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The cost of treatment and rehabilitation of servicemen with amputation after mine-blast injury

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Вартість лікування та реабілітації військовослужбовців з ампутацією після мінно-вибухової травми

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Introduction

Since 2014, Ukraine has been going through one of the most difficult periods in its modern history due to the military conflict in the east of the country. Armed aggression by the russian federation led to the annexation of Crimea and the armed conflict in Donetsk and Luhansk regions. In 2022, russia's full-scale invasion of Ukraine began, which caused significant human and material losses, seriously affected the national security, economy and social structure of Ukraine [1, 2] leading to amputations. Such injuries not only require immediate and qualified medical intervention, but also long-term and comprehensive rehabilitation. According to the Houp.org Foundation's expert assessment, 74% of all injuries among military personnel are limb injuries [3].

Treatment and rehabilitation of amputated servicemen after a mine-blast injury is a complex and multicomponent process that includes not only medical interventions but also psychological support, social adaptation, and professional rehabilitation. Studies conducted in various countries that either had relevant conflicts or wars or whose military contingents took part in military operations indicate that the costs of treatment and rehabilitation of the military [4–8].

These studies highlight the need to develop and implement government support programs that include not only medical care, but also financial support for patients and their families, which may include prosthetics, physical therapy, psychological support, and social services.

The purpose of the research is to study the «portrait» of servicemen with amputations as a result of mine-blast injuries and calculate the costs of their treatment and rehabilitation in a specialized institution that provides highly qualified inpatient care.

Object, materials and research methods

The object of the study is military personnel with amputations as a result of mine-blast injuries; the subject is the socio-demographic characteristics of such patients and the direct and indirect costs of the health care institution for their treatment and rehabilitation.

The sample included all servicemen with amputations caused by mine-blast injuries who underwent treatment and rehabilitation at the Feofinia Clinic of the State Administration of Affairs from September 2022 to June 2024 (46 people in total).

For data collection, information from available electronic medical records was used (age characteristics of patients; military ranks of patients; time from injury to admission of the patient to hospital; duration of medical evacuation; localization of the amputation site; duration of hospitalization and hospital stay; data on surgical interventions and rehabilitation measures; frequency and causes of repeated hospitalizations). Patients were not directly involved in the study, provided informed consent to the processing of their data at the time of treatment. All data used in the study is anonymized to ensure the confidentiality of personal information (resolution of the Committee on Ethics of Scientific Research of NaUKMA, registration number FWA00030125, minutes No. 3 dated May 15, 2024).

For calculations, the method of calculating the total costs of a specific disease, Cost-of-illness (COI) [9–11], and economic analysis were used. For the calculations of direct and indirect costs, the following input data were used: data on hospitalization and hospital stay of patients (number of days, cost of one day of stay), surgical operations, including anesthesia support, consultations of specialist doctors, costs of medicines, in particular for pain management, etc., information on laboratory and instrumental studies (quantity and cost), information on the scope and list of rehabilitation and support services.

The study had several limitations. In particular, this concerned the completeness of information on the provision of medical care to patients at the stage of medical evacuation, which could be useful for a complete analysis of the causes of amputations and their complications. Data on the subsequent costs of treatment and rehabilitation of patients after discharge from the hospital, as well as the costs of prosthetics, were not analyzed.

Research results

The sample of patients consists of 46 patients (military personnel) who received a mine-blast wound while serving in the military structures of Ukraine and were injured while performing combat missions.

All patients received medical care and rehabilitation from September 2022 to June 2024 at the Feofiniya Clinical Hospital of the State Management of Affairs of Ukraine in accordance with the Resolution of the Verkhovna Rada of Ukraine «On Providing Proper Medical Care to Military Personnel and Privates and Officers Who Were Injured, Contusion or Other Damage to Health During the Events in the East of Ukraine» [12].

The age range of patients ranged from 21 to 58 years. The mean age of patients was 36.7 years (median 36 years). By age, the respondents were distributed as follows: age 21–30 years: 12 patients (26%); 31–40 years: 17 patients (37%); 41-50 years: 11 patients (24%); 51–60 years old 6 patients (13%). The distribution by age group indicates that the largest number of amputated patients was in the age group of 31–40 years, the second was the group of patients aged 21–30 years. All patients were admitted to the health care facility at the stages of medical evacuation, with the exception of 2 people who were transferred as planned from other health care institutions due to the need for highly specialized medical care (both patients after long-term treatment: 243 and 164 days after injury, respectively).

The average duration of medical evacuation is 7.32 days (median 6 days). The minimum number of days from the moment of injury to hospitalization in the the Feofiniya Clinical Hospital of the State Management of Affairs of Ukraine is 48 hours, the maximum is 22 days. The distribution of the duration of evacuation is asymmetrical, with a shift to the right. The most common duration of medical evacuation is 6 days; Most values are located in the range from 2 to 12 days.

Significant differences in the duration of the stages of medical evacuation were recorded: 4 patients had a significantly longer time at the previous stage of medical evacuation (from 17 to 22 days). This requires more detailed study and analysis, but it is likely that this data can be useful for planning and improving the medical evacuation process. Also, such information is important for developing strategies to reduce the duration of the stages of medical evacuation.

According to the results of the analysis of military ranks of amputees, it was found that 8.7% of them had officer ranks, 21.7% were sergeants, and 69.6% were soldiers. It can be assumed that such a distribution by military ranks was due to the specifics of the service, other factors that led to injuries among military personnel. However, it is not possible to draw definitive conclusions about the relationship between rank and amputation risk from such a small amount of data. For a more detailed analysis, more data is needed, which includes information on factors such as the type of troops, the type of combat injury, access to medical care, training to provide self-help and assistance to another, etc.

10.9% of respondents had re-hospitalization; the median time between repeated hospitalizations was 68.2 days. In total, one re-hospitalization per patient was recorded (P=0.029). Among the main reasons for repeated hospitalizations in the study sample were: 1) the need for surgical intervention (closure of the colostomy); 2) phantom pains (neuroma); 3) phantom and nociceptive pain (heterotopic ossification and neuroma); 4) deterioration of visual acuity (penetrating wound of the sclera, intraocular foreign bodies, traumatic cataract of the eye); 5) phantom and nociceptive pain (heterotopic ossification and neuroma). It was found that most patients complained of pain syndrome in the form of phantom and/or nociceptive pain during repeated hospitalization. The causes of such pain were complications after amputations (heterotopic ossifications and neuromas).

Among all patients in the study sample, 55 amputations of various localizations were recorded, on average there were 1.2 amputations per patient. Every fifth patient had two or more amputations. Primary or repeated amputations were performed in 18 patients (32.7%). Among all other patients (37 or 67.3%), amputations were performed in the previous stages of treatment. This indicates that all servicemen received complex and multiple injuries, required immediate amputation, or the amputation took place at the time of injury (traumatic amputation).

According to the study, it was found that amputations of the lower limbs occurred in respondents much more often than in the upper ones. Most of the amputations (80%) were performed on the lower extremities: 40% of them were above the knee (thigh), 40% were lower (30.9% – lower leg, 9.1% – foot). Upper limb injuries accounted for 20% of the total number of amputations: 9.1% above the elbow, 10.9% below. This can be due to several factors. In particular, a higher probability of injuries to the lower extremities as a result of explosions, anti-personnel mines, falls, explosions, other hostilities, etc. It is important to note that the amputation localization data presented above are based on a limited set of data and may not be representative of a larger population. The reasons or indications for amputations that were performed at the previous stages of medical evacuation were not investigated due to the lack of relevant information.

The average period of stay of patients in the Feofiniya Clinical Hospital of the State Management of Affairs of Ukraine was 144 days (median 120 days), which indicates the complexity of the patient's health status, the need for an integrated approach to the treatment and rehabilitation of military personnel with amputations. It should be noted that during the study, significant fluctuations between the minimum and maximum values of the duration of stay in the hospital of amputees (from 50 to 200 days) were recorded.

When calculating the costs of hospitalization and stay for treatment, we took into account the costs of providing «hotel» services in the Feofiniya Clinical Hospital

of the State Management of Affairs of Ukraine (patient's stay in a 2-bed ward), data on the duration (number of days) of stay of patients with amputations. Such average costs were estimated at UAH 287,435 ≈UAH 290,000.

The costs of laboratory diagnostics were carried out in the context of certain types of such diagnostics: general clinical studies, biochemical studies, bacteriological studies and immunological studies. The results of the analysis of volumes and the list of laboratory diagnostic tests demonstrate a wide variety, which may indicate a complex and multi-stage process of diagnosis and treatment of such injuries. As well as an individualized approach to each patient depending on his condition and the need for certain laboratory tests. The total number of laboratory parameters performed is 9379, an average of 204 laboratory parameters per patient. Studies as complete blood count (964), determination of total protein (649), creatinine (688) and urea (647). The estimated total costs of laboratory diagnostics amounted to UAH 1,575,970 ≈UAH 1.6 million.

Costs for instrumental diagnostics: 49 instrumental diagnostic methods were analyzed, which are divided into the following groups: PET-CT, MRI, CT radiography, ultrasound diagnostics, etc. On average, about 10 computed tomography scans were performed on one patient. The use of CT for diagnosis is due to the fact that most patients had metal fragments in the body, which is a common contraindication to magnetic resonance imaging. The estimated total costs of instrumental diagnostics amounted to UAH 1,161,510≈1.2 million. on all patients with amputations as a result of mine-blast combat trauma. Of these, the largest costs are for CT – UAH 758,570 (465 examinations and 65.3% of instrumental diagnostics costs), MRI – UAH 45,400 (15 examinations and 4% of instrumental diagnostics costs). Ultrasound diagnostics accounted for 17% of all instrumental studies (on average 11.5 studies per patient) and the cost of its implementation amounted to UAH 193,225 ≈UAH 193,200.

Costs for surgical interventions: the total number of surgical interventions among the patients of the study sample was 406, on average 8.8 surgical interventions were performed per patient. When making calculations, the costs of surgical intervention, anesthesia support, dressings, VAK therapy were taken into account. The estimated total costs for surgical interventions amounted to UAH 773,505 ≈UAH 773,500.

Expenses for consultations of specialists: the number and cost of consultations and consultations, which were reflected in the medical history, were studied. According to the study, it was found that in general, 734 consultations of doctors of various profiles were recorded in the medical documentation, on average, one patient had 16 consultations.

The cost of medicines was calculated, first of all, for means for the management of pain in a patient after amputation, as well as the cost of antibiotics, anticoagulants, psychotropic drugs. In general, it should be noted that the costs of medicines for patients from the study sample were very variable and significantly depended on the sources of their receipt (public procurement, volunteer assistance, etc.). In particular, for the management of pain after amputation the cost of painkillers was about UAH 15,000 per patient. As for other medicines (antibiotic therapy, anticoagulants, psychotropic drugs, etc.), it is estimated that an average of about UAH 1500 per patient was spent every day. The estimated total cost of medicines for the group of respondents is about UAH 10,741,500≈10.7 million.

Costs for rehabilitation services: the provision of rehabilitation care by a multidisciplinary team in the the Feofiniya Clinical Hospital of the State Management of Affairs of Ukraine to patients in the acute rehabilitation period took place in all departments, centers, divisions of the health care facility where patients were hospitalized. Such a team included doctors of physical and rehabilitation medicine, physical therapists, occupational therapists, speech and speech therapists (speech therapists), assistants to physical therapists and occupational therapists, psychologists, and a social worker.

During the patient's stay at the stage of the acute rehabilitation period, rehabilitation care was provided of a low volume – 1 hour a day for 5 days a week [13]. According to the rehabilitation route, in the post-acute period, rehabilitation care for amputees was provided of a high volume – 3 hours a day for 5 days a week. Cost calculations were made for the main rehabilitation services: physical therapy, occupational therapy, classes with a psychologist and massage. The estimated total costs for the provision of rehabilitation services are UAH 1,155,116≈1.2 million. The largest share of costs (57%) was for physical therapy. This is due to the fact that patients needed prevention of complications caused by adynamia (pneumonia, bedsores, venous thrombotic complications, etc.), had the need for early mobilization, the need for the prevention of contractures and the maintenance of full range of motion in the joints, verticalization, increasing the patient's endurance, learning to sit and move (in the case of amputations of the lower or lower limbs), selection, training in the use, adjustment and provision of rehabilitation aids aimed at primary verticalization (in the case of amputations of the lower limbs) [13].

In general, according to the calculations, the total cost of treatment of 46 patients with mine-blast injuries (amputations) amounted to UAH 28,893,861 ≈UAH 29.0 million, of which the largest share was occupied by the costs of hospital stay (45%), laboratory and instrumental tests (9.1%) and medicines (28.6%). Per patient, the costs amounted to UAH 628 thousand.

Discussion of research results

According to the study, it was found that the problem of providing medical care and rehabilitation to the military is covered in international publications and scientific studies on countries that either had relevant conflicts

or wars, or whose military contingents took part in military operations.

Compared to other studies, certain differences have been established in terms of the age of servicemen with mine-blast injuries and amputations. According to our study, the average age of patients was 36.7 years, and according to the experience of other countries, the age range of patients varied from 25 to 30 years. In particular, the average age of servicemen injured by anti-personnel mines during the period of hostilities from 1991 to 1995 in southern Croatia was 25.5 years [14,15]. The average age of military personnel who took part in the operation in Iraq (period March 2004-December 2007) and received mine-blast injuries, – 24.5 years [16–18]. Studies by Belisle, J. G. et al. [19] also shows that the average age of U.S. military personnel who underwent major amputations of limbs during hostilities in Iraq and Afghanistan between October 1, 2001 and July 30, 2011, was 25 years. According to the data of a retrospective analysis of traumatic limb amputations due to explosions (military hospital, Kandahar, Afghanistan) [20] it was also found that the average age of patients with amputations due to mine-blast injuries was 29 years.

The experience of studying the type, location, and severity of injuries among military personnel who took part in military operations is important. Regarding the complexity of injuries, according to our study, patients had multiple injuries that required primary and secondary amputations (1.2 amputations per subject). These data are consistent with the results of other studies among military personnel who were injured by explosive weapons in Afghanistan in 2010 or 2011. trunk and/ or upper limbs [21]. The scale of traumatic amputations in British servicemen who took part in the military contingent in Afghanistan between 2003 and 2014 was also quite significant: the average number of lost limbs per wounded person was 1.6 [22]. According to other studies, the proportion of complex and very complex among all mine-blast injuries was 8.6% and 5.9%, respectively [23–25]. Among U.S. military personnel who underwent extensive limb amputations during combat operations in Iraq and Afghanistan in 2001-2011, the most common localization was below the knee amputation. In general, the complexity of the injury was assessed according to the appropriate scales and amounted to 15 points and above, which indicated serious injuries [19].

According to one of the domestic studies on injured servicemen in 2014-2016, who took part in the ATO and were hospitalized in the hospital. I.I. Mechnikov (Dnipro) [26], mine-blast injuries and impressions also prevailed (67.6%), including significant impressions on the lower limbs (62.2%). These data indicate a significant prevalence and complexity of traumatic injuries caused by mine-blast injuries.

It is also important to study the duration of treatment of servicemen with mine-blast injuries and amputations. According to this study, patients were treated for an average of 144 days (median −120 days; range−34-635 days). According to the study Melcer, T. et al. [27], which was conducted among 649 U.S. military personnel with limb amputations as a result of injuries sustained during the conflicts in Iraq and Afghanistan from 2001 to 2008, their treatment after early amputation was 90 days, late−more than 90 days after the injury. The results of a retrospective, interventional study of U.S. military personnel who participated in the operation in Iraq, indicate that the average duration of follow-up was 200 days (median – 97 days; range – 4–1023 days). Researchers pointed out that new surgical and pharmacological treatments are needed to improve functional and anatomical outcomes in such injuries [18].

Today, in Ukraine, the basic principles of providing medical care to military personnel are regulated by the relevant law of Ukraine [28], which was amended at the beginning of the full-scale invasion to ensure the provision of such assistance under martial law [29]. According to the order of the Ministry of Health of Ukraine [30] medical care should be provided to all victims and wounded around the clock without fail in the nearest healthcare institutions that are able to provide assistance in accordance with the profile of the lesion. Under martial law, civilian healthcare institutions, including private ones, are also involved in the provision of medical care, but on condition that the selected private medical institution provides services free of charge (paid for by the institution itself or within the framework of the Medical Guarantee Program (PMG).

The Medical Guarantee Program defines the appropriate packages of medical services, which provide for the provision of free assistance to victims of the consequences of hostilities, including those related to mine-blast injuries and their consequences. In particular, in the SGP in 2022 [31] the list of diagnostic-related groups (DRG) includes the corresponding codes for payment for interventions related to the consequences of mine-blast trauma (codes 805, 806, 807).

Reimbursement of NHSU expenses to health care institutions for the treatment of patients with mine-blast injuries was and is carried out at a combined tariff, which combines the global rate and the rate per treated case, taking into account the DRG. The share of payment for DRG, taking into account the complexity of the treated case, is growing annually. The corresponding changes in the combination of the share of the global rate and the rate for the DRG are presented in Table. 1. Also, the amount of reimbursement of expenses is adjusted by additional coefficients (for the willingness to provide medical care, the mountain coefficient; and from 2024. −for the provision of prolonged inpatient medical care to adults and children, which is associated with new risks and challenges due to the war and the need for long-term treatment, especially for patients with mine-blast injuries).

In 2024, two new packages of medical guarantees are included in the PMG: rehabilitation care for adults and children in inpatient and outpatient conditions with corresponding tariffs of UAH 19,769 and UAH 10,820.

Table 1

Changes in the PMG related to the provision of free medical care to patients with mine-blast injuries under contracts with the NHSU in 2022–2024 (prepared by the authors based on sources [32–34])

Indicator	2022	2023	2024
Tariff for medical services, UAH	7 506	8 635 (+1129)*	8 735 (+100)**
Global Rate Application Share Ratio			
from January 1 to March 31 of the corresponding year	0,8	0,95	0,6
from April 1 to June 30 of the corresponding year	0,75	0,85	0,55
from July 1 to September 30 of the corresponding year	0,7	0,65	0,5
from October 1 to December 31 of the relevant year	0,65		0,45
Adjustment coefficients to the rate for the treated case			
from January 1 to March 31 of the corresponding year	0,2	0,05	0,4
from April 1 to June 30 of the corresponding year	0,25	0,15	0,45
from July 1 to September 30 of the corresponding year	0,3	0,35	0,5
from October 1 to December 31 of the relevant year	0,35		0,55
Coefficient for willingness to provide medical care to children or adults, subject to compliance with additional conditions	1,3		
Mountain coefficient	1,2		
Coefficient for the provision of prolonged inpatient medical care to adults and children	X	X	0.1 of the global rate per month, is included in the terms of the contract with medical service providers determined by the list of the Ministry of Health (PMC «Inpatient care for adults and children without surgical operations»)
Weight coefficient DSG 805 Other surgical interventions associated with the long-term consequences of mine-blast trauma	1,91		
Weight coefficient DSG 806 Consequences of mine-blast trauma (severe burns, intracranial injuries)	3,17		
Weight coefficient DSG 807 Other diseases associated with long-term consequences of mine-blast trauma	1,02		

Note: * – compared to 2022; ** – compared to 2023.

Appropriate adjustment coefficients were applied to the rate for medical services (one rehabilitation cycle) depending on the complexity and complexity of the service provided [34]. The highest coefficients were used when undergoing inpatient rehabilitation: 2.1 for cases with the highest complexity in combined injuries and 1.6−high (in the presence of moderate and significant restrictions on daily functioning).

The results of this study allowed us to calculate the costs of treatment and rehabilitation of servicemen with amputations as a result of mine-blast injuries at the level of a specialized inpatient institution. The calculations indicate significant financial costs for inpatient treatment and rehabilitation of such patients compared to reimbursement of costs at the expense of the medical guarantee program (on average, UAH 628 thousand per patient against UAH 60–70 thousand for PMG)). The data obtained may be important for predicting future healthcare costs among military personnel after amputation, i.e., they may be important for improving budgeting and payment policies within the framework of state guarantees for the provision of medical services. The obtained cost calculation data indicate similar results in terms of the need for financial resources to cover the costs of treatment and rehabilitation of military personnel who took part in various conflicts or wars and were injured, which is reflected in other publications. In particular, according to Canadian researchers who have been assessing the financial costs of proper care for military personnel wounded in the performance of duty in the conflict zones in Afghanistan since February 7, 2006 As of February 6, 2007, such costs for treatment in a field hospital were approximately $20,000, a regional hospital outside the theater of operations – $42,000, and treatment in Canada after evacuation from a war zone – $113,000 Canadian dollars (in 2008 prices) [35].

According to Masini, B. D. et al. [36] patients with limb injuries accounted for 65% of the total use of hospital resources worth US$65.3 million. The authors emphasized that combat-related limb injuries require the greatest use of resources for inpatient treatment in the initial period after injury, lead to greater disability, and have the highest projected costs for social benefits. Similar data are presented in the study by Kurichi J.E. and co-author [37].

Some researchers also pointed to the need to create a long-term health financing mechanism for military personnel with amputations [38]. The results of international studies also indicate that military conflicts and wars lead to a large number of complex injuries and, accordingly, financial costs. In particular, the total 40-year expenditure of the British cohort of Afghans with lower limb amputations amounted to £288 million ($444 million); this figure included the cost of inpatient trauma care, rehabilitation, and prosthetics [22].

Prospects for further research

The results of this study are extremely important for further fundamental, practical and long-term research to study and predict the future costs of treatment and rehabilitation of servicemen with amputations received as a result of mine-blast injuries and wounds. After all, the financial costs of providing medical and rehabilitation services for amputated servicemen will continue in the coming years and decades. Further research on health, mental health or complications that develop after injury or injury among military personnel with amputations resulting from mine-blast injuries is warranted. We also note that the results obtained cannot be valid for civilians who received mine-blast injuries and wounds. Therefore, such studies can become important for understanding the possible financial burden on both the health care system and directly on civilian amputees as a result of mine-blast injuries.

Conclusions

According to international experience, it has been established that in military conflicts or operations (Croatia, Iraq, Afghanistan, etc.), mine-blast injuries and injuries occupy a significant share (50% or more), especially among military personnel. Such injuries are quite complex, multiple and, in the vast majority with complications, injuries and amputations of limbs were predominant.

A portrait of a serviceman with amputations as a result of mine-blast injuries and wounds, who were treated and rehabilitated at the the Feofiniya Clinical Hospital of the State Management of Affairs of Ukraine was formed. In particular, the average age of such patients was 36.7 years, which is slightly higher than according to international sources (25-29 years). This may indicate the specifics of Ukrainian long-term military operations in the context of a hybrid war and the impact of mobilization age on this indicator.

It was found that among the studied contingent of patients, they were characterized by multiple injuries (1.2 amputations per patient), which required a long stay for treatment (an average of 114 days). The vast majority of amputations were performed at the preliminary stages of medical evacuation (67.3% of respondents), mainly amputations of the lower extremities, which correlates with the data of other international studies and publications. One in ten of the respondents had a second hospitalization, which was mainly due to the need for repeated surgery or pain syndrome (phantom pains).

According to the calculations, the total costs of treatment and rehabilitation of servicemen with amputations (without prosthetics) who underwent treatment and rehabilitation at the the Feofiniya Clinical Hospital of the State Management of Affairs of Ukraine (46 respondents) amounted to more than UAH 28.9 million (in 2024 prices), which is an average of UAH 628 thousand per patient. This significantly exceeds the amount of payment at the global rate and the rate per treated case under the medical guarantee program. In 2024, the reimbursement rate for one person treated under the packages of medical services «Surgical operations for adults and children in inpatient conditions» / «Inpatient care for adults and children without surgical operations» amounted to UAH 8,735, «Rehabilitation care for adults and children in inpatient conditions» – the rate per treated case was UAH 19,769 or, taking into account the highest correction coefficient of 2.1 for one rehabilitation cycle – UAH 41,515.

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Purpose: to study the «portrait» of servicemen with amputations as a result of mine-blast injuries and to calculate the costs of their treatment and rehabilitation in a specialised institution providing highly qualified inpatient care

Materials and methods. The study was conducted among servicemen who underwent treatment and rehabilitation at the Feofiniya Clinical Hospital of the State Management of Affairs of Ukraine from September 2022 to June 2024 (46 people in total). The following methods were used to conduct the study: cost-of-illness method, economic analysis. The costs of prosthetics due to amputations were not analysed in the calculations.

Results. 46 patients (servicemen) who sustained mine-blast wounds while performing combat missions were included in the study. The patients' ages ranged from 21 to 58 years (mean age – 36.7 years). On average, there were 1.2 amputations per patient. The average length of stay for treatment and rehabilitation was 144 days (median 120 days). Overall, it was estimated that the largest share of costs was for inpatient treatment (45%), laboratory and instrumental tests (9.1%), and medicines (28.6%). The cost per patient was UAH 628 thousand.

Conclusions. According to the calculations, the total cost of treatment and rehabilitation of servicemen with amputations (excluding prosthetics) in the study sample was more than UAH 28.9 million (in 2024 prices).

Key words: direct and indirect costs, medical care, combat-related amputations.

Мета: вивчення «портрету» військовослужбовців з ампутаціями внаслідок мінно-вибухових травм та обрахунок витрат на їх лікування та реабілітацію у спеціалізованому закладі, який надає висококваліфіковану стаціонарну допомогу.

Матеріали та методи. Дослідження проведено серед військовослужбовців, які проходили лікування і реабілітацію у клінічній лікарні «Феофанія» Державного управління справами з вересня 2022 р. по червень 2024 р. (усього 46 осіб). Для проведення дослідження використано такі методи: підрахунку загальних витрат на конкретне захворювання (Cost-of-illnes), економічний аналіз. Витрати на протезування у зв'язку з ампутаціями до розрахунків не аналізувалися.

Результати. Вибірка пацієнтів складалася з 46 пацієнтів (військовослужбовців), які отримали мінно-вибухове поранення під час виконання бойових завдань. Усі пацієнти перебували на лікуванні з вересня 2022 р. по червень 2024 р. Віковий діапазон пацієнтів варіювався від 21 до 58 років (середній вік – 36,7 року). Найбільша кількість пацієнтів з ампутаціями припадала на вікову групу 31–40 років. Термін від моменту травми до госпіталізації у спеціалізований стаціонарний заклад становив від 48 годин до 22 днів (з урахуванням етапів медичної евакуації). Зафіксовано факти повторної госпіталізації серед досліджу-

ваного контингенту (10,9%); середній час між повторними госпіталізаціями становив 68,2 дні. Серед найбільш поширених причин повторних госпіталізацій – больовий синдром у вигляді фантомного та/або ноцицептивного болю.

У середньому на одного пацієнта припадало 1,2 ампутацій. Більшості пацієнтів ампутації були проведені на попередніх етапах лікування (37 пацієнтів, або 67,3%); 18 пацієнтам (32,7%) були проведені первинні чи повторні ампутації безпосередньо у закладі. Установлено, що ампутації нижніх кінцівок зустрічалися у респондентів значно частіше, ніж верхніх. Середній термін перебування пацієнтів на лікуванні і реабілітації становив 144 дні (медіана 120 днів).

Пацієнти у досліджуваній вибірці потребували значної кількості лабораторних та інструментальних досліджень. Розрахункові загальні витрати на лабораторну діагностику становили 1,6 млн грн. Переважна більшість пацієнтів потребувала проведення складних інструментальних досліджень під час лікування, зокрема комп'ютерної томографії, яка використовувалася найчастіше, оскільки більшість пацієнтів мала металеві осколки у тілі. Розрахункові загальні витрати на інструментальну діагностику становили близько 1,2 млн грн на всіх пацієнтів з ампутаціями внаслідок мінно-вибухової бойової травми, у т. ч. витрати на КТ – 760 тис грн (65,3% серед усіх витрат на інструментальну діагностику).

Більшість пацієнтів потребувала під час лікування лікарських засобів для менеджменту болю після ампутації. У середньому витрати на знеболювальні становили близько 15 тис грн для одного пацієнта.

У цілому згідно з проведеними розрахунками сумарні витрати на лікування 46 пацієнтів із міно-вибуховими травмами (ампутаціями) становили 28 893 861 грн ≈29,0 млн грн. Із них найбільшу частку становили витрати на перебування в стаціонарі (45%), лабораторні та інструментальні дослідження (9,1%) та лікарські засоби (28,6%). У розрахунку на одного пацієнта витрати становили 628 тис грн.

Висновки. Установлено, що за військових конфліктів чи операцій в інших країнах понад 50% припадає на міно-вибухові ураження і травми. Сформовано портрет військовослужбовця з ампутаціями внаслідок мінно-вибухових травм і поранень, які проходили лікування та реабілітацію у клінічній лікарні «Феофанія» ДУС. Пацієнти мали множинні травми з ампутаціями (1,2 ампутації на одного пацієнта). Згідно з проведеними розрахунками, загальні витрати на лікування і реабілітацію військовослужбовців з ампутаціями (без урахування витрат на протезування) у досліджуваній вибірці становили понад 28,9 млн грн (у цінах 2024 р.), що в середньому на одного пацієнта 628 тис грн. Це в рази перевищує обсяги відшкодування витрат на лікування таких пацієнтів за програмою медичних гарантій. Отримані дані свідчать про потребу у значних фінансових ресурсах для покриття фактичних витрат закладів на надання стаціонарної медичної допомоги.

Ключові слова: прямі та непрямі витрати, медична допомога, ампутації внаслідок бойових дій.

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