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MAIN PRINCIPLES OF PROVIDING EMERGENCY MEDICAL CARE FOR MECHANICAL INJURIES SUSTAINED DURING MARTIAL LAW

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In the context of armed conflicts and martial law, the issue of providing emergency medical care for mechanical injuries becomes particularly relevant, as these injuries are one of the main causes of high mortality among military personnel and civilians. According to the World Health Organization, over 60% of fatalities in combat zones are associated with severe mechanical injuries, such as open fractures, traumatic brain injuries, and damage to vital organs. In such extreme conditions, the effectiveness of medical care depends not only on the availability of necessary equipment but also on well-structured action protocols, rapid diagnostics, timely stabilization of the victim's condition, and qualified decision-making by medical personnel [2]. As noted in the Joint Trauma System protocols, improving the emergency medical care system helps reduce battlefield mortality through the implementation of modern methods of bleeding control, tactical evacuation, and pre-hospital stabilization algorithms [5].

Mechanical injuries are damage to tissues or organs resulting from sudden physical impacts from external factors on the human body, such as blows, falls, or accidents. They can manifest as abrasions, lacerations, dislocations, and fractures [6].

The basic principles of providing first aid to victims in emergencies with mechanical injuries are based on the rapid assessment of the victim's condition, timely identification of life-threatening conditions, and the application of effective measures to eliminate them before qualified medical help arrives. The primary task is to ensure the rescuer's safety, as providing aid in hazardous conditions can lead to additional casualties. Only after confirming that the area is safe should the rescuer approach the victim, following a clear sequence of actions:

- assessing the victim's consciousness through simple questions or pain stimulation. If the victim is unconscious, the airway patency should be checked immediately, as airway obstruction is one of the leading causes of death in the first minutes after injury. If necessary, maneuvers to open the airway should be performed, such as chin lift or jaw thrust, avoiding excessive neck extension, especially if a spinal injury is suspected;

- assessing the presence and quality of breathing, as if breathing is absent or ineffective, the responder should begin artificial ventilation using the "mouth-to-mouth" or "mouth-to-nose" method with barrier protection devices. In case of cardiac

arrest, cardiopulmonary resuscitation (CPR) should be performed, combining chest compressions and artificial ventilation in a 30:2 ratio [3].

One of the key principles is the control of external bleeding: applying direct pressure to the wound, pressure dressings, and, in the case of arterial bleeding, tourniquets applied above the injury site. In resource-limited conditions, improvised tourniquets are acceptable, but it is important to monitor the time they are applied to prevent ischemic complications [3].

Immobilization of injured limbs is another critical aspect, as it reduces the risk of additional injuries and facilitates the transportation of the victim. This involves using immobilization devices or improvised stabilizers to secure the bones. It is also essential to continuously monitor the victim's condition, regularly checking consciousness, breathing, and pulse.

The importance of providing psychological support should be emphasized, as fear, panic, and stress can worsen the victim's condition [3].

The "Prolonged Casualty Care Guidelines," published in December 2021, provide detailed recommendations for prolonged medical care for the wounded in combat conditions, especially when evacuation is delayed or impossible. This requires medical professionals to apply comprehensive approaches to support vital functions. The main principles of this document include continuous monitoring and support of vital functions, ensuring regular assessment of breathing, circulation, and consciousness levels to detect critical deviations promptly and correct them immediately. Advanced medical care includes methods beyond basic tactical medicine, such as intubation, mechanical ventilation, intravenous fluid administration for hemodynamic stabilization, and the use of medications to maintain blood pressure, especially in severe injuries with a risk of shock [6].

Infusion therapy and bleeding control principles involve the use of hemostatic agents, tourniquets, wound tamponade, and other methods for effective bleeding control, as well as restoring circulating blood volume to prevent hypovolemic shock. Infection control and antibiotic prophylaxis are crucial for preventing complications associated with open wounds, with the timely administration of broad-spectrum antibiotics minimizing the risk of severe infections, such as sepsis or purulent complications [6].

Thus, the system of prolonged medical care in combat conditions is based on a comprehensive approach combining intensive monitoring, specialized medical interventions, and psychological support to preserve life and stabilize the condition of the wounded.

Comparing these principles with approaches adopted in Ukraine, it can be noted that domestic specialists also adhere to similar medical care protocols in combat conditions. However, there are certain differences regarding the choice of medications, infusion therapy approaches, organization of casualty evacuation, and clinical decision-making algorithms in critical situations.

In Ukraine, the choice of medications largely depends on the availability of resources and medical unit supplies, often limited by economic factors and logistical challenges in combat zones. For example, while international protocols such as TCCC (Tactical Combat Casualty Care) recommend using modern hemostatic agents (e.g.,

Celox, QuikClot), domestic practice often relies on more accessible alternatives or traditional bleeding control methods, such as tight bandages or standard tourniquets. Additionally, international protocols recommend widespread use of pain control medications like low-dose ketamine, while in Ukraine, traditional analgesics, such as opioids, may be preferred due to limited access to modern drugs [4].

Infusion therapy in international protocols focuses on limited fluid resuscitation strategies (damage control resuscitation), using hypertonic solutions or blood substitutes to minimize the risk of hypothermia and coagulopathy. In Ukraine, especially in the early stages of combat, massive infusion therapy with large volumes of saline or Ringer's solution was common, which may be less effective in critical conditions. However, with the implementation of international standards, the situation is gradually improving, and modern approaches are becoming more widespread.

International standards emphasize continuous medical personnel training, including regular courses under programs such as TCCC, ATLS (Advanced Trauma Life Support), and PHTLS (Prehospital Trauma Life Support). In Ukraine, such programs are still developing, and although many military medics undergo training based on international standards, there is a need for systematic training at the national level. Positively, Ukrainian medics increasingly participate in international training and workshops, enhancing their qualifications. For instance, from May to July 2024, the International Charitable Foundation "Alliance for Public Health," supported by the International Research and Exchanges Board (IREX), implemented a training program for family doctors on interacting with combat veterans. The program included training sessions in Vinnytsia, Dnipro, and Kyiv, as well as webinars and the development of an online course to improve the qualifications of healthcare workers in providing primary medical care to veterans [1].

In conclusion, providing emergency medical care for mechanical injuries during martial law is a critically important factor in reducing mortality among the injured. The effectiveness of such care depends on the rapid assessment of the victim's condition, control of vital functions, timely bleeding control, proper immobilization of injuries, and psychological support. Comparing international protocols with Ukrainian practices demonstrates the gradual adoption of modern standards, contributing to improved medical care quality in combat conditions. At the same time, further development of the emergency medical care system requires enhancing medical personnel training, ensuring necessary resources, and integrating international experience into national practice.

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