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IMPROVING THE EFFECTIVENESS OF FIRST AID TO PATIENTS WITH POLYTRAUMA.

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Annotation: Polytrauma is the simultaneous or almost simultaneous occurrence of two or more traumatic injuries, each of which requires specialized treatment. Polytrauma is characterized by the presence of a mutual aggravation syndrome and the development of a traumatic disease, accompanied by violations of homeostasis, general and local adaptation processes. Such injuries usually require intensive care, emergency operations and intensive care measures

Key words: medicine, polytrauma, injury, diagnostics and causes, treatment, modern methods, anatomy.

The term “polytrauma” is a collective concept that includes the following types of injuries: multiple, combined, combined.
Multiple mechanical injuries include damage to two or more internal organs in one cavity (for example, liver and intestines), two or more anatomical and functional formations of the musculoskeletal system (for example, hip and forearm fractures).
Combined injuries are considered to be simultaneous damage to internal organs in two or more cavities (for example, damage to the lung and spleen) or damage to internal organs and a segment of the musculoskeletal system (for example, traumatic brain injury and fracture of limb bones).
Combined injuries are called injuries resulting from exposure to various traumatic factors: mechanical, thermal, radiation (for example, hip fracture and burn of any area of the body or traumatic brain injury and radiation exposure). There may be a greater number of options for simultaneous exposure to damaging factors.
Multiple, combined and combined injuries are characterized by a special severity of clinical manifestations, accompanied by a significant disorder of vital body functions, difficulty in diagnosis, complexity of treatment, a high percentage of disability, and high mortality. Such injuries are much more often accompanied by traumatic shock, blood loss, and threatening circulatory and respiratory disorders. The severity of polytrauma is indicated by mortality rates. With isolated fractures, it is 2%, with multiple fractures — 16%, with combined injuries — 50% or more.
Polytrauma is a generalizing concept, meaning that the patient has several traumatic injuries at the same time. In this case, it is possible to damage both one system (for example, skeletal bones) and several systems (for example, bones and internal organs). The presence of polysystemic and multiple organ lesions negatively affects the patient's condition, requires intensive medical measures, increases the likelihood of traumatic shock and death.
In the group of victims with combined mechanical injuries, musculoskeletal injury is most often combined with traumatic brain injury. Such combinations are noted in almost half of the victims. In 20% of cases with combined trauma, damage to the musculoskeletal system is

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accompanied by chest injury, in 10% by damage to the abdominal organs. It is not uncommon to have simultaneous trauma to 3 or even 4 areas of the body (skull, chest, abdomen and musculoskeletal system).

There is a certain pattern in the dynamics of general changes occurring in the human body that has been injured. These changes are called "traumatic illness". Strictly speaking, a traumatic disease develops with any, even minor damage. However, its clinical manifestations become noticeable and significant only in severe shockogenic (more often — multiple, combined or combined) lesions. Based on these positions, traumatic illness is currently understood as a pathological process caused by severe trauma and manifested in the form of characteristic syndromes and complications.

During a traumatic illness, there are 4 periods, each of which has its own clinical symptoms.

The first period (shock) lasts from several hours to (occasionally) 1-2 days. In time, it coincides with the development of traumatic shock in the victim and is characterized by a violation of the activity of vital organs both as a result of direct damage and as a result of hypovolemic, respiratory and cerebral disorders inherent in shock.

The second period is determined by post-resuscitation, post-shock, postoperative changes. The length of this period is 4-6 days. The clinical picture is quite motley, largely depends on the nature of the dominant lesion and is most often represented by such syndromes as acute cardiovascular insufficiency, adult respiratory distress syndrome (RDSV), disseminated intravascular coagulation syndrome, endotoxicosis. It is these syndromes and related complications that directly threaten the life of the victim during this period. In the second period of traumatic illness, with multiple organ pathology, it is especially important to take into account that the multiple disorders present in the patient are manifestations of a single pathological process, therefore treatment should be carried out comprehensively.

The third period is determined mainly by the development of local and general surgical infection. It usually begins on the 4th-5th day and can last several weeks, and in some cases months.

The fourth period (recovery) occurs with a favorable course of traumatic illness. It is characterized by suppression of the immune background, delayed reparative regeneration, asthenization, dystrophy, and sometimes persistent violations of the function of internal organs and the musculoskeletal system. During this period, the victims require rehabilitation treatment, medical, professional and social rehabilitation.

For the correct solution of therapeutic and tactical tasks in providing medical care to victims with polytrauma, it is extremely important to identify the leading (dominant) lesion, which currently determines the severity of the condition and poses an immediate threat to life. The dominant injuries during the course of a traumatic illness may vary depending on the effectiveness of the therapeutic measures taken.

At the same time, the severity of the general condition of the victims, violations of their consciousness (up to the lack of contact), the difficulty of identifying the dominant damage, and an acute shortage of time during mass admissions often lead to untimely diagnosis of damage. About 3 patients with concomitant trauma are diagnosed untimely, and 20% are mistakenly diagnosed. It is often necessary to deal with the erasure or even perversion of clinical symptoms (for example, with injuries to the skull and abdomen, spine and abdomen, as well as other combinations).

An important feature of polytrauma is the development of mutual aggravation syndrome. The essence of this syndrome is that damage to one location exacerbates the severity of the other.

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At the same time, the overall severity of the course of a traumatic illness, depending on the amount of damage, increases not arithmetically, but rather exponentially. This is primarily due to qualitative changes in the development of shock when summing up blood loss and pain impulses coming from several foci, as well as depletion of compensatory resources of the body.
Classics of traumatology and orthopedics considered polytrauma mainly as a wartime problem. Nowadays, due to the mechanization of industry and the widespread use of motor transport, the number of polytrauma sustained in peaceful conditions as a result of road accidents and industrial accidents has increased dramatically. Polytrauma is usually treated by traumatologists with the participation of intensive care specialists. In addition, depending on the type and location of injuries, thoracic surgeons, abdominal surgeons, urologists, neurosurgeons and other specialists may participate in the diagnosis and treatment of polytrauma.
The most common are multiple injuries as a result of road accidents (more than 50%), the second place is occupied by industrial accidents (more than 20%), the third is falls from a height (more than 10%). Men suffer about twice as often as women. In 1-5% of the total number of polytrauma cases, the victims are children, the main reason is participation in road accidents (younger children are passengers, in older age groups cases of collisions with child pedestrians and cyclists predominate). In children with polytrauma, injuries to the lower extremities and TBI are more common, and injuries to the abdominal cavity, chest and pelvic bones are less common than in adults.
In adults with polytrauma as a result of road accidents, limb injuries, chest injuries, abdominal injuries, pelvic fractures, ruptures of the bladder and damage to the cervical spine predominate. Abdominal, chest and traumatic brain injuries have the greatest impact on the prognosis for life. In case of accidental falls from a great height, severe traumatic brain injury is more often detected, and in case of suicide attempts, multiple injuries to the lower extremities are detected, since patients almost always jump feet first. Falls from a height are often accompanied by rupture of intra-thoracic vessels, which leads to the rapid development of hemorrhagic shock.
The distinctive features of polytrauma are:
Mutual burden syndrome and traumatic illness.
Atypical symptoms that make diagnosis difficult.
There is a high probability of developing traumatic shock and massive blood loss.
Instability of compensation mechanisms, a large number of complications and deaths.
There are 4 degrees of severity of polytrauma:
Polytrauma of the 1st degree of severity – there are minor injuries, there is no shock, the outcome is a complete restoration of the function of organs and systems.
Polytrauma of the 2nd degree of severity – there are moderate injuries, shock of the I-II degree is detected. Long-term rehabilitation is necessary to normalize the activity of organs and systems.
Polytrauma of the 3rd degree of severity – there are severe injuries, shock of the II-III degree is detected. As a result, partial or complete loss of functions of some organs and systems is possible.
Polytrauma of the 4th degree of severity – there are extremely severe injuries, shock of the III-IV degree is detected. The activity of organs and systems is grossly disrupted, there is a high probability of death both in the acute period and during further treatment.
Taking into account anatomical features, the following types of polytrauma are distinguished:

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Multiple trauma – two or more traumatic injuries in the same anatomical area: a fractured shin and a fractured hip; multiple fractures of the ribs, etc.
Combined injury – two or more traumatic injuries of different anatomical areas: TBI and chest injury; shoulder fracture and kidney damage; collarbone fracture and blunt abdominal injury, etc.
Combined injury – traumatic injuries as a result of simultaneous exposure to various traumatic factors (thermal, mechanical, radiation, chemical, etc.): burn in combination with a hip fracture; radiation damage in combination with a spinal fracture; poisoning with toxic substances in combination with a pelvic fracture , etc.
Combined and multiple injuries may be part of a combined injury. A combined injury can occur with the simultaneous direct action of damaging factors or develop as a result of secondary damage (for example, when fire foci appear after the collapse of an industrial structure that caused a limb fracture).
Taking into account the danger of the consequences of polytrauma for the patient's life, there are:
Non–life-threatening polytrauma - injuries that do not cause gross violations of vital activity and do not pose an immediate danger to life.
Life–threatening polytrauma is damage to vital organs that can be corrected by timely surgical intervention and/or adequate intensive care.
Fatal polytrauma is damage to vital organs, the activity of which cannot be restored even by providing timely specialized care.
Taking into account the localization, polytrauma is isolated with lesions of the head, neck, chest, spine, pelvis, abdomen, lower and upper extremities.
Diagnosis and treatment for polytrauma are often a single process and are carried out simultaneously, due to the severity of the condition of the victims and the high probability of developing traumatic shock. First of all, the general condition of the patient is assessed, injuries that may be life-threatening are excluded or identified. The scope of diagnostic measures for polytrauma depends on the condition of the victim, for example, when identifying traumatic shock, vital research is carried out, and the diagnosis of minor injuries is carried out, if possible, in the second place and only if this does not aggravate the patient's condition.
All patients with polytrauma undergo urgent blood and urine tests, as well as determine their blood type. In case of shock, the bladder is catheterized, the amount of urine excreted is monitored, blood pressure and pulse are regularly measured. Chest X-ray, limb bone X-ray, pelvic X-ray, skull X-ray, echoencephalography, diagnostic laparoscopy and other examinations may be prescribed during the examination. Patients with polytrauma are examined by a traumatologist, a neurosurgeon, a surgeon and an intensive care specialist.
At the initial stage of treatment, antishock therapy comes to the fore. In case of bone fractures, full-fledged immobilization is carried out. In case of fractures, tears and open fractures with massive bleeding, a temporary stop of bleeding is performed using a tourniquet or hemostatic clamp. With hemothorax and pneumothorax, the chest cavity is drained. In case of damage to the abdominal organs, an emergency laparotomy is performed. With compression of the spinal cord and brain, as well as with intracranial hematomas, appropriate operations are performed.
If there are injuries to internal organs and fractures that are the source of massive bleeding, surgical interventions are performed simultaneously by two teams (surgeons and traumatologists, traumatologists and neurosurgeons, etc.). If there is no massive bleeding from fractures, open reposition and osteosynthesis of fractures, if necessary, are performed after

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patients are brought out of shock. All activities are carried out against the background of infusion therapy.

Then patients with polytrauma are hospitalized in the intensive care unit or intensive care unit, blood and blood substitutes are continued, drugs are prescribed to restore the functions of organs and systems, various therapeutic measures are carried out (bandages, drainage changes, etc.). After improving the condition of patients with polytrauma, they are transferred to a traumatology (less often – a neurosurgical or surgical department), they continue medical procedures and carry out rehabilitation measures.

According to WHO, polytrauma ranks third in the list of causes of death in men aged 18-40 years, second only to oncological and cardiovascular diseases. The number of deaths reaches 40%. In the early period, death usually occurs due to shock and massive acute blood loss, in the late period – due to severe brain disorders and concomitant complications, primarily thromboembolism, pneumonia and infectious processes. Disability is the outcome of polytrauma in 25-45% of cases. Prevention consists in carrying out measures aimed at preventing road, industrial and household injuries.

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