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Pressing questions of treatment and rehabilitation of victim are with battle trauma of musculoskeletal system on the modern stage (review of literature)

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With beginning of active battle actions in Ukraine sharply the amount of victim increased with the fire, mine-explosive and comminuting damages of the musculoskeletal system both among soldiery and peaceful population. Therefore the problems of treatment and rehabilitation of victim because of battle actions in recent year purchased the special sharpness. Objective. To analyse the sources of literature on questions the grant of medicare in case of fire damages of the musculoskeletal system and to define problems and perspective directions in restoration treatment of consequences of battle traumas. Methods. The state-of-the-art review of scientific works is conducted from the questions of treatment of fire and mine-explosive damages of the musculoskeletal system and their consequences. Results. It is shown that by the last decades as a result of creation of modern shooting- iron and explosive projectiles scales and weight of traumatic damages grew considerably, frequency of plural and united wounds grew also. The fire traumas of the musculoskeletal system re accompanied by plenty of complications and unsatisfactory by the anatomic and functional results of treatment. Characteristic for such damages is traumatic illness, that develops in reply to a battle trauma and has long and complicated motion, high indexes of lethality and heavy disability. Most frequent are traumas of extremities — 65–75 % and in some battle operations — 80 anymore. Mine-explosive wounds that is accompanied by massive belong to the heaviest traumas by the damages of soft fabrics of extremities, main vessels and nerves, development of compartment syndrome. By the damage of backbone and spinal cord characteristic high lethality (19,1–52,9 %) and bar disability.Conclusions. Without regard to the far of the worked out technologies of restoration treatment and rehabilitation of victim with fire and mine-explosive traumas, specialists continue to perfect the methods of physical rehabilitation, and also work on the removal of problems and defects that yet exist in organization of rehabilitation measures.

Із початком активних бойових дій в Україні різко збільшилась кількість постраждалих із вогнепальними, мінно-вибуховими й осколковими ушкодженнями опорно-рухової системи як серед військових, так і мирного населення. Тому проблеми лікування і реабілітації постраждалих унаслідок бойових дій в останній рік набули особливої гостроти. Мета. Проаналізувати джерела літератури з питань надання медичної допомоги в разі вогнепальних ушкодженнях опорно-рухової системи та визначити проблеми й перспективні напрями у відновному лікуванні наслідків бойової травми. Методи. Проведено аналітичний огляд наукових праць із питань лікування вогнепальних і мінно-вибухових ушкоджень опорно-рухової системи та їх наслідків. Результати. Показано, що останніми десятиріччями внаслідок створення сучасної вогнепальної зброї та вибухових снарядів значно зросли масштаби і тяжкість травматичних ушкоджень, також збільшилась частота множинних і поєднаних поранень. Вогнепальні травми опорно-рухової системи супроводжуються великою кількістю ускладнень і незадовільними анатомічними та функціональними результатами лікування. Характерним для таких ушкоджень є травматична хвороба, яка розвивається у відповідь на бойову травму та має довгий і ускладнений перебіг, високі показники летальності й тяжкої інвалідності. Найчастішими є травми кінцівок — 65–75 %, а у деяких бойових операціях — 80 % і більше. До найтяжчих травм належать мінно-вибухові поранення, які супроводжуються масивними ушкодженнями м'яких тканин кінцівок, магістральних судин і нервів, розвитком компартмент-синдрому. Ушкодженням хребта й спинного мозку характерні висока летальність (19,1–52,9 %) і стійка інвалідизацію Висновки. Незважаючи на значну кількість розроблених технологій відновного лікування та реабілітації постраждалих із вогнепальними та мінно-вибуховими травмами, фахівці продовжують удосконалювати способи фізичної реабілітації, а також працюють над усуненням проблем і недоліків, які ще існують в організації реабілітаційних заходів. Ключові слова. Вогнепальні, мінно-вибухові, ушкодження, переломи, бойова травма, опорно-рухова система, інвалідність, відновне лікування, реабілітація.

Key words. Fire, mine- explosion, damage, breaks, battle trauma, musculoskeletal system, disability, restoration treatment

Introduction

In Ukraine, the problem of treatment and rehabilitation of patients with gunshot, shrapnel, and mine-explosive injuries of the locomotor system and their consequences is currently extremely acute. Severe military events led to a large number of patients with the specified injuries of the spine and limbs not only among the military, but also among the civilian population, which is one of the characteristic features of modern warfare.

Considerable attention of researchers is given to patients with fresh gunshot injuries of the musculoskeletal system; this problem became especially acute in our country with the beginning of hostilities in Donbas in 2014. Today in Ukraine, both scientists and teachers of higher medical institutions and doctors of practical health care are actively working on the problem of treating fresh injuries.

In recent years, a number of scientific findings have been published on the issues of providing emergency medical aid directly during hostilities, in which modern principles of diagnosis and treatment of fresh gunshot wounds of the limbs and spine are given, and new modern treatment technologies are proposed. Methodological recommendations and manuals for the treatment of fresh combat injuries of the musculoskeletal system have been developed and issued [1–21]. These problematic issues are also actively discussed at scientific and practical events (conferences, webinars, etc.).

Purpose: to analyze the sources of literature on the provision of medical assistance in case of gunshot injuries of the musculoskeletal system and to identify problems and promising directions in the rehabilitation treatment of the consequences of combat trauma.

Material and methods

An analytical review of studies on the treatment of gunshot and mine-explosive injuries of the locomotor system and their consequences was conducted.

Results and their discussion

The conducted scientific studies show that in recent decades, as a result of the creation of modern firearms and explosive shells, the scale and severity of traumatic injuries have increased significantly, and the frequency of multiple and combined injuries has also grown. Gunshot injuries of the components of the musculoskeletal system are accompanied by a large number of complications and unsatisfactory anatomical and functional results of treatment [22–23]. Such injuries are characterized by traumatic disease, which develops in response to modern combat trauma and has a long and complicated course, high rates of mortality and severe disability [2, 4–5, 17–19]. This is also confirmed by the experience of the war in Afghanistan, where about 50,000 soldiers were wounded, traumatized and contused, of whom about 2,000 (4 %) had their limbs amputated. At the same time, it was found that the absence or defect of one lower extremity due to increased load on a healthy person often leads to obliterating endarteritis. Every fifth wounded person in that war received a mine-explosive injury, which was usually accompanied by a contusion, and subsequently in 50 % of cases caused the development of hypertensive disease [22, 24].

During the First World War, it was determined that the structure of combat injuries of the locomotor system was dominated by limb injuries, from 50 to 70 %. In modern military events, limb injuries account for 65–75 %, and in some combat operations, even 80 % or more [5–6, 10, 25–26]. Among all limb injuries, 44.5 % are leg injuries, which lead to disability in almost 64 % [12, 15, 25]. Today, gunshot fractures of the bones of the tibia make up 19.5–42.1 % of all fractures of the bones of the limbs, while diaphyseal fractures occur in 83.2 % of cases, metaphyseal and intra-articular fractures in 16.8 % [6, 12, 15, 25].

Features of gunshot fractures of the tibia are fragmented and comminuted nature (35.1–41.3 %), the presence of bone defects (9.1 %), injury to blood vessels (4.8 %) and nerves (10.9 %). Purulent complications occur in 50.4–60.1 % of cases, which in 38.2 % turn into osteomyelitis [4, 10, 15, 22–23].

The most serious injuries include mine-explosive injuries, which are accompanied by massive damage to the soft tissues of the limbs, main vessels and nerves, and the development of compartment syndrome. Popliteal arteries are damaged in 8.6–22.2 % of the wounded, which subsequently leads to limb amputation in 54.5–72.5 % of cases [4, 10, 15, 22–23].

In the general structure of sanitary losses, the share of injuries of the upper and lower extremities is 62.5 %, the absolute majority of which (78.4 %) are soft tissue injuries and 21.6 % are gunshot fractures. A characteristic feature of modern combat injuries is a large number of combined and multiple wounds (32.1 %), the prevalence of shrapnel (62.9 %) and explosive (25.6 %) injuries [5, 13, 21]. Fire fractures of the bones of the lower leg were observed in 94.07 % of the wounded, limb separation at the level of the lower leg in 5.93 %. Shrapnel injuries were recorded in 84.60 % of cases, bullet injuries in 12.05 %, mine-explosive injuries in 3.35 %. 50.45 % of patients had isolated injuries, 32.43 % had multiple injuries, and 17.12 % had combined injuries [10, 15].

Injuries to the spine and spinal cord account for an average of 2 % in the overall structure of combat trauma, but these injuries are among the most severe, characterized by high mortality in 19.1–52.9 % and permanent disability. In 25 % of cases, death occurs immediately after receiving an injury, more than a third of the wounded die during the evacuation stages before hospitalization [2, 27–34].

Research conducted by scientists of the State Institution Professor M. I. Sytenko Institute of Spine and Joint Pathology of the National Academy of Medical Sciences of Ukraine in 2016, showed that 70–80 % of gunshot injuries to the spine and spinal cord are combined or combined, accompanied by injuries to the neck, chest and abdominal cavities. At the same time, mine and shrapnel injuries of the spine dominate over bullet wounds [29]. In 83 % of cases, spinal injuries are combined with severe neurological symptoms, in 66 % there is a complete rupture of the spinal cord or cauda equina [2, 27–31]. For this group of patients, the standards and protocols of surgical treatment of patients with fresh injuries of the spine and spinal cord, which were developed by the «Trauma Committee of the College of American Surgeons» and recognized worldwide [2], are effectively applied.

In Ukraine for the period of 2014–2015, regional medical and social examination centers recognized 2,338 combatants as persons with disabilities, of whom 737 (31.5 %) were due to injuries of the musculoskeletal system. Among them, the majority (45.6 %) were individuals with disabilities due to injuries of the lower extremities, 29.6 % — upper extremities, 24.8 % — polytrauma. The disability was caused by persistent functional and irreversible disorders — anatomical defects. In the first cases, the patients needed medical rehabilitation, in the others, limb prosthetics and socio-professional rehabilitation. Amputation defects of the upper (2.3 %) and lower (4.6 %) limbs were observed in the combat zones of that time [35].

Nowadays, the problem of restorative treatment and rehabilitation of individuals with the consequences of gunshot, mine-explosive and shrapnel injuries of the locomotor system is becoming more and more important. The use of physical rehabilitation aids in the elimination of complications of gunshot fractures of the limbs, for this purpose complex programs are created, which include physiotherapy, massage, post-isometric relaxation, kinesiotherapy, mechanotherapy [36–40]. The leading place in the solution of medical, social and economic problems of the postwar period is occupied by the problems of restorative treatment of old injuries of the locomotor system, received during hostilities. Individuals who have been in extreme war situations develop so-called post-traumatic stress disorders, and various psychosomatic diseases begin to manifest a few months after returning to normal life. It was also found that compared to civilians, combatants are 2–3 times more likely to suffer from such diseases as hypertension, gastritis, peptic ulcer disease of the stomach and duodenum, and people with disabilities are more likely to have problems related to functional disorders from received wounds and injuries [37, 41–43].

It is important to emphasize that combatants are a special contingent that needs multidisciplinary rehabilitation, but, unfortunately, its level remains insufficient. Carrying out rehabilitation measures for military personnel has its own characteristics, since participation in combat actions, which were accompanied by huge physical and psychological load, generate powerful combat stress [37].

Based on the analysis of modern scientific literature, there are currently various clinical and functional methods of restorative treatment for this group of patients, but there are no uniform methodological approaches to the organization of medical, professional and social rehabilitation. In this regard, there is a need to create optimal options for carrying out treatment and prevention and rehabilitation measures [44]. At all stages of treatment of the wounded, it is important to follow the principles of consistency and heredity of the medical services of the armed forces and civilian health care institutions [24]. The timeliness, complexity, continuity of the rehabilitation process, the fastest return of patients to a full-fledged psychosocial life, and the maximum recovery of lost working capacity are very important [37, 46]. It is promising in the near future to develop a more advanced system for carrying out rehabilitation treatment and preventive measures, as well as technologies for restorative treatment of the consequences of gunshot injuries of the musculoskeletal system in the distant period [30–33, 43–45].

It remains important to analyze the effectiveness of rehabilitation measures for the named contingent of victims. It has been proven that the rehabilitation prognosis of treatment results also depends on the rational preparation of rehabilitation programs with the determination of rehabilitation potential and the implementation of an individually selected rehabilitation algorithm [47]. The rehabilitation potential of patients with gunshot wounds can be increased by improving the system of organizing medical care already at the early stages of treatment, for which it is necessary to systematize existing knowledge and

analyze errors [44, 48–50]. It is also appropriate to study the factors that influence the level of rehabilitation potential, the possibilities of its implementation, and the level of rehabilitation prognosis in musculoskeletal disorders [43, 44, 48–52].

The effectiveness of treatment and measures of medical rehabilitation largely depend on the level of training of medical personnel, material and technical support of the medical institution, compliance with the basic principles of medical rehabilitation. They are as follows: early onset, comprehensiveness, individualization of medical rehabilitation programs, phasing, continuity and consistency, as well as persistent cooperation of the patient and doctor. At the same time, it is important to adhere to a social direction, to constantly monitor the adequacy and effectiveness of medical measures [38].

The fact that the state program «Rehabilitation of War Injuries in Ukraine» has been created, which is being implemented with the support of the European Union and Switzerland, shows the relevance of the problem. The goal of this program is to develop rehabilitation standards at the global level aimed at restoring not only the physical and psychological state of patients, but also their return to a full life (preserving work and social contacts). A digital rehabilitation system is also being created, which will improve the work of rehabilitation commissions and rehabilitation centers [53].

Conclusions

The problem of medical rehabilitation of individuals with combat injuries of the locomotor system is quite complex and requires further study. At each stage of rehabilitation, the joint activity of doctors of various specialties is important: orthopedists-traumatologists, therapists, surgeons, psychologists, rehabilitators-methodologists of physical therapy and rehabilitation, etc.

Functional prognosis of the treatment of patients with gunshot wounds depends on the rational formulation of rehabilitation programs with determination of rehabilitation potential and implementation of an individually selected rehabilitation algorithm.

Solving problematic issues will provide an opportunity to improve the results of treatment and rehabilitation of patients with combat injuries of the musculoskeletal system.

Conflict of interest. The authors declare no conflict of interest.

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PRESSING QUESTIONS OF TREATMENT AND REHABILITATION OF VICTIM ARE WITH BATTLE TRAUMA OF MUSCULOSKELETAL SYSTEM ON THE MODERN STAGE (REVIEW OF LITERATURE)

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