cystography, retrograde pyelography, bronchoscopy, gastroduodenoscopy, lumbal puncture, diagnostic laparoscopy and thoracoscopy, laparocentesis and thoracocentesis, analysis of the blood, leukoformula conducted with the separation of the formed elements, ALT, AST, bilirubin, amylase, blood sugar, total protein, urine, creatinine, oxygen levels in blood (hypoxia). Sensitivity to antibiotics was determined by the cultivation of the secretion phlegm, urine, and blood from the wound.

The main provisions of the defense:

1. The incidence of severe joint trauma ranged from 15.9% to 34.9%, and there is no downward trend in this number, but an increase. Severe joint trauma results in death in 10.8% -87.9% of cases and

the formation of symptoms that negatively affect the quality of life in 20.3% -48.1% of cases.

2. By conducting clinical and diagnostic research, we have identified treatment tactics to determine the severity of the severe joint trauma and the dominant injury;
3. Directions of care based on the principle of "damage control" after a severe joint trauma: cessation of bleeding; activation of oxygen delivery; prevention of complications;
4. Pre-clinical care after severe joint trauma has been improved and developed in the form of an algorithm based on the "damage control" system.
5. During severe joint trauma, acute respiratory distress syndrome develops in the early hours and increases the mortality rate, the determination of the copnography, oxygenation index and interleukin-6 play an important role in its early diagnosis. Early diagnosis of acute respiratory distress syndrome and implementation of multi-stage surgical treatment tactics prevent deaths in 12.5% of cases, and complications in 17.9% of cases.
6. In patients with severe joint trauma, in the acute phase of traumatic disease, surgical treatment using minimally invasive technology was performed using a new multi-stage surgical tactical system, the timing and duration of reconstructive surgery was determined, disability and mortality were reduced.
7. Early surgical treatment of long tubular bones after severe joint trauma leads to a decrease in the incidence of complications of traumatic disease and postoperative lethality.

The scientific novelty of the research. For the first time, on the basis of large clinical material, a comparative analysis was made between the severity of injuries and the severity of the patient's condition after severe joint trauma, and a direct correlation was observed between them. In patients with severe joint trauma and whose the degree of damage is assessed severe, the indications for surgical fixation of fractures have been expanded, the effectiveness of osteosynthesis with an external fixation device has been proven, as a result, lethality decreased by 15,7% and this indicator is statistically accurate with high reliability ($p<0.001$)

For the first time, as a result of scientific analysis, based on uncontrolled and controlled factors, to justify organizational measures, all deaths are divided into groups of unpreventable deaths (UPD), preventable deaths (PD), and potentially preventable deaths (PPD), between the 2nd and 3rd groups "damage control" - "management of the injuries" is applied in a systematic form that has been improved by us, as a result, lethality decreased by 18,5 % and this indicator is statistically accurate with high reliability (p =0,010).

The incidence of acute respiratory distress syndrome in patients with severe joint trauma, developmental variants were studied, treatment tactics were determined, it was proved that severe joint trauma from the first minutes can cause the acute respiratory dystress syndrome and lead to a significant increase in mortality. As a result of retrospective and prospective scientific research, oxygen support was provided as soon as possible, anti-cytokine therapy and complex treatment were carried out, and lethality was reduced by 12,5%.

For the first time, a unified logistics-diagnostic and treatment strategy has been developed and implemented. With the help of scientific analysis of the results, we have proved the feasibility, safety and effectiveness of the use of modern minimally invasive technologies in the diagnosis of treatment of severe injuries. For the first time, an algorithm was developed to determine the volume and timing of recovery operations during severe joint trauma. As a result, the patient's stay in the hospital is significantly reduced.

Practical significance of the work. Provisions of treatment tactics were determined based on the severity of injuries and the severity of the patient's condition in patients receiving SJT.

– Algorithm of step-by-step treatment is proposed, indications for surgical interventions are defined, details of “damage control” tactics are formed, the sequence of surgical interventions, including osteosynthesis, was determined in different variants of the joint during polytrauma.
– Surgical tactics for polysegmentary and open fractures are defined, risk factors for infectious complications that may result in disability and lethality have been considered when using new minimally invasive osteosynthesis methods.

– Treatment tactics have been developed in patients with acute respiratory distress syndrome, and the surgical spectrum has been expanded. A special treatment diagnostic algorithm has been developed, which, as a result of its application in clinical practice, has significantly reduced disability and lethality.
– A department for treatment of joint trauma patients was opened.
– Medical equipment and human resources were formed during the medical care of SJT patients.
– The directions of treatment-diagnostic measures were developed and applied in practice during the emergency care of patients receiving SJT in the multidisciplinary treatment-and-prophylaxis institution.
– A focused system for polytrauma patients has been established in one treatment facility, which allows patients to save labor and equipment spent on specialized medical care.
– The main provisions of the work are used in the teaching process of the Department of Health Organization, Traumatology-Orthopedics and Surgery of the ASATIFD named after A. Aliyev

Object and subject of research. 1033 patients aged 14-80 years with severe joint trauma, examined by clinical, instrumental, radiological, laboratory methods, 806 men, 227 women, were observed, the variant of development of traumatic disease, early and adequate diagnosis of acute respiratory distress syndrome, indications for multistage surgery, capnography, oxygenation index, interleukin-6 indicators were selected as the subject of the study.

Approbation of dissertation work. Materials of the dissertation were discussed at the XIII International Conference on Eurasian Surgery and Gastroenterology (Baku, 2013); and were discussed at the scientific-practical conference dedicated to the I Congress of Az. Traumatologists and Orthopedics (Baku, 2014); II Congress of Az Traumatologists and Orthopedics (Baku, 2016); III International Congress of Az Orthopedics and Traumatologists (Baku, 2019). Materials of the dissertation also were discussed at the «Science and Innovation – Modern Concepts» Collection of scientific articles on the results of the work of International Scientific Forum (Moscow, 2019); at the "Global science. Development and novelty" Col. Scien-

tific works on materials X International Sci. Conf. (Munich, 2019); at the scientific-practical conference dedicated to the birthday of A.M. Aliyev (Baku, 2020). Primary discussion of the dissertation was in the joint meeting of the departments Traumatology and Orthopedics, "General Surgery with courses of Pediatric Surgery and Plastic Surgery", "General Surgery with courses of Cardiovascular Surgery and Neurosurgery" of Azerbaijan State Advanced Training Institute for Doctors named after A.Aliyev, and with staff of the Scientific Research Institute of Traumatology and Orthopedics (07.02.2020; protocol № 01).

Application of scientific-research work in practice. The results of the study were applied in practice at the City Clinical Hospital # 3 and in other treatment bases of Azerbaijan State Advanced Training Institute for Doctors named after A.Aliyev.

36 scientific works on the topic of the dissertation – 17 articles, 4 abstracts were published in the republic, 13 articles, 2 abstracts in foreign journals.

Organization where dissertation work is performed. The dissertation was done in Azerbaijan State Advanced Training Institute for Doctors named after A.Aliyev, and in the Scientific Research Institute of Traumatology and Orthopedics.

The volume and structure of the dissertation. The dissertation consists of 77.657 signs, including an introduction (1.320 signs), a review of the literature (10.247 signs), chapter relating to materials and methods (4.791 signs), 4 chapters relating to personal research (11.911 signs), chapter V (7.584 signs), conclusions, results, practical recommendations (9.947 signs). The literature lists have 622 scientific sources (27 of them are in Azerbaijan, 5 are in Turkish, 399 are in Russian and 198 are in other foreign sources). The dissertation is illustrated with 69 tables, 62 figures, and 2 schemes. The bibliography refers to 526 scientific sources (29 of them are in Azerbaijani, 5 in Turkish, 266 in Russian and 229 in foreign languages).

THE MATERIAL AND METHODS OF THE RESEARCH

The contingent of the research. In 2009-2015, 1033 people were taken to the City Clinical Hospital # 3 with severe joint trauma. The-

se patients were divided into 2 groups for comparative analysis of treatment and diagnostic procedures:

I Group – Comparison group of patients treated in 2009-2010, II group – patients treated in 2011-2015 are referred to as main group patients.

The research methods. The patient's general condition is evaluated from the moment the patient enters the clinic. In this case, the correlation between the severity level of the trauma and the condition of the patient is determined. Drowsiness disorders, neurological status, indicators of hemodynamics and central venous pressure, pulse rate, completeness and tension, artificial respiratory apparatus (ARA) parameters (if the patient is attached to this apparatus), oxygen supply – all of these procedures provide to detect the severity level of the conditions of the patients in a short-term, also it was conducted following screening methods: roentgenography, roentgenoscopy, contrast CT examination, angiography, ECG, USE, ExoEEG, intravein urography, cystography, retrograde pyelography, bronchoscopy, gastroduodenoscopy, lumbar puncture, diagnostic laparoscopy and thoracoscopy, laparocentesis and thoracocentesis.

Analysis of the blood conducted with the separation of the formed elements which occurred leukoformula and was performed using laboratory examination methods. At the same time, indicators such as ALT, AST, bilirubin, amylase, blood sugar, total protein, urine, creatinine were also examined. Oxygen levels in the blood (hypoxia), hemostasis indicators were studied by instrumental non-invasive methods. Sensitivity to antibiotics was determined by the cultivation of the secretion from the wound, phlegm, urine, and blood. Statistical analysis was performed using variation and discriminant methods.

Traditional methods were used during the treatment and diagnostic procedures in the comparison group patients.The severity level of injury in the main group of patients was assessed on the basis of modern scales (AIS and ISS, etc.), and these patients were assisted on the basis of the principle of "damage control." From the 1033 patients, 828 were main, 205 were patients in the comparison group.

Table 1

Frequency of injuries of anatomic regions by groups

Damaged anatomical region	Main group (n=828)	Comparison group (n=205)	Total (n=1033)	$\chi 2$; p
Skull	406 49,0±1,7%	80 39,0±3,4%	486 47,0±1,6%	$\chi 2$=6,61; p=0,010
Spinal column	82 9,9±1,0%	10 4,9±1,5%	92 8,9±0,9%	$\chi 2$=5,11; p=0,024
The chest	322 38,9±1,7%	79 38,5±3,4%	401 38,8±1,5%	$\chi 2$=0,01; p=0,926
The abdomen	171 20,7±1,4%	45 22,0±2,9%	216 20,9±1,3%	$\chi 2$=0,17; p=0,682
Pelvis	165 19,9±1,4%	39 19,0±2,7%	204 19,7±1,2%	$\chi 2$=0,08; p=0,771
Musculoskeletal system	661 79,8±1,4%	172 83,9±2,6%	833 80,6±1,2%	$\chi 2$=1,74; p=0,187

*p – statistical accuracy between indicators of the comparison group and distinction.

Treatment of 185 patients (22.3%) from the main group and 61 patients (29,8%) of the comparison group patients ended with lethality. From the 1033 patients, 806 (78%) were male and 227 (22%) were female. Treatment of 195 patients of men (24,2%) and 51 patients of women (22,5%) ended with lethality. Treatment of 22,5% of men in the main group, 31% in the comparison group, 21,7% of women in the main group and 25,5% in the comparison group ended with lethality.

Table 1 shows that MSS occurs more (80,6 ± 1,2%) after severe joint trauma and spinal cord injury occurs less (8,9 ± 0,9%). Figure 1 shows that patients brought to the clinic in an agonal position have the highest number of skulls (92,4%) and the lowest number of spinal injuries (18,2%).

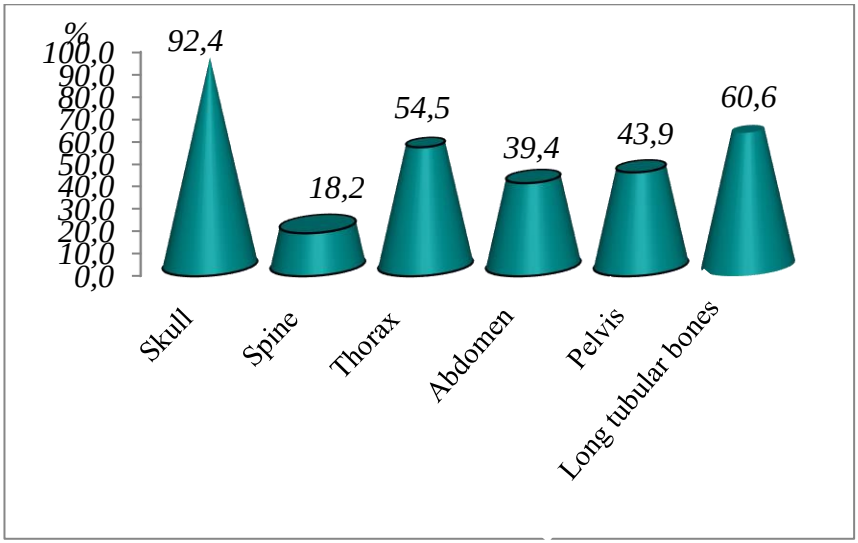


Figure 1. Frequency of occurrence of damaged anatomical areas in patients with predagonal and agonal conditions

THE EVALUATION O THE SEVERITY LEVEL OF THE INJURIES IN THE PATIENTS WITH SEVERE JOINT TRAUMA

Measurement scales can be used to assess the severity level of injuries in patients with SJT. The AIS scale, created in 1970 for this purpose, has since been upgraded several times. However, it is only possible to estimate the severity level of single injuries with this scale. The severity level of the trauma was measured by the AIS scale measuring of the damaged anatomical regions and by raising the square from 3 heaviest form among of them: ISS = $(AISa)^2$ + $(AISb)^2$+ $(AISc)^2$ – where a,b,c are the damaged anatomical regions. To assess the severity level of the trauma, the human body is divided into 6 regions: head including the face and neck, chest, abdomen, pelvis, vertebral column, and extremities. The severity level of damage of each region is estimated on a 6-point scale ranging from 0 to 5

points. At this time 0 indicates no damage, 5 indicates serious damage of this area. With this system, During evaluating the damage of six areas of the body, the top three of them are raised to square. These three numbers are then collected, the resulting number is expressed in points, and this indicates the severity level of the trauma on the ISS scale – the maximum is 75 points. In most countries of the world, serious injuries result in deaths over 25%. For example, these include skull hematomas, bilateral hemotorax, numerous torned and crushed wounds caused by more than 1500 ml of hemorrhage, numerous fractures of pelvis bones, and separation of symphysis. Such damages are assessed by the AIS system at 5 points.

If the victim has two or more injuries which are assesed each of them by 4 points at the same time on the AIS scale, this is a life-threatening injury. Currently, “damage control” injuries control protocol for abdominal, thoracic, skull-brain, spinal and orthopedic traumas is developed.

In our study, the severity level of injury of the main and comparison group patients was retrospectively and prospectively measured on the AIS and ISS scale and carried out coding of all patients' injuries. According to the ICS scale, when the severity level of the injury upto 25 points it is estimated as moderately severe, 26-40 as severe, 41-50 as very severe, upto 75 points as critical. During sorting of the patients who delivered to the clinic the severity level of injuries in the shock-relief room was assessed on the basis of the AIS and ICS scales, the dominant life-threatening injury was identified and treatment-diagnostic tactics based on “damage control” were established.

THE PRINCIPLES OF THE TREATMENT-DIAGNOSTICS ALGORITHMS DURING REGULATION OF “DAMAGE CONTROL” INJURIES

Although the term "Damage control" has been used since the 90s of the last century, the meaning of this concept is not properly understood in many countries. So far, in the case of during SJT and PT patients have low arterial pressure or severe skull-brain

trauma, and etc. is recommended the tactics of amputation or open osteosynthesis while two or sometimes 3 surgical brigades working simultaneously. Those who say that any surgical intervention provides extra trauma to those patients, and these procedures against the shock operations are a prerequisite for choosing of the wrong treatment tactic. In fact, any operation (surgical intervention) is considered to be aggression for the patient, and to some extent aggravate the patient's condition. Generally, "damage control," – "control for injuries" is used in various anatomical areas, for example, in the abdominal and chest cavity under the name of damage control surgery (DCS) in the musculoskeletal system as the name “damage control orthopedics” (DCO). In order to apply “damage control” in practice, three factors must be seriously considered:

1. The severity of the initial trauma (the “first hit”);

2. The patient's biological constitution (age, body weight, and diseases);

3. The number of operations that must be performed, their expected duration, their traumacicity, and the amount of blood to be lost. These operations are considered as the second hit for patients with severe trauma.

While complying the principle of “Damage control”, first of all, the operations on the abdomen and the chest cavity, in the small pelvis organs and in the brain were performed. However, these operations are also divided into two stages and in very rare cases into three stages. In the first stage, the pleural cavity is drained to abolish pneumo- and hemothorax. Then the laparotomy is performed by temporary compression of the bleeding vessels (spleen and kidneys), tamponade of the liver wound, and removing the damaged lumen from the abdominal cavity operations are performed. After these measures, only the skin wound is sewing continuously, and resuscitation measures in parallel with these surgeries continue. If it is possible to stabilize the condition of the patient, within 24-36 hours, the patient will be taken back to the operating table, splenectomy, the repair of the liver wound, and so on. surgeries are performed and the laparotomy wound is completely closed. In the first stage, during damage of the

musculoskeletal system the gypsum ankle and sometimes the external fixation apparatus (EFA) are used. The lungs crush during SJT causes complications of TD. Thus, the lungs crush leads to directly acute respiratory distress syndrome (ARDS), turning into one of the causes of polyiorgan deficiency and can seriously affect the outcome of treatment.

THE ROLE OF THE ACUTE RESPIRATORY-DISTRESS SYNDROME IN THE PATIENTS WHO RECEIVE SEVERE JOINT TRAUMA

For clarifing the development of ARDS among patients with SJT, the effect of this syndrome on the tactics of treatment, whether frequency directly or indirectly leading to, or causing the death of these patients based on the level of development of that process it is important to divide these patients into groups There are three clinical-laboratory variants of ARDS after SJT: compensation variant – slight reduction in oxygenation index (300-250 mm.c.c.); subcompensation variant – the oxygenation index reduces to 250-200; decompensation variant – the oxygenation index less than 200. The compensatory variant is characterized by the development of hyperdynamic type blood circulation, and the subcompensation and decompensation options are accompanied by the development of hypodynamic type blood circulation. The decompensation option is clinically accompanied by respiratory failure and characteristic roentgenogically changes.

While controlling for vital functions among of the main group patients of ARDS of developed compensation option was conducted urgent, emergency, delayed surgery, conservative treatment (plaster, traction of the skeleton) in parallel and no respiratory complications were reported.

Among of the main group of ARDS which subcompensation option developed, to restore vital functions during and after surgery in addition to intensive resuscitation measures, urgent operations were performed on the abdominal organs and in the skull. The sources of intoxication were eliminated in order to minimize the risk factors for the satisfying

of the outcome of these operations, and a less invasive osteosynthesis type was chosen using external fixation apparatus during long-tube bones fracture to facilitate patient care or early activation.

Life-saving surgery is essential in patients with advanced ARDS decompensation options. Long-term correction (at least 24 hours) of vital functions and basic parameters of hemostasis was performed for surgical intervention in the main group of patients. Conduction of the delayed operations in this group of patients are possible only after the patient's overall condition stabilizes.

Table 2

Division of patients to the groups according to severity level of injuries and frequency mof occurrence of ARDS variants

The severe level of the injury	The variants of ARDS	Groups		$\chi 2$; p
		main group	comparison group	
Severe	compensation	6 (16,2%)	9 (29,0%)	$\chi 2$=1,641; p=0,440
	subcompensation	19 (51,4%)	14 (45,2%)	
	decompensation	12 (32,4%)	8 (25,8%)	
Very severe	compensation	11 (12,9%)	2 (11,8%)	$\chi 2$=0,147; p=0,929
	subcompensation	26 (30,6%)	6 (35,3%)	
	decompensation	48 (56,5%)	9 (52,9%)	
Total	compensation	17 (13,9%)	11 (22,9%)	$\chi 2$=3,334; p=0,189
	subcompensation	45 (36,9%)	20 (41,7%)	
	decompensation	60 (49,2%)	17 (35,4%)	

*P – statistical accuracy between indicators of the comparison group and distinction ($p<0,05$)

Table 2 shows that ARDS developed in 122 (14,7%) patients in the main group and 48 patients (23,4%) in the comparison group.17

patients treated in the main group (13.9%) developed compensation of the ARDS, in 45 patients (36.9%) developed subcompensation, and in 60 patients (49.2%) developed decompensation variants. In 11 (22.9%) patients of the comparison group, compensation for ARDS, subcompensation in 20 patients (41.7%) and decompensation in 17 patients (35.4%) developed.

RESULTS AND DISCUSSONS

The severity level of injury in patients with SJT was 243 patients (23,5%) which the severity level was evaluated moderate severe and mean severity score was 17-25 points according to ISS. Among of these patients, 174 patients (21%) were from the main and 69 patients (33,6%) were from the comparison group. The condition of these patients allowed the diagnostic procedures to be fully implemented.

The patients who the severity level of injury was estimated at 26-40 points on the ISS scale, which is in critical condition and 390 (43,1%) of 475 (46%) patients were from the main and 85 (41,5%) were from the comparison group. In these patients, roentgenogical and USM examinations were performed, with dynamic monitoring of vital functions, also CT and MRT tests performed as needed.The patients who the severity level of injury was estimated at 41-50 points on the ISS scale, which is in critical condition and 206 (24,9%) of 249 (24,1%) patients were from the main and 43 (22%) were from the comparison group. The function of resuscitation in these patients is: 1) those functions are relatively stabilized after vital functions are restored; 2) dominant injuries were detected, life-saving stage less invasive surgeries were performed, and parallel diagnostic measures were performed which don't aggravate the patient's condition. The patients who the severity level of injury was estimated at 51-75 points on the ISS scale, which is in critical condition: 1) recovery and continually regulation of vital functions; 2) minimal urgent, life saving operations were performed. More than 75,4% of the patients admitted to the clinic in the agonal and predagonal condition the cause of death wae due to severe skull-brain trauma (Figure 1). The cause of death in other patients was

chest injuries in 7,4% of cases and pelvic injuries in 3,7%. In 11% of cases, there were open polisectoral fractures. So:

- For the correct choice of treatment tactics of carrying out radiation diagnostics and early detection of dominant injuries is one of the prerequisites for improving the patient's.
- The procedures against of hemorrhagic and traumatic shock and resuscitation measures should be started in an ambulance or admission department.
- It is important that the resuscitation measures and against of shock measures continue in the intensive care department and in the operating room, and in parallel with these measures, ray diagnostics examinations should be performed.
- The sequence of aid to the damages should be performed based on the principle of “damage control”.

It is known that there is a direct correlation between of action force of the trauma and action mechanism with the number of damaged anatomical regions and this often determines the severity level of the patient's condition, but this is not always the case, there must be individual approach to each patient, regardless of the number of damaged anatomical regions, first, the level of severity of his injury and condition should be determined and then identify which groups (stable, boundary, unstable, critical groups) the patients belong to. Only then the diagnostic measures carried out according to the principle of “damage control”.

Clinical diagnosis of damage to various organs and systems as a result of joint trauma is often difficult. Thus, the sequence of use of various diagnostic methods after severe trauma and the volume of these examinations depends on the general condition of the patient. Sometimes there is a joint damage of different organs and systems, in which relatively mild injuries are "hidden" in the shadow of severe injuries. Therefore, these patients were divided into 4 groups for radiation diagnostics in patients admitted to the clinic as a result of joint trauma.

The first group - patients with stable condition (moderate severity) who do not need urgent surgery. This group includes those patients who, after X-ray and USM examinations, did not need other

examinations and continued their treatment in the designated departments. This group included 27.1% of the main group of patients (174 patients) and 48% of the comparative group of patients (69 patients).

The second group - patients who are unlikely to recover without resuscitation and therefore transferred directly to the intensive care unit - in this group of patients radiographic examinations (X-ray and USM) were performed in parallel with resuscitation. 38.8% of patients (401 patients) were included in this group. Treatment of 115 (28.7%) of these patients ended in death.

The third group - patients who were transferred directly to the operating room and underwent parallel diagnostic radiological examinations (X-ray and USM) on the operating table. 6.8% of patients (70 patients) were included in this group. 22 of these patients (31.4%) died.

The fourth group - patients brought in predagonal and agonal conditions - could not be examined in any of these patients due to the very short hospital stay (several minutes). 6.4% of patients (66 patients) were included in this group.

The actuality of the JSBT is measured by the serious social and economic damage which inflicted on society. At the same time, joint skull-brain injuries require a specific approach to the organization of medical care due to its clinical features. Among patients receiving SJT, the patients with skull-brain injuries were found 47% of cases. 49% of patients in the main group and 39% of patients in the comparison group had JSBT. Depending on the severity level of the skull injuries, the skull traumas are divided into mild, moderate and severe SBT. According to the CPC, the severity level of SBT is estimated at 3-15 points based on due to the level of disturbances of consciousness, speech, movement and sensory impairments. The light level of SBT was estimated at 13-15 points, moderate-severe level at 9-12 points, and severe level of SBT at 3-8 points.

385 patients (79,2%) from the 486 patients treated in the clinic with JSBT had a common MSS injury. The injuries of the chest were found in 195 (40,1%) patients, abdomen in 163 (33,5%) patients, pelvic injuries in 165 (34%) patients, and spinal

cord in 26 (5,3%) patients. 363 patients (94,2%) from the 385 patients with MSS had fractured of long-tube bones. 306 patients from the 363 patients were main (75,4%) of patients who belong to this group), 57 patients were from the comparison group (71,3%).

The main provisions of the new strategy in the diagnosis of skull - brain injuries are as follows:

- Radiation diagnosis and early detection of dominant injuries is one of the conditions for the patient's recovery in order to choose the right treatment tactics.
- It is important to start hemorrhagic and traumatic shock control and resuscitation measures in an ambulance or reception.
- It is important to continue the resuscitation measures and shock control in the intensive care unit and operating room, and to conduct radiation diagnostic examinations in parallel with these measures.
- Diagnosis of injuries and sequence of care should be based on the principle of "damage control".
- Factors complicating the diagnosis of SJT injuries: severe skull – brain trauma, traumatic and hemorrhagic shock, alcohol intoxication, the very serious patient's condition.
- Leading radiation diagnostic tests are considered X-rays and ultrasound examinations during SJT injuries.
- It is important to start early resuscitation measures in parallel with radiological diagnostic examinations in SJT patients.
- Diagnostic measures for joint MSS injuries in patients receiving SJT can be carried out urgency, without delay. The severity of the injuries of the anatomical areas and the time taken to restore vital functions have great importance for this, i.e the diagnostic measures should not increase the degree of hemorrhagic traumatic shock and aggravate the patient's condition.
- Comparison analysis of treatment and diagnostic measures in patients with developed compensation, subcompensation and decompensation variants of TD was performed for the evaluation of treatment-diagnostic strategies, including multi-stage treat-

ment tactics, based on the application of the "Damage control" system analysis. We used a scale of indications for multi-stage surgical tactics, developed by us, considering the severity of injuries and the severity of the patient's condition to determine the tactics of surgical treatment.

It had an opportunity to perform roentgenological examination in 306 (63%) patients out of 486 patients who receive JSBT, and 227 (46,7%) patients had CT scan. It is also possible to carry out roentgenological examination of the skull in very severe injuries of the other anatomical areas but the information is limited of this method when the skull is damaged.

Thus, diagnostic measures of the skull-brain injuries in patients with SJT were performed in accordance with the requirements of the principle of “damage control”. Although roentgenological examination can be performed for each patient, CT scan is a more sensitive and specific examination method. However, this examination can be performed in the background of stabilization of vital functions.

Table 3 shows that the lethality was 64,9 ± 6,3% in the comparison group of the patients with joint skull-brain trauma (JSBT), whereas in the main group this parameter was 46,4 ± 2,9%, and the difference between groups was statistically correct ($p < 0,05$).

Thorax joint injuries took the third place and were found in 38,8% of patients after MSS and skull trauma due to the frequency of occurrence among anatomic regions.Roentgenological examination techniques have been used extensively as an informative method in the diagnosis of thorax and thoracic organs damage. Proper diagnostic X-ray examination is of great importance for accurate diagnosis.

372 (93%) patients out of 401 (38,8%) patients with chest injuries, were conducted a primary X-ray examination, and 168 (42%) of these patients repeated X-ray examinations if needed. As a result, the pleural cavity of these patients was punctured, and were detected the hemothorax in 62 (15,5%) patients, pneumothorax in 57 (14,2%) patients, and hemopneumothorax in 66 (16,5%) patients.

Table 3

The classification of the patients who has joint damages with skull-brain injury and long-tube bone fractures

Groups		The crushed level of the brain			Total
		LCLB	MSCLB	SCLB	
Main group (n=306)	Total	143	72	91	306
	The recovered patients	119 83,2±3,1%	33 45,8±5,9%	12 13,2±3,5%	164 53,6±2,9%
	The deads	24 16,8±3,1%	39 54,2±5,9%	79 86,8±3,5%	142 46,4±2,9%
Compa-rison group (n=57)	Total	30	11	16	57
	The recovered patients	17 56,7±9,0%	2 18,2±11,6%	1 6,3±6,1%	20 35,1±6,3%
	The deads	13 43,3±9,7%	9 81,8±11,6%	15 93,7±6,1%	37 64,9±6,3%
χ^2; p		χ^2=10.397; p = 0,001	χ^2=1,965; p=0,161	χ^2=0,136 p=0,713	χ^2=6,584 p=0,010

*p – statistical accuracy between indicators of the comparison group and distinction

After X-ray examination, rib fractures were detected in 236 patients (total 258 patients had rib fractures), there are numerous rib fractures in 143 persons (55,4%) among of these patients. Injuries of the lungs and pleura are rare in single rib fractures, but the injuries of lungs and pleura are found in nearly all cases of numerous, especially fragmentary fractures of the ribs. Standard X-ray shows fractures including the 7th rib. Because the fracture of the IX-XII ribs coincides with the intensive shadow of the liver and spleen, a special X-ray examination of these ribs was made with more intense X-rays. 29 (7,2%) patients who the treatment ended with lethality were admitted

to the clinic as agonal situation. Because of this (24 patients belong to the main, 5 patients belong to the comparison group) they had no opportunity to perform any diagnostic procedures. In the other 372 patients (92,8%) at the first examination, 51 patients had subcutaneous emphysema (44 patients belong to the main, 7 patients belong to the comparison group), and 102 patients (89 patients belong to the main, 13 patients belong to the comparison group) had chest deformity and asymmetry. Numerous fractures of the ribs were found in 37% of patients in the main group with the thorax injuries. This parameter was 30,4% in the comparison group.

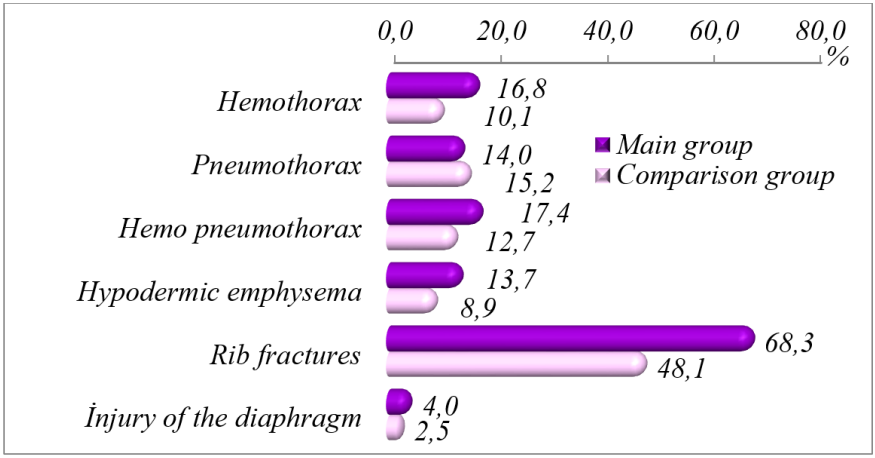


Figure 2. Frequency of the joint chest injuries and the complications by groups

X-ray examination didn't reveal the fractures of the ribs in 22 (4,1%) patients (totally it were 540 x-rays). Early and effective lung injury screening method is a multispiral computer tomographic scan. The sensitivity of this examination is 100%. Then bronchofibroscopy with 79,3% sensitivity and X-ray with 63,7% sensitivity comes. However, it is well known that CT scan and bronchofibroscopy in severe patients is often not possible, and X-ray signs of the pulmonary injuries occur after 24 hours, the lungs crush may remain in the shade on the background of pneumothorax and hemothorax, which are ot-

her clinical signs of chest traumas. In addition to X-ray examination, ultrasound examination, pleural puncture, thoracoscopy, and sometimes bronchoscopy, bronchography, and esophagoscopy were used in the diagnosis of chest damage.

Figure 2 shows that the incidence of chest damage and complications increased among of the main group patients with joint chest injury. Bronchoscopy examination was performed on 34 patients during aspiration of vomiting residues for suspicion of bronch's injury. This method, along with diagnostic information, is also done by thoracobronchial rooting.

Bronchial injury was detected in 5% (16 patients) of the main group patients undergoing bronchoscopy examinations and 5,1% (4 patients) in the comparison group. In 14 persons of these patients, due to formation of the moderate to large hemopneummothorrhasis after the stabilization the respiratory and hemodynamic indicators, in 12 patients undergoing thoracoscopy, the diaphragm was damaged (only 15 patients had diaphragm rupture –13 (4%) in the main group, 2 (2,5%) in the comparison group), and the torned of the bronch in 14 patients was confirmed. The patient's hemodynamic parameters and breathing must be relatively stable to perform this examination. Damage of the diaphragm and bronchial tear, result in hemopnevmotorax which is followed by thoracoscopy to extract collected blood from the pleural cavity. In 3 patients, diaphragmatic damage was revealed during thoracotomy. However, the results of X-ray examinations show that this method is a very important technique for the diagnosis of chest injuries due to its mechanism, sensitivity and specificity.

Thus, regardless of the type of trauma and the variant of surgical tactics, the following treatment-diagnostic algorithm should be followed during the treatment of patients: 1) removal of pain; 2) early and adequate drainage of the pleural cavity; 3) carrying out the measures to ensure the opening of the lungs for adequate participation in the acts of respiration; 4) restoration of airway permeability; 5) restoration of chest tightness; 6) full internal and external decompression of the brain; 7) complete cessation of bleeding and replacement of lost blood; 8) infusion, antimicrobial therapy, immobilization.

Invasive and instrumental examination techniques are widely used for the diagnosis of abdominal injuries in patients with severe shock. In all patients with suspected abdominal injury, USM can detect the amount of fluid in the abdomen and damage to the parenchymatous organs. Ultrasonography can be repeated dynamically several times if the patient's condition requires it. CT scanning is the most effective technique for detecting abdominal and peritoneal damage, but this examination method can be performed promptly and immediately after the removal of injuries that are life-threatening and indicative of urgent support.

The most effective way to detect damage to the urinary system is an X-ray examination. The most informative methods of rupture of the bladder and urethra are cystography and retrograde urethrapyelography. The results of excretory urography in patients with hemodynamic instability in severe shock are unsatisfactory. Therefore, contrast SCT is an invaluable examination for detecting of the damage to the liver, spleen, pancreas, duodenum, kidneys, urinary tract, bile ducts. SCT also is an effective examination method in the diagnosis of purulent complications in the abdomen. Laparoscopic surgeries can negatively affect the functioning of the cardiovascular and respiratory systems. This is because of used carbon dioxide to create pneumoperitoneum can lead to the development of acidosis, a decrease in heart rate and an increase in pulmonary artery pressure, the development of hypothermia and, consequently, coagulopathy or ventricular arrhythmias causes.

However, the Trendelenburg situation reduces the negative impact of pneumoperitoneum on the heart. Laparoscopy is often considered an invaluable diagnostic and treatment tool for the detection of diaphragmatic damage in thoracoabdominal and abdominothoracic injuries. However, it should be borne in mind that endoscopy is an indispensable tool for examination and treatment only in the presence of stable hemodynamic parameters.

It is known that pneumoperitoneum increases the amount of carbon dioxide in the arterial blood, resulting in increased intracranial pressure, especially during skull-brain injury. Therefore, in such cases, laparoscopic intervention is not recommended.

Table 4

Joint abdominal injury by groups

Groups	The recovered patients	The deads	$\chi 2$; p
Main group (n=171)	95 55,6±3,8%	76 44,4±3,8%	$\chi 2$=1,77; p=0,184
Comparison group (n=45)	20 44,4±7,4%	25 55,6±7,4%	
Total (n=216)	115 53,2±3,4%	101 46,8±3,4%	216

*p – statistical accuracy between indicators of the comparison group and distinction.

As can be seen from Table 4, 216 patients with SJT participated in joint abdominal injuries. 171 persons (20,7%) among of these patients were in the main, 45 (22%) were in the comparison group patients. In 182 persons (84,3%) out of 216 patients, the damages of the different anatomical regions were predominant. 65 (30,1%) patients' abdomen, 71 (32,9%) patients' skull, 28 (13%) patients' chest, 5 (2,3%) patients' pelvis, 11 (5,1%) patients' extremity, 2 (0,9%) patients' spinal cord injuries were predominant. Other patients had congruent dominance. Thus, abdomen injuries in 34 (15,7%) patients, skull injuries in 17 (7,9%) patients, chest injuries in 14 (6,5%) patients, and extremity injuries in 8 (3,7%) patients were dominant. Thus, in 30,1% of 216 patients with joint abdominal injuries, the abdominal injury was dominant, and in 15,7% was congruent to the dominant injury.

After SJT the laparocentesis performed in 70 persons (32,4%) out of 216 patients who participate joint with abdomen. The respond was positive only in 23 of them (32,9%). In 169 persons (78,2%) out of 216 patients, laparotomy operation was performed (23 out of them was performed after laparocentesis). 132 persons out of 216 patients (61,1%) had USM screening. Among of them in 82 (62,1%) patients was performed emergency laparotomy, 15 (11,4%) patients had no life-threatening injuries and was performed the resuscitation according

to the principle of "damage control", after stabilization of vital functions, repeated ultrasonography examination was performed and an emergency laparotomy was performed because of increase the amount of free fluid in the abdominal cavity. In 32 patients, the USM examination showed no signs of abdominal injury. After laparocentesis the laparotomy was performed in 12 patients undergoing USM.

In 8 patients (18,2%) had liver-spleen, in 5 patients (11,4%) had liver-gall bladder, in 2 patients (4,5%) had liver-gall bladder-spleen, in 5 patients (11,4%) had liver – small intestine mesentery, in 2 patients (4,5%) had hepatic and urinary bladder, in 7 patients (15,9%) had spleen, in 5 patients (11,4%) had spleen – small intestine mesentery, in 3 patients (6,8%) had spleen – colon mesentery, in 3 patients (6,8%) had kidneys, in 3 patients (6,8%) had urinary bladder torned wounds, in 1 (2,3%) patient had a crashed spleen wound and separation of the umblical cord were detected who underwent of the direct laparotomies (44 patients).

Contrast SCT scan is an indispensable technique for detecting liver, spleen, pancreas, duodenum, kidney, urinary tract, bile duct injuries, and it can also be used effectively for the diagnosis of purulent complications in the abdominal cavity. CT scan was performed in 33 patients with immediate and delayed resolution after elimination of injuries that are life-threatening and requiring urgent help for the detection of abdominal cavity and in the behind of the peritoneal organs injuries, and accuracy was 100%.

As it seems, the frequency of the abdominal injuries among patients in the main group has increased. The severity level of the injuries in 41 patients (24%) was evaluated moderate to severe injury, in 48 patients (28,1%) severe, in 53 patients (31%) very severe, and in 29 patients (16,9%) critical among of 171 patients from the main group. In the comparison group (45 patients), the severity level of the injuries was evaluated in 12 patients (26,7%) imoderately severe, in 19 patients (42,2%) severe, in 10 patients (22,2%) severe, and in 4 patients (8,9 %) critically. Despite of the increasing of the severity level of the injury among the main group patients, the lethality fell from 55,6±7,4% among the patients in the comparison group to 44,4±3,8% in the main group (Table 4). Among patients receiving

SJT, MSS injuries are in the first place according to the frequency. In 85,4% patients (711 patients) out of 833 (80,6%) patients with MSS injuries, had long-tube bone fractures. 661 patients (79,8%) were in the main, 172 patients (83.9%) were in the comparison group among of these patients. Patients with long tube bones fractured was open in 182 and PSF at 274.

Table 5

The frequency of MSS injuries by groups

Groups	The recovered patients	The deads	$\chi 2$; p
Main group (n=661)	535 80,9±1,5%	126 19,1±1,5%	$\chi 2$=4,22; p=0,040
Comparison group (n=172)	127 73,8±3,4%	45 26,2±3,4%	
Total (n=833)	662 79,5±1,4%	171 20,5±1,4%	833

*p – statistical accuracy between indicators of the comparison group and distinction

As shown in Table 5, lethality has decreased in the main group patients with joint MSS, and the difference between groups is statistically correct ($p<0,05$). All patients underwent X-ray examination, also CT and MRT examinations was performed during in complex cases of pelvic traumas. The highest frequency was shin bone (37,7%), femur bone (29,1%), forearm (17,4%) and humerus (15,8%) bone fractures were found, it was required special treatment for these fractures in patients with joint traumas.

Open fractures of the long tube bones were found in 18% of patients in both groups. Among of 274 patients with polysegmented fractures, in 22 patients (8,03%) the upper extremity bones fractures, in 99 (36,1%) patients only the lower extremity bones fractures, and in 153 patients (55,8%) mixed fractures were found. In 225 (82,1%)

patients 2 segments, in 45 (16.4%) patients 3, in 4 (1,5%) patients 4 segments were fractured. Among the 274 patients 45 patients (16,4%) had open fractures. Among of 45 open fractures, 6,7% (3 patients) was humerus bones, 11,1% (5 patients) was forearm bones, 20% (9 patients) was femur bones and 62,2% (28 patients) was shin bones fractures.

THE DETERMINATION OF THE INSTRUCTIONS TO THE MULTISTAGE TACTICS

Depending on the development variants of the TD, the examination and treatment of patients continued in specialized departments, intensive care units – in the department of the care against of shock, and some patients in the operating room. 21% of patients from the main group and 33,7% of patients from the comparison group were admitted to the traumatology department and general surgery department, and in these patients it has developed compensation version of the TD, while in some patients has developed subcompensation version.

16,1% (133 patients) of the main group, and 14,1% (29 patients) of the comparison group patients were given direct to the operation block. In most of these patients, TD decompensation version has developed, and in some of them developed subcompensation version. 58 (11,1%) of the main group patients who referred directly to the intensive care unit were admitted in agonal condition, 463 patients had developed compensation and decompensated variants of TD (total 62,9%). 52,2% patients of the comparison group were admitted directly to the intensive care unit. Eight of these patients (7,5%) were in an agonal state, while other patients (99 patients) developed a subcompensation and decompensation variant of the TD.

The multistage surgical tactical scale index (MST – SI) was measured using Table 6 and the surgical treatment tactics were identified. Thus, 189 patients (24,5%), who belong to the main group and had a TD compensation option, were admitted to the department and received general treatment.

Table 6

Determination scale of the indications for the processing of multistage surgical tactics

№	Injuries or complications	Importance	Score
1	When entered, the arterial pressure is less than 70 mm. m.c.	no yes	0 1
2	Pressed fractures and intra skull injuries requiring urgent trepanathia	no yes	0 3
3	Injury which requiring chest thoracotomy, traumatic amputations of the extremities, damage of the great arteries, polysegmented open fractures with the presence of lower extremities	no yes	0 3
4	Free blood volume in chest and abdominal cavity at start of operation, ml	upto 1000 1000-2000 > 2000	0 2 4
5	Large volume hematoma in the behind of peritoneum or intra pelvis	no yes	0 3
6	Availability of bleeding sources that can cause problems	no yes	0 2
7	Damage of the large blood vessels of the abdomen and the pelvis	no yes	0 3
8	3 or more organs injuries in the abdomen and pelvis or 2 organs injuries requiring complex surgical treatment	no yes	0 2
9	Toxic phase of disseminated peritonitis	no yes	0 2
10	Unstable hemodynamics requiring medication regulation during surgery	no yes	0 6

Comparative analysis of treatment and diagnostic measures was conducted in patients whose developed compensation, subcompensation and decompensation version of TD, for evaluation of therapeutic and diagnostic strategies, including multistage treatment tactics based on the use of “damage control” system. To determine surgical

treatment tactics, we used modified determination scale to the formed multistage surgical tactics considering the severity level of injuries and the severity of the patient's condition.

In 58 patients (29,4%) of the comparison group with a compensation variant of TD were treated generally and no death was reported. The severity level of injuries were evaluated in 14 (3,4%) patients of the 408 patients with subcompensation variant of TD moderate severe (according to ISS scale), in 294 (72,1%) patients severe, and 100 (24,5%) patients very severe. In 16 (18%) patients of the 89 patients from the comparison group with subcompensation variant of TD, the severity level of injury was evaluated moderate severe, in 60 (67,4%) patients severe, and in 13 (14,6%) patients very severe. In 67 (38,7%) patients of the 173 patients from the main group with decompensation variant of TD, the severity level of injury was evaluated severe and in 106 (61,3%) patients very severe. 20 (40%) patients of the 50 patients from the comparison group with decompensation variant of TD, the severity level of injury was evaluated severe and 30 (60%) patients very severe. If the severity level of injury and condition is estimated at 2-7 points according to the MST – SI, this is consistent to the I variant of TD – to the compensation option, without the need for the use of MST tactics. In 247 patients out of 1033 patients receiving SJT, compensation variant of TD developed, where the severity level of injury in these patients was estimated at 17-25 points on the ICS scale.

For all patients under MST tactics based on the "damage control" system, the parameters of the effectiveness of the intensive care are the same for repeat surgical intervention after the first surgical intervention: A/T more than 100 mm.m.c., heart beats up to 90 per minute, SaO_2 more than 97%, $PaCO_2$ less than 40 mm.m.c. milk, pH more than 7,35, Ht more than 0,20 l / l, prothrombin index more than 50%, normal or excess volume of the blood (heart rate) during heart contractions, diuresis more than 0,5 ml/kg/h, normothermia, Ca^{+2} and lactic acid levels in blood plasma within the norm.

During MST the anesthesiological and intensive care to the patients who receive SJT is particular important, and in this case «damage control resuscitation» term is used. The key factors in

the choise of the patients for the implementation of MST tactics are traditionally based on the severity level of the injuries and the severity level of the condition, as well as taking into account the planned volume and trauma of the first operation, also severe acidity (pH less than 7,3), hypothermia (less than 35°C), and the prognosis of hemotransfusion, which is over 3000 ml, and according to GKS, the forecast of SBT should also be taken into account.

It is no need of MST tactics in patients who have developed compensation variant, in these patients the parameters (pH, body temperature, volume of planned hemotransfusion) which is necessary for the MST did not exceed the limit of the norm. When the patients in this group were admitted to the clinic, the pH ranged 7,39-7,49, the body temperature ranged 36°C-37,2°C and hemotransfusion occurred up to 580 ml.

In 65% of patients from the I group, total bleeding did not exceed 1500 ml and these patients did not have heterotransfusion during emergency and urgent surgeries.

Delayed surgical operations (EFA insertion in long bones) were performed in 16 patients, in this operations within 6-72 hours (relative stabilization period of traumatic disease – 12-48 hours and stabilization or recovery of vital functions), the level of lactic acid in all patients doesn't exceed the level of the norm (2,44 mmol/l), Ht was – more than 0,20 l/l. Consequently, the specifics of treatment tactics in patients with compensation variant of TD are:

– no need MST.
– delayed operations can be performed at any time after the relative stabilization of vital functions.
– anesthesiologic and reanimatological care is conducted in minimum and the body temperature, pH, lactic acid and the amount of Ht does not have a significant effect on treatment tactics.

If the severity level of injuries and condition of the patient's are estimated to be greater than 13 points according to the multistage surgical tactic scale index, MST tactics should be selected with the help of specific anesthetic and intensive care (“damage control resuscitation”) in these patients. In the II variant of TD – in the subcom-

pensation variant used MST tactics in patients who MST-SI score was estimated more than 13 points.

There was no significant change in the auxiliary parameters that provided the basis of choosing of MST by shortening the first operation, as the pH was less than 7,3 only in one patient. Hypothermia less than 35°C has never been reported in any patient, but in patients who the volume of planned hemotransfusion were more than 3000 ml MSTT SI was more than 13 points in all patients. Immediate and urgent surgical interventions within the first hours after the patient's admission to the clinic in the range of MST were performed with EFA fixation of the fractures of the long-tube bones and pelvic bones (15 patients), and these operations were performed by shortening the duration of laparotomy, stopping of the abdominal bleeding, purification of the secretion of intra-abdominal organs, and elimination (2 patients). Repeat surgical interventions in the abdominal cavity organs during the MST are performed after the 24 hours when the patient is admitted to the clinic, ie during the second cycle of TD, as the relative stabilization of vital functions in the subcompensation variant occurs over this period. Similarly, the absence of subcompensation in other life-support systems in this group of patients of the second period of TD may delay the conditions necessary for the subsequent reliable fixation of fractures in long-tube bones and pelvic bones, and as a result, it becomes possible only on the 14th to 17th day of traumatic disease. So, the main features of the treatment tactics of the traumatic disease in the subcompensation phase are:

– During the implementation of MST tactics, the character of the surgical procedure should be taken into account, with the severity level of the patient's overall condition abd objective factors for recurrent surgical intervention or delayed operations.
– The quality of the “Damage control resuscitation” treatment tactics, – respirator regulation (STA-intubation), measured by the overall quality of measures such as energyplastic support and anesthesia.

In III variant of TD – in decompensation variant MST-SI evaluated at around 18 points. MST was performed in 42 patients (41.6%) in the III variant of TD. In these patients, the parameters as the body temperature was 35°C and hemotransfusion volume in the previous group – were not corroborated, so the body temperature in these patients was

higher than 35°C, the index of hemotransfusion was similar to those parameters in the previous group. At the same time, 34 patients (19,6%) had a pH less than 7,3. During this time, the 5 patients had a pH less than 7,3 and the multistage surgical tactical scale index varied between 11 and 13 points. In one of these patients, death occurred during an urgent laparotomy. Immediate and urgent structure in the implementation of MST tactics was to stabilize with EFA in the long tube bones and pelvic bones in 36 patients (20,8%), while 56 patients (32,4%) had minimal volume laparotomy for continued bleeding. In the case of TD with a decompensation variant, in the first phase of TD is clinically the most likely phase of complications started without any significant progression, which is a long process. Therefore, the choosing of the time of the recurrent surgical interventions and delayed surgical interventions (traditional surgical tactics) have its specificity in this group of patients during MST tactics. The duration of recurrent laparotomy has been selected after achieving subcompensation in the external respiratory system, hemodynamics, and blood systems. The maximum delay of the recurrent laparotomy did not exceed more than 36 hours. The duration of the conduction of delayed traumatic surgeries in patients who weren't chosen MST tactics was also chosen accordingly to this.

Thus, the optimal time for repeated delayed operations during the MST tactics and the guidelines for the development of this tactic have been determined:

– There is no need for MST tactics in patients who have developed a compensatory variant of TD;
– In the TD compensation variant, compensation between the main life support systems can be achieved on the 2nd day of the trauma, and delayed operations can be performed at any later time, regardless of the subsequent formal transitions of the TD.
– Objective criteria for repeated surgical intervention or delayed operations in the implementation of MST tactics in patients with subcompensated and decompensated variants of TD, as well as the severity of the patient's general condition, the nature of the operation to be performed must considered.

– 6-24 hours is the optimal time for repeated laparotomy and delayed surgical interventions during MST tactics in patients with developed subcompensation variant of TD. Repeated surgical treatment at MSS may be performed after compensation has been achieved in the external respiratory system, hemodynamics, and circulatory system. Replacement of EFA with a more reliable type of osteosynthesis should not be performed earlier than 7-10 days after trauma.
– In the decompensation variant of TD, repeated laparotomy and delayed operations can be performed only up to 36 hours after achieving subcompensation in the external respiratory system, hemodynamics and blood system. . We have come to the conclusion that, after a long period of instability and septic complications, the last reliable osteosynthesis, as the third stage of MST tactics, cannot be performed earlier than the 15th day of TD. – In patients with multiple segmental fractures after SJT, short-term life-saving surgeries should be performed on the thoracic, abdominal, skull, spine, and pelvis. – In case of II-III degree open fractures of long tubular bones, the primary surgical treatment of the wound should be completed with osteosynthesis of the fracture with external fixation apparatus. Once the wound has healed, a more reliable and adequate type of osteosynthesis can be selected by removing the external fixation device. – Osteosynthesis of closed fractures should be performed between 3 and 14 days as delayed operations. – Osteosynthesis performed during multiple segment fractures should be able to withstand the weight of the body and the patient should be able to move freely 1-2 days after surgery. Treatment and rehabilitation of these patients should be carried out under the supervision of one medical institution.

As shown in Table 7, the lethality ratio during joint injuries with long-tube bones of the different anatomic regions among of the main group patients (30,2±1,8%) was significantly reduced compared to the comparison group (45,9±4,1%) and the difference between them is statistically correct ($p<0,001$).

Table 7

The ratio of the improvement and lethality of the different anatomic regions joint injuries with long tube bones in patients who received SJT

The name of group or anatomical regions		The names of segments								Total	
		Femur bones		Shin bones		Humerus bones		Forearm bones			
		total	Deads	Total	Deads	total	Deads	Total	deads	total	deads
SBT	Main group	98	35 35,7±4,8%	132	52 39,4±4,3%	27	6 22,2±8,0%	9	1 11,1±10,5%	266	94 35,3±2,9%
	Comparison group	16	10 62,5+12,1%	21	9 42,9+10,8%	11	6 54,5+15,0%	9	4 44,4+16,6%	57	29 50,9+6,6%
χ2; p		χ2=4,130; p =0,042		χ2=0,091; p =0,763		χ2=3,779; p =0,052		χ2=1,108; p =0,293		χ2=4,807; p =0,028	
Chest	Main group	71	19 26,8+5,3%	83	25 30,1+5,0%	31	5 16,1=6,6%	38	8 21,1=6,6%	223	57 25,6+2,9%
	Comparison group	15	5 33,3±12,2%	19	9 47,4±11,5%	9	5 55,6±16,6%	8	2 25,0±15,3%	51	21 41,2±6,9%
χ2; p		χ2=0,266; p =0,606		χ2=2,070; p =0,150		χ2=5,783; p =0,016		χ2=0,051; p =0,822		χ2=4,971; p =0,026	
Abdomen	Main group	71	22 31,0±5,5%	43	10 23,3±6,4%	24	7 29,2±9,3%	13	3 23,1±11,7%	151	42 27,8±3,6%
	Comparison group	16	7 43,8+12,4%	9	4 44,4+16,6%	7	3 42,9+18,7%	6	3 50,0+20,4%	38	17 44,7+8,1%
χ2; p		χ2=0,957; p =0,328		χ2=1,698; p =0,193		χ2=0,049; p =0,824		χ2=0,413; p =0,520		χ2=4,049; p =0,044	
Total	Main group	240	76 31,7+3,0%	258	87 33,7+2,9%	82	18 22,0=4,6%	60	12 20,0=5,2%	640	193 30,2+1,8%
	Comparison group	47	22 46,8±7,3%	49	22 44,9±7,1%	27	14 51,9±9,6%	23	9 39,1±10,2%	146	67 45,9±4,1%
χ2; p		χ2=4,007; p =0,045		χ2=2,247; p =0,134		χ2=8,756; p =0,003		χ2=3,220; p =0,073		χ2=13,295; p<0,001	

*P – Statistical accuracy between indicators of the comparison group and distinction

The duration of repeated operations in the MSS was the same as for patients with subcompensation variants during the MST. These operations were performed on a delayed form, ie on the 19th and 20th days compared to the previous group. Consequently, in the decompensation variant of TD has the following treatment tactics:

– The conditions required for the repeated surgical intervention during the MST tactics are the same as in the subcompensation variant;
– Guidance on MST tactics is possible to expanded the indication for surgery if the pH is less than 7,3 when the index of MSTT is 11-13 points.

Over the past five years, as a result of the using of selected treatment tactics after SJT, it has been possible to reduce lethality by 18,8% among patients who have developed subcompensation and decompensation variants of TD. Among of the main life support systems in the compensation variant of TD can be achieved to the compensation in the second day of trauma, regardless of the next formal transitions of TD, and delayed operations can be performed at any later date.

In the subcompensation version, during MSTT the optimum time for recurrent laparotomy and delayed surgical interventions is 12–48 hours. Repeated surgical treatment in MSS may be possible after achieving compensation in the external respiratory system, hemodynamics, and blood system. Replacing of the EFA with a more reliable osteosynthesis type is not recommended to be administered 7-10 days after trauma. In Figure 3 and Figure 4, the construction of a liver wound within MSTT, minimally invasive osteosynthesis of the left femur bone and of the left shin bone was performed in a patient with a joint trauma to the skull, abdomen, and limbs. Repeat laparotomy and delayed operations in the decompensation variant of TD can only be performed for up to 36 hours after achieving subcompensation in the external respiratory aparatus, hemodynamics, and blood systems.

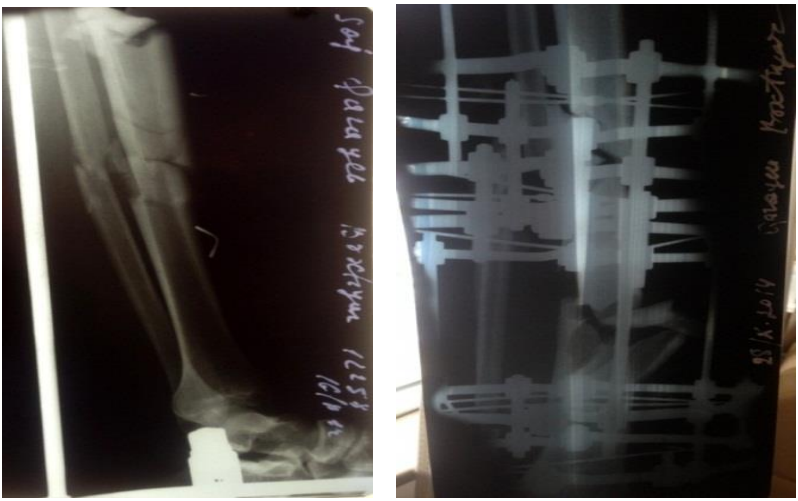
We have concluded that, after long-term instability and septic complications, the last reliable osteosynthesis, as the third stage of

MST tactics, cannot be performed earlier than the 15th day of TD. Thus, the optimal time for repeated delay operations during MST tactics and guidelines for the development of this tactic have been determined. The use of this surgical tactic provides a reduction in lethality when the index is between 11-13 points and the pH is less than 7.3 according to the scale of indications for MST tactics. The compensatory variant of TD of the main group of patients did not differ significantly from the comparative group (multi-stage surgical tactics scale index between 2-7 points), ie traditional treatment tactics were used and no deaths were reported in both groups.

Before operation **After operation**

Figure 3. The fracture of the femur bone

The index of multistage surgical tactics scale in the main group of patients which developed a subcompensatory variant of TD was rated between 11-16 points, and MST tactics were used in this group of patients. As a result, the lethality decreased from 42,2% among of the comparative group patients receiving traditional surgical treatment which developed the subcompensation variant of TD and to 22,9% among patients in the main group. The last reliable osteosynthesis operations in long tubular bones were performed after 11-14 days.



Before operation **After operation**

Figure 4. The fracture of the shin bone

Table 8

The evaluation of the effectiveness of treatment tactics based on the "damage control" principle proposed by us

The type of operation (The acute period of TX)	The quantity of operation		RC (95% AI)
	Main group	Comparison group	
The amount of decompression surgery in the skull-brain trauma	14 / 21 66,7±10,3 %	3 / 24 12,5±6,8%	ŞN = 14,00 * (3,09 – 63,51)
Recurred sanitation thoracic surgeries	11 / 298 3,7±1,1%	16 / 74 21,6±4,8%	ŞN = 0,14 * (0,06 – 0,31)
Quantity of stabilizing operations in the extremities	187 / 328 57,0±2,7%	3 / 16 18,8±9,8%	ŞN = 5,75 * (1,61 – 20,55)
Quantity of stabilizing operations in the abdomen	41 / 171 24,0±3,3%	2 / 45 4,4±3,1%	ŞN = 6,78 * (1,57 – 29,21)

Note: RC – The ratio of chances; 95% AI – 95% accuracy interval (upper border – lower border); * – Statistical accuracy between indicators of the comparison group and distinction ($p < 0,05$)

As can be seen from Table 8, indications for surgical interventions have been expanded by selecting MST tactics among the main group of patients. As a result, the number of decompression, stabilization operations in the abdomen, pelvis and extremities performed during the joint skull-brain trauma of the main group of patients was significantly increased, the number of thoracic rehabilitation operations was reduced. As a result, mortality decreased among the main group of patients.

Table 7 shows the level of lethality during dominant and during congruent lesions of dominance of different anatomical regions. It is clear that the lethality among the main group patients who receive JSBT decreased from 50,9±6,6% – to 35,3±2,9%-in the comparison group. This parameter was 27,8±3,6% versus 44,7±8,1% for joint abdominal injuries, and 25,6±2,9% versus 41,2±6,9% for chest injuries, and these indicators were statistically accuracy ($p<0,001$) with high reliability.

We conducted a comparative analysis among patients who underwent JST and had surgery in those with fractured bones to confirm the benefits of less invasive osteosynthesis. Early and delayed complications such as postoperative wound infection, fever, thrombophlebitis, flebotrombosis, fat embolism, thromboembolism, etc. were analyzed. Mixed clinical complications were not considered for accurate analysis of patients undergoing osteosynthesis. Thus, the comparative analysis of normal osteosynthesis in the comparison group patients with the severity level of injury and less invasive osteosynthesis in the main group is presented in Table 9.

As shown in Table 9, in 48,5±6,1% of patients in the comparison group who conducted simple osteosynthesis (extracortical), these complications encountered, while in the main group of patients with less invasive osteosynthesis these complications were only 17,6±3,7%. Frequency of complications of the injuries of the anotomical regions in patients who may examined for evaluation of the far results – the first place belongs to musculosceletal system; the second place belongs to the skull-brain trauma; the third place belongs to – abdomen; the fourth place belongs to the chest injuries.

Table 9

Comparative analysis of complications occurring after simple and less invasive osteosynthesis

Complications		Extracortical osteosynthesis (comparison group) (n=68)	Less invasive osteosynthesis (main group) (n=108)	$\chi 2$;p
Early period complications	suppuration of the surgical wound	3 4,4±2,5%	2 1,9±1,3%	$\chi 2$=0,280; p=0,597
	paresis of the branch of the fibular nerve	4 5,9±2,9%	2 1,9±1,3%	$\chi 2$=1,016; p=0,313
	the formed oedema after the operation	5 7,4±3,2%	3 2,8±1,6%	$\chi 2$=1,097; p=0,295
	Total	12 17,6±4,6%	7 6,5±2,4	$\chi 2$=5,402; p=0,020
Delayed complications	weak consolidation of the fracture	5 7,4±3,2%	3 2,8±1,6%	$\chi 2$=1,097; p=0,295
	the contracture of the neighboring joints	10 14,7±4,3%	5 4,6±2,0%	$\chi 2$=5,434; p=0,020
	hypotrophy of surrounding soft tissues	4 5,9±2,9%	4 3,7±1,8%	$\chi 2$=0,456 p=0,499
	the shortness of the extremity	2 2,9±2,0%	–	$\chi 2$=1,128; p=0,288
	Total	21 30,9±5,6%	12 11,1±3,0%	$\chi 2$=10,707; p=0,001
Total		33 48,5±6,1%	19 17,6±3,7%%	$\chi 2$=19,185; p < 0,001

*P – statistical accuracy between indicators of the comparison group and distinction.

Figure 5 shows that in 42,1% patients in the main group who received skull-brain injury and were unable to be examined have been revealed the rest symptoms of trauma, this rate was 63,6% in the comparison group, in the main group who received chest injuries the rest symptoms have been revealed in 20,3% patients, while in the comparison group was 38,7%, in the main group who received abdomen injuries the rest symptoms have been revealed in 38,2% patients, while in the comparison group was 56,3%, in the main group who received musculosceletal system injuries the rest symptoms have been revealed in 48,1% patients, while in the comparison group was 70 %, The effect of these rest symptoms on the quality of life is different, some of the effects are insignificant, while some of them are very serious.

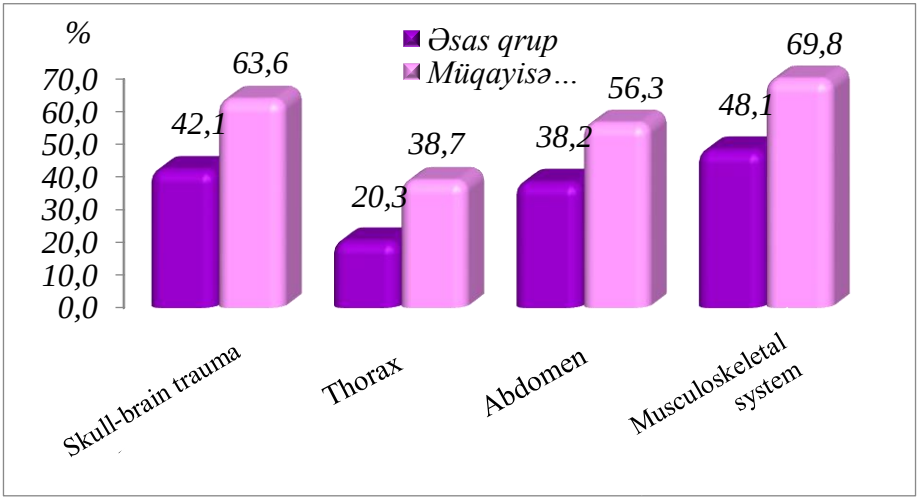


Fig. 5. The frequency of rest symptoms of damages of the arious anatomical areas that can affect quality of life after treatment

Table 10 provides information about the criteria used to evaluate the outcomes of MSS treatment. The results of osteosynthesis of long tube bones were evaluated using Table 10. The results of standard open osteosynthesis in the comparison group and the results of the

less invasive osteosynthesis methods in the main group were given among of the patients who have the same severity level of injuries and development variant of TD for the correct assesment of the fractures treatment outcomes.

Significant improvement was achieved in patients undergoing traditional open osteosynthesis among the comparison group patients and those who underwent surgical treatment with the preferred less invasive osteosynthesis method. This ultimately contributes to the reduction of disability and prevents the decline in quality of life.

Table 10

Assessment of the surgical treatment results

Criterias	Result		
	Good	Satisfactory	Unsatisfactory
The disproportion between the length of the extremities (cm)	1	2	>2
Displacement at an angle (degree)	<5	5-10	>10
Pain	no	no	yes
Complication	no	few	complications and the proceeding of the diseases

Of the 662 patients with co-occurring MSS who were discharged after treatment, 38.7% (256 patients) had complications that could result in disability. Complications were 63.5% (80 patients) in this group of patients, compared with 32.9% (176 patients) in the main group. At the same time, the incidence of complications in some anatomical areas within the group with complications is higher than in the main group of patients compared to the comparison group, zamanı we have encountered such a picture in dominant traumatic brain and dominant abdominal trauma. We explain this by a significant reduction in lethality among patients with severe injuries, i.e., patients at risk of death, compared with the comparative group of

the main group of patients, as some of these patients have potential disabilities. are included in the ranks of patients.

Table 11

Functional consequences of the fractures treatment

Results	Groups		$\chi 2$; p
	Main group (n=29)	Comparison group (n=28)	
Good	22 75,9±7,9%	6 21,4±7,8%	$\chi 2$=17,248; p=0,0002
Satisfactory	6 20,7±7,5%	16 57,1±9,4%	
Unsatisfactory	1 3,4±3,4%	6 21,4±7,8%	

*P – statistical accuracy between indicators of the comparison group and distinction.

Table 11 shows that patients in the main group whose the outcome of the fracture treatment was estimated unsatisfactory were reduced 18% than the patients in the comparison group. After SJT, in the treatment of long-tube bone fractures are found such compilcations as improperly adjacent fractures, false joints, osteomyelitis.

At the same time, although high levels of traumatic care are provided because of the general condition of the patients was very severe, it is not possible to avoid disability in the end. However, in some cases, due to the osteosynthesis type is not selected according to the nature of the fracture in intrajoint and surrounding joint fractures; due to inadequate selection of metal constructions selected for osteosynthesis during diaphyseal fractures, the far outcomes of the treatment ended disability.

In patients receiving SJT, the analysis of the frequency and structure of the complications and subsequent lethality, such indicators as the number of beds days, economic costs, changes of the dynamics in laboratory parameters, duration of temporary loss of ability doesn't allow to

full adequat evaluate of the effectiveness of the modern treatment in these patients. In this regard, the study of quality of life in addition to the far outcomes of treatment may determine the superiority of this or other treatment method and is the final step in evaluating the effectiveness of treatment based on the principle of “damage control”. Therefore, in our research, we have set the task to investigate this problem as well. During the solution ways of this task and their discussion, we assessed the quality of life in these patients over a far period (follow-up period was from 1 to 5 years) using the MOS SF-36 (Medical Outcomes Study 36-item Short Form Health Survey) questionnaire.

The analysis shows that an early and complex approach to the treatment of patients based on the principle of "damage control" can improve their quality of life. The quality of life is considerably higher in patients with treatment tactics based on less invasive therapeutic-diagnostic measures and multistage surgical tactics scale.

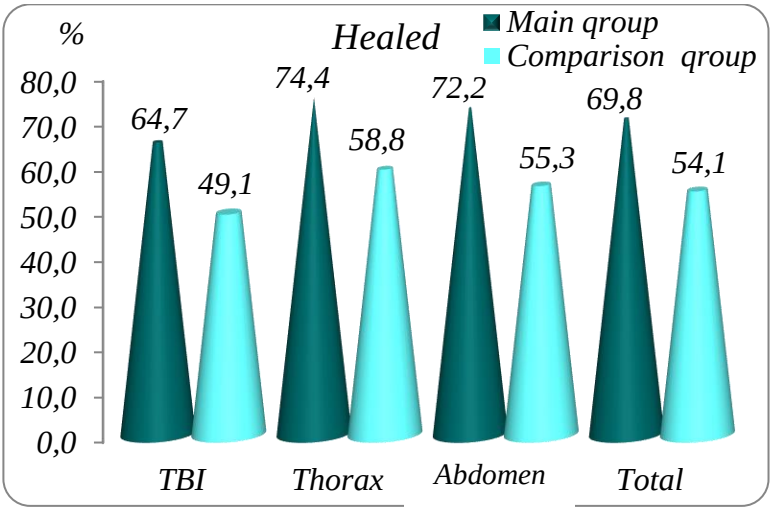


Figure 6. Ratio of improvement in groups of joint injuries of various anatomical areas associated with long tubular bones

As can be seen from Figure 6, improvement increased among the main group of patients (69,8% – 54,1%).

Among patients with MSS injuries, including fractures of the long tubular bones, lethality was reduced by 15,7% in the main group compared to the comparison group.

Thus, using the new treatment diagnostic algorithm, it was possible to reduce the lethality 15,6% among main group patients with SJT and with brain injury, dominance or competition for dominance, 15,6% among main group patients with thoracic injury, and 16,9% among main group patients with abdominal injuries than comparative qroup patients.

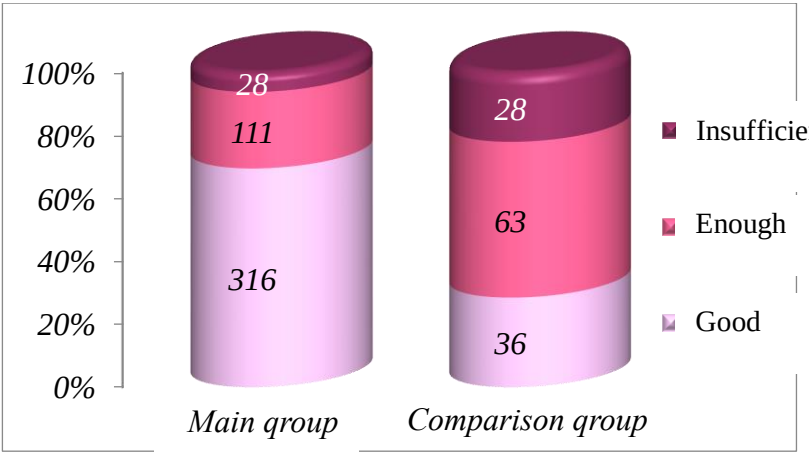


Figure 7. Evaluation of far results in patients treated on the basis of traditional method and "damage control" principle

As can be seen from Figure 7, in 6,2% of the main group patients and in 22% of the comparison group patients treated by our improved "damage control" principle and multi-stage surgical treatment tactics, the results of treatment were evaluated insufficient. The difference between the corresponding indicators of both groups is statistically accurately for all categories ($p < 0,05$), except for the role activity based on physical activity of the physical component of health ($p > 0,05$). As for the psychological component of health, the difference between the categories of mental health and social activity is incorrect ($p > 0,05$), and in other cases is correct ($p < 0,05$).

RESULTS

1. Injuries on anatomical areas after SJT: musculoskeletal system – 80,6%, skull – 47,0%, thorax – 38,8%, abdomen – 20,9%, pelvis – 19,7%, spine – 8,9% of cases. In patients treated on the basis of multi-stage surgical tactics, skull –brain trauma was dominant in 35,7%, abdominal injuries in 42,6%, and thoracic injuries in 18%. The severity of injuries on the basis of AIS and ISS scales was moderately severe – 23,5%, severe – 46,0%, very severe – 24,1%, those in agonal condition – 6.4%.
2. The timing of patient delivery to the clinic is one of the risk factors that seriously affects the mortality rate. There is a correlation between the time of delivery to the clinic and the mortality rate of patients who received SJT and the degree of damage was assessed as very severe on the ISS scale (delivery time is directly proportional to the mortality rate, inversely proportional to the probability of survival).
3. As a result of the shortening of the procedure of the duration of the preoperative preparation phase and operation of the first emergency surgery performed in the early hours of the injury using the "Damage control" tactic, it was possible to significantly reduce the postoperative lethality by 18%.
4. Due to the application of “Damage Control”, decompression operations were performed by 54,2% more, lethality was reduced by 15,6% among the main group of patients receiving JSBT, the rehabilitation operations were performed by 17,9% less among the patients with joint chest injuries and lethality was reduced by 15,6%, stabilization operations were performed 19,6% more among patients with joint abdominal trauma and lethality decreased by 16,9%, stabilization operations were performed 18,1% more among patients with pelvic injuries and lethality decreased by 5,2%.
5. Lethality was reduced by 18,5% using the improved “Damage control” tactic in the main group of patients with joint skull brain injury and fractures of the long tubular bones than comparative group of patients, and and the difference is statistically accurate ($p = 0,010$).

6. Surgical intervention in fractures of the pelvic unstable and long tubular bones of the extremities during joint injuries in the early period (within the first 12 hours of the injury, no expected or unexpected complications occurred.) minimally invasive osteosynthesis including preference for external fixation devices, and multi-stage surgical treatment tactics should be preferred. In 48,5 ±6,1% of patients in the comparative group undergoing normal osteosynthesis (extracortical) were found some complications, while such complications were only 17,6±3,7% in the main group of patients underwent minimally invasive osteosynthesis.
7. MSS traumas often do not determine the severity of the injury, but delays in osteosynthesis of long tubular bone fractures can seriously affect the outcome of operations in other anatomical areas, leading to increased complications and, consequently, lethality. Insufficient results of operations on the organs of the cavities (wound infection, indication for relaparotomy, etc.) led to delays in planned operations in the lower extremities, resulting in a 2,8% increase in lethality.
8. The incidence of ARDS in the main and comparative groups was studied, a comparative analysis of different treatments was performed, and a new treatment-diagnostic algorithm was developed. As a result of these measures, re-sanitizing thoracic operations decreased from 21,6% in the comparison group to 3,7% in the main group, and the lethality from 33,7% in the comparison group to 21,2% in the main group.
9. In the long period, from 1 to 5 years, a comparative analysis of the main and comparative group of patients showed that the new treatment-diagnostic measures applied to the main group of patients significantly reduced the number of many complications (30,6%).

PRACTICAL RECOMMENDATIONS

1. In order to reduce the mortality rate and complications during severe joint trauma, the "damage control" system should be widely used at all stages: "damage control surgery" (DCS) in organs with cavities, "damage control orthopedics" (DCO) in

the musculoskeletal system, anesthesiological-intensive care "damage control resuscitation" – DCR and so on.

2. The occurrence of ARDS from the first minutes of SJT is 42%. Therefore, all patients with SJT should undergo capnography as soon as possible with oxygenation and appropriate prophylaxis. It is important to perform the primary prophylaxis of ARDS, the conduction of the prophylaxis of the alveolar and intestinal oedema for patients who receive SJT. Artificial respiratory apparatus and the conduction of the anticytokine treatment is compulsory.
3. Minimally invasive surgeries and early neurosurgical care are needed to prevent skull-brain trauma and intraabdomen trauma in patients with SJT.
4. Laparothoracoscopy should be performed for detecting diaphragm damage during joint trauma of the chest and abdominal cavity organs.
5. The sequence of operations was determined in different combinations of multiple segment fractures, as osteosynthesis in fractures of the lower extremities and pelvis conducted from the peripheral segment, while in the upper extremities on the contrary, it is started from the central (proximal) segment. Fractures in segments of one area must be fully osteosynthesized on the same day of surgery. Osteosynthesis of simple fractures should be initiated first. Fractures of long tubular bones must be osteosynthesized, regardless of whether they are displaced or not. When fractures occur simultaneously in the upper and lower extremities, osteosynthesis of the lower extremities is performed first. In the case of multiple segmental fractures, a type of osteosynthesis should be selected that does not aggravate the patient's condition and allows to perform early of the musculoskeletal function of the extremity.
6. It is recommended to perform recovery operations at SJT during hospitalization.
7. To reduce disability and lethality, there should be a multidisciplinary approach to the therapeutic and diagnostic algorithm.

List of published scientific works on the theme of dissertation

1. Ağır müştərək travmalar və respirator-distress sindrom (Ədəbiyyat icmalı) / Azərbaycan Ortopediya və travmatologiya jurnalı, Bakı – 2012 iyul-dekabr, № 2, s. 52-62 (həmmüəl.: Verdiyev V.Q., Qasımov N.A.).
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3. Politravmalar zamanı döş qəfəsi və ətrafların müştərək zədələnmələrində cərrahi taktika və strategiya / Sağlamlıq», Elmi-praktik jurnal, Bakı – 2013, № 4, s. 86-92 (həmmüəl.: Qasımov N.A., Verdiyev V.Q.).
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18. Особенности хирургического лечения при сочетанных травмах грудной клетки и конечностей / “Tibb və Elm”. Ə.Əliyev adına elmi-praktik jurnal. Bakı – 2015, № 2 (2), s. 29-33 (соавт.: Касумов Н.А.).
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AĞIR MÜŞTƏRƏK TRAVMA ALMIŞ XƏSTƏLƏRİN MÜALİCƏSİNİN NƏTİCƏLƏRİNİN YAXŞILAŞDIRILMASI YOLLARI

XÜLASƏ

Tədqiqat işi ağır müştərək travma (AMT) almış xəstələrdə müasir proqressiv müalicə diaqnostika alqoritmi formalaşdırmaqla, bu xəstələr arasında əlillik və letallığın azaldılmasına nail olmaq üçün yeni taktika və strategiyanın hazırlanmasına həsr olunmuşdur. Bunun üçün 2009-2015-ci illər ərzində 3 saylı klinik xəstəxanada müalicə almış 14-80 yaş arasında 1033 xəstənin retrospektiv və prospektiv təhlili aparılmışdır. Bu xəstələr arasında müasir müalicənin üstünlüklərinin göstərmək üçün 2009-2010-cu illərdə ənənəvi üsulla müalicə almış müqayisə qrupu və yeni müalicə diaqnostika alqoritmi əsasında 2011-2015-ci ildə müalicə almış əsas qrup xəstələrinə bölünmüşdür. Əsas qrup xəstələri arasında zədələnmələrin ağırlıq dərəcəsi AİS (Abbreviated İnjury Scale) və İSS (Injury Severity Scale) şkalaları əsasında qiymətləndirilmiş "damage control" zədələnmələrə nəzarət prinsipi əsasında yardım göstərilmişdir. Göstəriş yarandığı halda bizim tərəfimizdən çoxmərhələli cərrahi taktika şkalasına yaradılmış modifikasiya əsasında cərrahi yardım olunmuşdur. Nəticədə:

– Əməliyyatın sonrakı letallığı 18% azaltmaq mümkün olmuşdur;

– Müştərək kəllə-beyin travması almış xəstələr arasında dekompressiyaedici əməlyyatlar 10,5% artıq aparılmış, letallıq 15,6% azalmış, döş qəfəsi zədələnməsi olan xəstələr arasında təkrar sanasiyaedici əməliyyatlar 17,9% az aparılmışdır və letallıq 15,6% azalmış, müştərək qarın travmaları almış xəstələr arasında sabitləşdirici əməliyyatlar 19,6% artıq aparılmış və letallıq 16,9 azalmış, çanaq zədələnmələri olan xəstələr arasında stabilləşdirici əməliyyatlar 18,1% artıq aparılmış və letallıq 5,2% azalmışdır. Uzunborulu sümüklərin azinvaziv osteosintezi zamanı üstünlük xarici fiksasiya aparatına verilmişdir (62,4%) və ağırlaşmalar 29,5% azalmışdır.

Çoxsaylı seqment sınıqlarının müxtəlif kombinasiyalarında əməliyyatların ardıcıllığı müəyyənləşdirilmiş, travmatik xətəliyin, o cümlədən kəskin distress sindromun inkişaf variantlarına uyğun olaraq, müalicə diaqnostika strategiyası müəyyənləşdirilmişdir.

Uzaq dövrün nəticələrinin müqayisəli təhlili göstərmişdir ki, ağırlaşmalar və fəsadların miqdarı əhəmiyyətli dərəcədə (11,8%) azalmışdır.

Firudin İsmayıl Ibrahimov

THE IMPROVEMENT WAYS OF TREATMENT RESULTS OF PATIENTS WITH SEVERE JOINT TRAUMA

SUMMARY

The present research work is devoted to the working out a new tactic and strategy that helps to reduce disability and lethality among patients with severe joint traumatic injuries (S/JT) by creating a modern progressive algorithm for diagnosis and treatment. For this purpose, a retrospective and prospective analysis of patients aged 14-80 years treated in 2009-2015 in clinical hospital № 3 was conducted. In order to demonstrate the advantages of the modern method of treatment, patients were divided into groups: treated with traditional methods in 2009-2010 patients were referred to the comparison group, whereas patients treated in 2011-2015 with the use of a new therapeutic-diagnostic algorithm, – to the main group. The degree of the main group patients damage was assessed according to the AIS and İSS scales and they were assisted with considering of the monitoring damage of the "damage control". Depending on the indications, the doctor carried out an operation of these patients taking into account the modification by the scale of multi-stage surgical tactics. Results: – we managed to reduce the lethality by 18% – it was possible to carry out 10,5% more decompression operations among patients with combined craniocerebral injuries, while mortality rate decreased by 15,6%. Among patients with thoracic injuries operations with resanitation were carried out 17,9% less, while the mortality rate decreesed by 15,6%. Among patients with concomitant abdominal injuries, calming operations were performed at 19,6% more, while lethality decreased by 16,9%. Among patients with pelvic injuries, there were carried out 18,1% more stabilizing operations, while lethality decreesed by 5,2%. In minimally invasive osteosynthesis of long tubular bones, preference was given to manipulations with the external fixation apparatus (62,4%), thus complications were reduced by 29,5%.

At different combinations of injuries of numerous segments, the sequence of operations was determined, the treatment-diagnostic strategy was determined in accordance with the variants of the development of traumatic disease taking into account acute distress syndrome. A comparative analysis of the late period results showed that we succeeded to significantly reduce the complications (on average, 11,8%) and prevent the possible negative consequences of trauma.

THE LIST OF ABBREVIATIONS

AIS	– Abbreviated Injury Scale
SJT	– severe joint trauma
AO/ASİF	– Association for Osteosynhesis / Association for stable İnjury Fixation
CB	– concussion of the brain
MSCLB	– moderate severe crushed level of the brain
SCLB	– severe crushed level of the brain
BFS	– bronchofibroscopy
MSTT	– multistage surgical treatment tactics
MSS	– musculoskeletal systems
ECG	– electrocardiography
EEG	– electroencephalography
ISS	– Injury Severity Scale
SBT	– skull-brain trauma
CT	– computer tomography
ARD	– acute respiratory deficieny
ARDS	– acute respiratory distress syndrome
JSBT	– joint skull-brain trauma
MSCT	– multispiral computer tomography
MRT	– magnetic resonance tomography
POD	– polyorgan deficiency
PT	– polytrauma
PSF	– polysegmented fracture
TD	– traumatic disease
ARA	– artificial respiratory apparatus
SKT	– spiral computer tomography
TS	– trauma score
SICS	– spread intravenous coagulation syndrome
USE	– ultrasound examination
EFA	– external fixation apparatus

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