

НА ДОПОМОГУ ЛІКАРЮ, ЩО ПРАКТИКУЄ. ЛЕКЦІЇ

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Comparative Characteristics of Patients Structure in the Orthopedics Department of a Clinical Hospital in a Region Remote from the Front Line during Peacetime and the First Year of a Full-Scale War in Ukraine

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Objective. To analyze changes in the nosological structure of patients, treatment technologies, to outline the peculiarities of surgical interventions in the trauma profile of a civilian clinical hospital during the war period and to emphasize the need for relevant knowledge and skills of specialists in the treatment of combat trauma and its consequences. *Methods.* A comparative analysis of the clinical and nosological structure of 2,475 patients were treated during the year before the war and 3,838 patients during the full-scale war year. Among them, 83.1 % were civilians, 7.7 % were temporarily resettled, and 9.2 % were military personnel. The study utilized bibliosemantic, medical-statistical, and clinical methods. *Results.* During the active phase of the war, the Orthopedics Department of the civilian clinical hospital provided specialized medical assistance to both civilian populations and military personnel injured during hostilities. The relative number of hospitalized men increased by 4.83 %, and although the absolute number of those urgently hospitalized decreased. Despite the overall increase in the number of operations per patient, surgical activity in the Orthopedics Department decreased from 86 to 80 %. The intensification of inpatient treatment organization, patient preparation for subsequent stages of surgical interventions in the Rehabilitation Department, and outpatient medicine work collectively reduced the average bed-day in the Orthopedics Department by 12.3 %. *Conclusions.* Thus, during the war, the structure of patients in the Orthopedics Department of the civilian medical clinical institution changed, with an increase in the relative number of male patients and those with multiple and combined injuries. A notable feature of the treatment process organization during hostilities is the phasing of the treatment of the wounded not only at the levels of medical evacuation but also within the clinical hospital. The intensification of the organizational component and the outpatient link of the treatment process allowed for a reduction in bed-days and the provision of inpatient treatment to a larger number of patients.

Мета. Проаналізувати зміни в нозологічній структурі хворих, лікувальних технологіях, окреслити особливості хірургічних втручань травматологічного профілю цивільної клінічної лікарні у воєнний період та наголосити на потребах у відповідних знаннях і вміннях фахівців щодо лікування бойової травми та її наслідків. *Методи.* Проведено порівняльний аналіз клініко-нозологічної структури 2 475 цивільних пацієнтів ортопедо-травматологічного відділення, які лікувались протягом року перед війною та 3 838 осіб, госпіталізованих протягом року під час неї (цивільні — 83,1 %, тимчасово переселені — 7,7 і 9,2 % військових). Використано бібліосемантичний, медико-статистичний і клінічний методи аналізу. *Результати.* В активну фазу війни профільне відділення надає спеціалізовану допомогу як цивільному населенню, так і військовим. Це спричинило зміни в клініко-нозологічній структурі пацієнтів: збільшилось на 4,83 % відносне число госпіталізованих чоловіків і зменшилась кількість звернень в ургентному порядку. Попри збільшення сумарної кількості операцій на одного пацієнта, хірургічна активність зменшилась із 86 до 80 %, оскільки низка хворих були оперовані на попередніх етапах Інтенсифікація організації стаціонарного лікування, підготовки пацієнтів до подальшого етапу хірургічних втручань у реабілітаційному відділенні та роботи амбулаторної медицини знизило середній ліжко-день у відділенні на 12,3 %. *Висновки.* Отже під час війни в цивільній медичній клінічній установі змінилася структура пацієнтів ортопедо-травматологічного відділення: збільшилась кількість пацієнтів чоловічої статі з множинними і поєднаними ушкодженнями. Особливістю організації лікувального процесу є етапність спостереження поранених не лише на рівнях медичної евакуації, але і в клінічній лікарні. Інтенсифікація організаційної компоненти й амбулаторної ланки лікувального процесу дозволяє зменшити ліжко-день і забезпечити стаціонарним лікуванням більшу кількість пацієнтів. *Ключові слова.* Ортопедо-травматологічне відділення, клініко-нозологічна структура пацієнтів, організація лікувального процесу.

Keywords. Orthopedics Department, clinical-nosological structure of patients, organization of the treatment process

Introduction

According to analysts, military conflicts significantly impact civilian orthopedic surgery. The number of patients with injuries, open fractures, and those requiring reconstructive surgeries on bones and soft tissues with subsequent prolonged rehabilitation is increasing [1–4].

In addition to healthcare facilities within the military health system, individuals with combat injuries receive treatment in civilian hospitals corresponding to the tertiary, and quaternary levels of medical care [1]. This prompts the search for new strategies to improve the treatment of those injured and wounded in combat situations [5].

A structural subdivision of a clinical multidisciplinary hospital is the Orthopedics Department, which provides urgent and planned specialized medical care to patients with injuries and diseases of the musculoskeletal system. The provision of this Department with personnel and medical equipment is carried out in accordance with orders approved by the Ministry of Health of Ukraine, volume and quality of medical care align with clinical protocols.

During the war, leaders of civilian healthcare institutions face the task of organizing the work of medical personnel to treat both civilian and military patients in a way that does not compromise the ability to assist the civilian population with musculoskeletal injuries while ensuring timely and high-quality treatment for military personnel.

From this perspective, for timely response to the constantly changing situation, it is important to conduct an analysis of the structure of patients hospitalized in the specialized departments of a civilian hospital, assess statistical indicators characterizing the dynamics of the share of combat surgical trauma and related injuries, corresponding changes in the features of surgical interventions, and so forth.

Objective: to analyze changes in the nosological structure of patients, treatment technologies, outline the features of surgical interventions in the orthopedic profile of a civilian clinical hospital during a period of full-scale aggression, and emphasize the need for relevant knowledge and skills among specialists in the treatment of combat trauma and its consequences.

Materials and Methods

The study was approved by the Bioethics Commission of Danylo Halytsky Lviv National Medical University (protocol № 11 of 19.12.2022).

We conducted an analysis of the dynamics of providing specialized orthopedic care at St. Luke's Hospital in Lviv from 2021 to 2023. In 2021, the Orthope-

dics Department treated 2 475 patients, all of whom were civilians. From March 2022 to March 2023, there were 3838 individuals in the Department (further analysis is presented in the «Results and Discussion» section).

The following research methods were utilized:

– *bibliosemantic:* for the analysis of contemporary sources of scientific information regarding the improvement of assistance organization for hospitalized individuals;

– *statistical:* for the collection, processing, and analysis of indicators, establishing comparison group correlations, and determining the reliability of the obtained results;

– *clinical:* for justifying the clinical-epidemiological, clinical-nosological, and clinical-organizational characteristics of skeletal injuries;

– *standardized assessment systems:* for determining the severity of injuries and the condition of hospitalized patients with limb injuries.

For ease of reference in the text and the analysis of clinical-nosological characteristics, the group of patients treated in the Orthopedics Department in 2021 is referred to as the comparative group, and the group of patients treated in the department from March 2022 to March 2023 is referred to as the main group.

Results and Discussion

The analysis revealed that out of the 2475 patients who received assistance in 2021, 66.58 % had musculoskeletal injuries. Among them, 1648 (66.59 %) had skeletal fractures, with 474 patients (28.76 %) having fractures of the upper limbs and 1125 (68.26 %) of the lower limbs. Multiple injuries were observed in 20 patients (1.21 %), combined injuries in 29 patients (1.77 %), and 33.42 % had orthopedic diseases.

From March 2022 to March 2023, the Orthopedics Department treated 3838 patients, a 55.07 % increase compared to the previous year. Among them, 83.1 % were civilians, 7.7 % were temporarily displaced, and 9.2 % were military personnel. Patients with skeletal fractures numbered 2 225 (35.01 % more than the previous year), constituting 57.97 % of the total, while those with orthopedic diseases made up 42.03 %.

The number of patients with fractures of the upper limbs was 633 (28.44 %), a 33.54 % increase compared to the previous year. The total number of lower limb fractures was 1 486 (66.7 %), a 32.08 % increase. Multiple injuries were noted in 247 patients (6.43 %), a staggering 1 235 % !!! increase, and combined injuries were observed in 95 patients (2.47 %), representing a 327.59 % increase compared to the previous year.

For greater clarity and convenience of comparison, the data has been presented graphically (fig. 1).

The active phase of the war also influenced the gender distribution of patients: while men accounted for 52.88 % of all hospitalized individuals in the comparative group (in 2021), in the main group, their relative number increased to 57.71 %. However, the average age of patients did not change significantly and remained at (52 ± 1) years.

In our view, this can be explained by the presence of younger, predominantly male military personnel, as well as the inclusion of older internally displaced persons — patients from temporarily occupied territories and areas adjacent to the conflict zones, who suffered both domestic and gunshot injuries. Additionally, the Orthopedic Department continued to admit local residents with injuries and disorders of the musculoskeletal system.

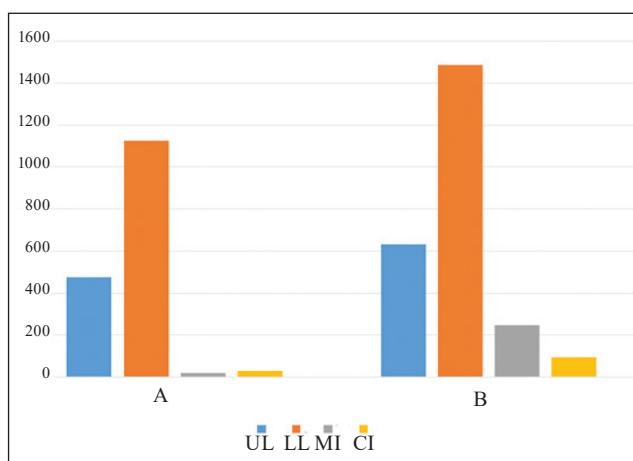


Fig. 1. Distribution of patients by fracture localization: A — in 2021; B — in 2022–2023. Where UL — upper limb, LL — lower limb, MI — multiple injuries, CI — combined injuries

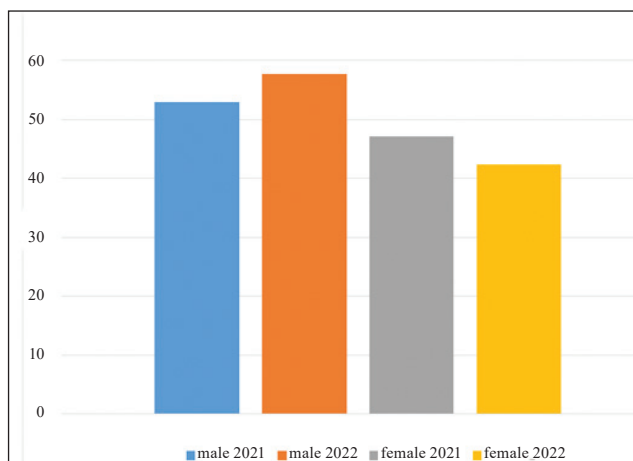


Fig. 2. Distribution of patients by gender in the control and main groups

The majority of patients in the comparative group (2021) were admitted to the Orthopedics Department as an emergency (78.74 %) with bone fractures, of which 98.5 % were closed fractures and 1.5 % were open fractures. Most patients with open fractures had soft tissue injuries classified as IO-1, IO-2 due to the mechanism of internal damage by bone fragments.

The absolute number of patients admitted in an emergency manner in the main group was lower than in the comparative group, accounting for 63.31 %. However, the percentage of patients referred from military institutions and outpatient clinics increased. The number of patients with open fractures increased to 4.5 %, among whom soft tissue injuries were classified as IO-3, IO-4, and IO-5 (fig. 2).

The increased number of patients with multiple fractures rose to 6.43 %, and those with combined injuries increased to 2.47 %. These patients underwent staged surgical operations on the musculoskeletal system, while those with combined injuries and wounds followed the damage control strategy.

It is essential to highlight that all patients with combat-related bone injuries of the extremities, hospitalized in the Orthopedics Department, had their fractures immobilized with external fixation devices (Ex Fix). However, approximately 2 % of these patients required correction of Ex Fix during the inpatient treatment for fracture stabilization.

While 25 % of patients in the control group underwent urgent internal osteosynthesis based on indications, in the main group, such surgical procedures were performed only in the absence of mass hospitalizations of military personnel and temporarily displaced individuals.

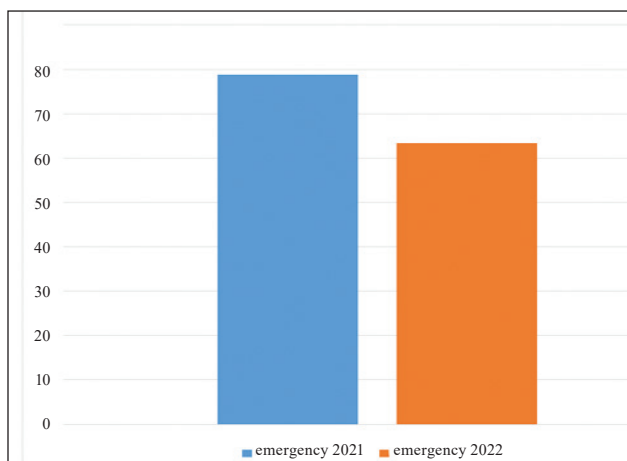


Fig. 3. Dynamics of emergency admissions in the control and main groups

Upon the arrival of evacuated wounded individuals, thorough examination and wound inspection were conducted in the operating room, involving repeated or secondary surgical wound debridement, and if necessary, correction of Ex Fix.

Patients with limb injuries and soft tissue defects (both military and civilian) required a multidisciplinary approach to treatment, involving specialists in radiological diagnostics, critical care doctors, surgeons, plastic surgeons, and orthopedic surgeons. The primary goal of treating patients with combined trauma and life-threatening complications of trauma was to save the patient's life. In patients with polytraumatic injuries of the limbs and tissue defects, overcoming wound infection, wound healing of soft tissues, and/or performing plastic closure of the wound were crucial. Proper evaluation of the limb's condition and making tactical decisions regarding its preservation or amputation were essential.

For the treatment of wound infections and the execution of corresponding surgical interventions for plastic wound closure, patients were transferred to the Surgical Department or the Plastic and Reconstructive Surgery Department. This affected the number of surgical operations recorded by the Orthopedics Department. Despite the overall increase in the number of operations per patient, the surgical activity in the Orthopedics Department decreased from 86 to 80 %. This was influenced by some patients being operated on during the earlier stages of evacuation and then transferred to the Orthopedics Department for conservative treatment with subsequent transfer to the rehabilitation Department.

The reduction in surgical activity was also influenced by the referral of some patients by territorial recruitment and social support centers (enlistment offices) for examination and health assessment in inpatient conditions and for obtaining the relevant conclusion from the medical advisory commission.

Due to the more massive influx of injured individuals to the Orthopedics Department during the full-scale war and to ensure their bed capacity, the organizational aspect of the treatment process was intensified. Another factor influencing the average bed-day in the Orthopedics Department was the introduction of an intermediate stage of patient treatment in the Rehabilitation Department to prepare them for the subsequent stage of surgical intervention, including the conversion of the method of fracture fixation from external fixation to internal osteosynthesis (conversion).

Another factor in reducing the bed-day in the Orthopedics Department was the intensification of out-

patient medical care, which provided treatment for operated patients in the postoperative period in the absence of complications. Patients positively responded to this organization of the treatment process.

All the above measures resulted in a 12.3 % reduction in the average bed-day from 6.1 bed-days in 2021 to 5.4 bed-days in 2022.

We have to state that the main group saw a significant increase in the number of patients with limb amputations and those requiring amputation. These were mainly young, working-age individuals after combat trauma. Their treatment involved preparing the amputation stump for prosthetics. 1.5 % of them required amputations for secondary indications. The decision to amputate the limb for secondary indications was made by a panel of doctors based on the MESS scale and their experience. To obtain the patient's consent for amputation, it was necessary to explain to them the necessity of such an operation and the prospect of modern prosthetics. One convincing argument in favor of amputation (based on indications) and the patient's agreement to the amputation was the possibility of communication of these patients with successfully prosthetized fighters for the restoration of the function of the amputated limb in the Rehabilitation Department.

Conclusions

Based on the conducted research, it has been determined that during the war in the civilian medical clinical institution, there was a significant change in the patient structure of the Orthopedics Department: there was a 55.07 % increase in the total number of hospitalized patients compared to the previous year, and the number of patients with multiple (1 235 % increase!!!) and combined injuries (327.59 % increase) compared to the previous year. The relative number of patients with open fractures, including soft tissue injuries of grades IO-3, IO-4, and IO-5, increased by 3 %.

The gender distribution of patients changed: the relative number of men increased by 4.83 %. However, the average age of patients did not change significantly and was (52 ± 1) years.

Despite the overall increase in the number of surgeries, the surgical activity in the Orthopedics Department decreased from 86 to 80 %. The reasons for the decrease in surgical activity include the fact that some of the injured were operated on at previous stages of medical care provision, and others underwent plastic surgeries to close soft tissue defects in the Surgical Department. In addition, patients in

the Orthopedics Department were present for diagnostic purposes and health assessment dynamics according to the referrals of the territorial recruitment center (enlistment offices).

An organizational feature of the treatment process during the period of hostilities is the staged treatment of the injured not only at the levels of medical evacuation but also in the departments of the civilian clinical hospital.

The intensification of the organizational component and the outpatient sector of the treatment process allowed for a 12.3 % reduction in the bed-days and, accordingly, provided hospital treatment for a larger number of patients.

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

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ПОРІВНЯЛЬНА ХАРАКТЕРИСТИКА СТРУКТУРИ ПАЦІЄНТІВ ТРАВМАТОЛОГІЧНОГО ВІДДІЛЕННЯ КЛІНІЧНОЇ ЛІКАРНІ У ВІДДАЛЕНОМУ ВІД ФРОНТУ РЕГІОНІ ЗА ПЕРІОД МИРНОГО ЧАСУ І ЗА ПЕРШИЙ РІК ПОВНОМАСШТАБНОЇ ВІЙНИ В УКРАЇНІ

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