Regarding the relevance of the issue of registering diseases of the circulatory system, combat injuries of the heart and major vessels in military personnel

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Abstract

Objective. To develop organisational measures to improve the provision of medical care to servicemen with the most common diseases of the circulatory system, combat injuries of the heart and major vessels by creating a clinical registry of this pathology.

Materials and methods. The study concerned servicemen, exclusively men, who participated in the Anti–Terrorist Operation/Joint Forces Operation from June 2014 to January 2022, and servicemen of the Defence Forces of Ukraine who fought against Russian aggression from February 2022 to July 2023 (n=501). The age of the study participants ranged from 21 to 58 years, with an average age of (41.5 ± 2.2) years. The most common diseases of the circulatory system, combat injuries of the heart and major vessels were analysed.

Results. A clinical registry of circulatory system diseases, combat injuries of the heart and major vessels in military personnel was created at the Amosov National Institute of Cardiovascular Surgery of the National Academy of Medical Sciences of Ukraine as a leading scientific institution of cardiac surgery with sufficient material and technical resources, highly qualified medical staff and a developed network of regional support centres in Ukraine.

Conclusions. The creation of clinical registries in the context of active hostilities is an extremely relevant organisational measure, since the information reflected in the clinical registry makes it possible to develop organisational measures to determine the need for cardiac surgery, improve the efficiency and quality of its provision in a short time.

Keywords: diseases of the circulatory system; combat trauma of the heart and major vessels; organisational measures; clinical registry.

The hostilities that continued in the area of the Anti–Terrorist Operation (ATO)/Joint Forces Operation (JFO) were accompanied by significant human losses. According to the Office of the United Nations High Commissioner for Human Rights in eastern Ukraine, from mid–April 2014 to February 2022, more than 13,000 people were killed and 29,500 to 33,500 people were injured, including more than 12,000 Ukrainian servicemen [1, 2]. Since 24 February 2022, the local military conflict in eastern Ukraine has escalated into a full–scale Russian invasion of Ukraine. According to the statistics of combat losses during military conflicts, one third of servicemen with gunshot wounds or chest injuries die due to bleeding and cardiac arrest. The victim has a chance of survival only if medical medics manage to get him or her to a cardiac surgery hospital. These circumstances determine the causes of mortality during hostilities – among the chest injuries, more than 30% of victims suffer heart damage, and 10–15% – damage to the complex: pericardium, heart, large vessels [3 – 5]. At the same time, mine–blast and bullet wounds to the heart are the most life–threatening, with mortality rates of up to 90% [6]. With the outbreak of a full–scale war by the Russian Federation, it is clear that the expected need for highly qualified cardiac surgery will increase [7].

Since the Second World War, there have been no thorough scientific and practical works on military medicine that would systematically summarise the experience of combat operations, so it is important and relevant to systematise the utilitarian Ukrainian experience in this area in the context of a hybrid war, which is significantly different from other armed conflicts in Syria, Iraq, and Libya [8, 9]. In order to improve the efficiency of the medical support system of the Defence Forces of Ukraine (DFU) for the wartime period, it is extremely important to summarise the practical experience gained during the ATO/JFO in Donetsk and Luhansk regions [1]. To ensure the generalisation of practical experience and the development of organisational measures to determine the need for cardiac surgery and improve the efficiency of its provision, it is necessary to conduct a thorough monitoring analysis of the most common circulatory system diseases (CSD), combat injuries (CI) of the heart and major vessels in the structure of chest wounds in servicemen. Clinical registries (CRs) are designed to help practitioners, researchers and healthcare managers with this task, as they are files of information about each observation of a particular disease, its course and treatment. Due to the thorough collection of general and medical information, the CR contains an appropriate level of data for statistical, epidemiological and clinical studies. The purpose of the RC is to conduct expert qualified assessment of the quality of medical care, risk factors for the disease, patient survival rates, and to establish a forecast for the development of the epidemiological process of a given type of pathology in order to subsequently...
introduce organisational measures to increase the need for medical care, its quality and efficiency.

The main principle of the RC is to accumulate information about patients of a particular healthcare facility, which is used to assess the quality and effectiveness of medical care, conduct clinical trials, self-analysis of the healthcare facility to establish an expert assessment of the quality of treatment, etc.

The tasks of the CR are: monitoring the incidence and/or frequency of injury/injury; monitoring mortality rates; analysing the quality of medical care; conducting research, etc.

Thus, the development and implementation of effective organisational measures to determine the need for highly qualified cardiac surgery, the efficiency and quality of its provision to servicemen is currently based solely on the experience of other countries or on outdated approaches. At the same time, it should be noted that technological progress has not only added to peaceful and positive phenomena and developments, but has also made significant changes to the armaments of the armies of aggressor countries. Mine and explosive weapons are widespread, new types of ammunition and types of explosive devices used in local wars have emerged, and thus, there has been a shift in the nature of combat injuries and traumas of military personnel [10]. Therefore, it is time to develop and implement organisational measures to determine the need for highly qualified cardiac surgery, the effectiveness and quality of its provision to servicemen, which can be achieved in a short period of time through the creation of a high-quality CR BT of the heart and great vessels and the most common CVDs in servicemen.

The aim of the study is to develop organisational measures to improve the provision of medical care to servicemen with the most common CVD, BT of the heart and great vessels by creating a CD of this pathology.

Materials and methods of the study
As a result of fruitful cooperation between the Amosov National Institute of Cardiovascular Surgery (NICS) of the National Academy of Medical Sciences of Ukraine and the National Military Medical Clinical Centre “Main Military Clinical Hospital” of the Ministry of Defence of Ukraine, the creation of CR BT of the heart and great vessels and the most common CVDs in servicemen referred for surgical treatment to the NICS was launched.

The study included military personnel, exclusively men, who participated in the ATO/JFO between June 2014 and January 2022, and servicemen of the JFO who fought against the Russian aggression from February 2022 to July 2023 (n=501). The age of the study participants ranged from 21 to 58 years and averaged (41.5 ± 2.2) years.

The distribution of the sample by nosological units was as follows: BT of the heart and great vessels – 40 (8.0%) patients, the most common COD – 461 (92.0%) patients who required surgical treatment.

Diagnostic and treatment procedures were performed at the NISSH in accordance with clinical protocols that are reviewed and approved annually, and standard imaging diagnostic methods were used: chest X-ray, echocardiography and coronary angiography, computed tomography (CT), spirometry, and others.

The study does not violate the principles of bioethics, and its results can be published (extract from the minutes of the meeting of the Bioethics Commission of the State Institution "Amosov National Institute of Medical Sciences of the National Academy of Medical Sciences of Ukraine" of 02 July 2022). All patients who participated in the study signed an informed voluntary consent.

Results
To date, an increase in the number of CVD, BT of the heart and main vessels has been identified, which may be associated with active hostilities taking place in Ukraine.

The CR of the most common CVDs, BPs of the heart and great vessels in military personnel contains the following information blocks.

General information: serial number, database coding number (in accordance with the Law of Ukraine "On Personal Data Protection", when creating a CR, it is necessary to comply with the protection of personalised information, which is usually ensured by database coding), medical history number, year of birth, age at the time of hospitalisation, gender, extended information on the type of military activity (relationship to the military, branch of the military, rank, job performed, location – rear, front line); length of military service, etc.

Anthropometric data: height, body weight, body mass index (BMI) with interpretation of overweight (OB), obesity with indication of its degree, abdominal obesity (AO).

Complaints: obligatory, optional and neurotic groups.

Data from the medical and social modifying group of risk factors for the development of CVD: smoking status, smoking history, alcohol consumption, eating behaviour, etc.

Data from the medical and biological non-modifying group of risk factors for the development of CKD: severe heredity, tachycardia, NSTE, hypertension, metabolic disorders (hypercholesterolaemia, hypertriglyceridaemia, hyperglycaemia).

Clinical and laboratory tests: complete blood count with leucocyte count, general urinalysis, biochemical blood count, electrolyte composition, prothrombin index, etc.

Diagnostic data of imaging methods: chest X-ray, echocardiography (left ventricular wall thickness, interventricular septal thickness, end-diastolic volume, end-systolic volume, ejection fraction, etc.), coronary angiography, CT scan, spirometry, etc.

Medical history data: time and circumstances of the debut of CCI (BT of the heart and major vessels, chest wounds, etc.), duration of the disease, preliminary clinical diagnosis, complications, type and duration of surgical treatment, etc.
Life history data: concomitant pathology, its course, treatment, infectious diseases, vaccinations, etc.
Evacuation data: place and time of injury, place and time and level of medical care, diagnostic and treatment procedures performed.
Data on diagnostic and treatment procedures and surgical interventions performed at the NISSH: date and time of hospitalisation, final diagnosis, its correspondence with the preliminary diagnosis when the patient/wounded was referred, type of surgery (name of surgery), postoperative complications, timing of their occurrence, additional diagnostic and treatment procedures (if necessary), clinical recovery of the patient, conditions and recommendations for rehabilitation.

The CR of the most common CVD, BT of the heart and major vessels in servicemen, which is being developed at the NISSH, meets all these requirements, as it is "closed", the personal data of respondents are protected by special coding and are available exclusively to the doctors of a particular patient/victim.

Discussion

Until recently, all information about patients with CJD was recorded exclusively on paper and stored in the archives of the vast majority of medical institutions. Naturally, this made the accounting and reporting process lengthy and imperfect. Currently, Ukraine is only in the process of digitalising document management, including medical records. Several national disease registries have been created and are operating, including the cancer registry and the diabetes registry, while others are still being created. The relevance of analysing the clinical databases of the leading healthcare institutions of Ukraine to develop organisational measures to review their needs, improve the quality and efficiency of their activities during the period of active hostilities in Ukraine is beyond doubt. At the same time, the creation of CRs of any pathology in military personnel and civilians during martial law requires doctors and scientists to comply with certain ethical principles and rules regarding the possession of personal information, for example, access to surnames and names, military ranks, branches of the armed forces, time and place of injury/trauma, etc. In other words, the CR of CVD, BT of the heart and major vessels, chest wounds in servicemen should be "closed", encoded, accessible only to a limited number of users (doctors) determined by the order of the head of the medical institution.

The relevance of creating the CR of CVD, BT of the heart and great vessels in servicemen on the basis of the NISSH is due to the fact that this scientific and medical institution is the flagship of Ukraine in providing highly qualified cardiac surgery, which is classified as the highest level IV, i.e. it is a leading scientific institution of cardiac surgery, it has a well-equipped material and technical base, is staffed by highly qualified medical personnel, is widely engaged in scientific activities, and coordinates and cooperates with a developed network of regional centres for cardiovascular surgery throughout Ukraine.

Thus, the Amosov National Institute of Cardiovascular Surgery of the National Academy of Medical Sciences of Ukraine is the optimal leading medical institution that demonstrates its authoritative position in the cardiac surgery industry of Ukraine and can fully ensure the development, creation and operation of CRs of CVD, BT of the heart and great vessels in military personnel. The data included in it can be equated to the data of a population registry. These developments will be useful for the service to provide adequate, timely, highly effective medical care in the field of cardiovascular surgery.

Conclusions

The creation of a CD in active hostilities is an extremely relevant organisational measure, as the information reflected in the CD makes it possible to develop ways to determine the need for cardiac surgery under certain conditions, improve the efficiency and quality of its provision in a short time.

Funding. This study was conducted as part of an applied research project: "Develop and improve the organisational model of cardiac surgery care under martial law in Ukraine" at the expense of budgetary funds.

Conflict of interest. The authors declare that they have no conflicts of interest.

Authors' contributions. All authors contributed equally to this paper.

Consent to publication. All authors have read and approved the final version of the manuscript and agreed to its publication.

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Received: 25.12.2022