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Features of diagnostics and management of military servants with pulmonary tuberculosis in hospital conditions

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The aim of the work is to analyze the features of diagnostics and management of military personnel with tuberculosis who were treated in hospital.

Materials and methods. A retrospective analysis of the medical records of 57 patients with pulmonary tuberculosis of military personnel, all males, who underwent inpatient treatment at the Ternopil Regional Phthisiopulmonological Medical Center was carried out.

Research results. The analysis found that new cases of pulmonary tuberculosis were in 48 (84.2 %), recurrent cases – in 9 (15.8 %) patients. When analyzing the ways of detecting tuberculosis in patients, most of them were diagnosed due to complaints (57.9 %), during a preventive examination tuberculosis was detected in 17.5 %, during the provision of care after an injury – in 15.8 %. It was found that in 15 out of 48 (in 31.3 %) of the newly diagnosed patients, old residual changes after pulmonary TB were observed on the X-rays (fibrosis, pneumocirrhosis, dense foci, tuberculomas). Destruction of lung tissue was diagnosed in 31 (55.4 %) patients, and mycobacteria of tuberculosis were detected in sputum in 42 patients (75.0 %). Complications of pulmonary tuberculosis were observed in 23 (40.3 %) patients. Concomitant diseases were noted in 37 (64.9 %) patients. After discharge from the hospital, the patients continued treatment in outpatient settings.

Conclusions. In order to timely diagnose pulmonary tuberculosis in military personnel, doctors of all specialties should carefully collect anamnesis, take into account previous diseases, stressful situations, injuries. Patients should be promptly referred for X-ray examination and sputum examination for the presence of tuberculosis mycobacteria.

Keywords: pulmonary tuberculosis; military personnel; diagnostics; inpatient treatment.

The WHO statement on the public health emergency in Ukraine (2026) notes that since the start of the war in Ukraine in February 2022, the WHO, in close collaboration with the Ukrainian Ministry of Health and numerous partners on the ground, has provided essential health

services across the country, often facing serious risks. Attacks on healthcare facilities have claimed the lives of healthcare workers and patients and caused serious damage to healthcare infrastructure. These attacks continue to undermine access to vital services, cause lasting harm to communities and further weaken recovery efforts. Our joint efforts have ensured that millions of people have continued to receive the care they need. In 2025 alone, WHO provided essential health services to 1.9 million people, delivering critically important medical supplies, providing safe spaces for healthcare workers and patients, strengthening trauma care and rehabilitation, expanding mental health and psychosocial support (MHPSS), and facilitating the medical evacuation of 1,231 people. However, the intensification of hostilities, the growing energy crisis and the cumulative impact of repeated strikes on medical infrastructure continue to exacerbate the health crisis [1].

During armed conflict, morbidity and mortality rates rise amongst both military personnel and civilians. The range of health issues in wartime is extremely broad: from physical injuries to mental health disorders; infectious diseases play a significant role, due to overcrowding, disruptions to the water supply, a lack of hygiene products and medicines, and so on. War triggers epidemics due to a sharp deterioration in sanitary conditions, primarily the lack of access to clean water, which can lead to outbreaks of infectious diseases, in particular tuberculosis (TB) [2].

Hostilities on Ukrainian territory have led to significant population displacement, disrupted the continuity of TB treatment for internally displaced persons, and created conditions that increase the risk of TB infection and the reactivation of latent infection, both among the general population and among military personnel. The rise in TB incidence and prevalence in 2022–2023 resulted both from the identification of TB cases that had gone undiagnosed during the pandemic and from the impact of the hostilities. Current trends in epidemiological indicators highlight the need to implement programmes for the active detection and prevention of TB among at-risk groups that have become extremely vulnerable during the conflict – military personnel and internally displaced persons [3, 4].

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The study examined the structure, characteristics, types and circumstances of diagnosis, as well as methods of surgical treatment for tuberculosis in military personnel undergoing inpatient treatment. It was found that highly specialised facilities for the diagnosis and treatment of tuberculosis in wartime conditions in Ukraine continue to play an important, and in some cases decisive, role due to the concentration of high-tech equipment (operating theatre facilities), the availability of a reference laboratory, competent specialists in carrying out diagnostic and therapeutic procedures, as well as a scientific and applied basis for the conservative management of complex cases [5].

In this paper, the authors present information on the characteristics of clinical and laboratory manifestations in military personnel with HIV co-infection resulting from TB. If HIV is detected, such individuals must undergo a clinical and laboratory examination in an inpatient setting at a specialised healthcare facility in order to determine the clinical stage of HIV infection, diagnose opportunistic infections, including TB, the mandatory and timely initiation of continuous antiretroviral therapy (ART), and the effective treatment of identified opportunistic infections, comorbidities and complications. Such measures will help to safeguard the health of people living with HIV and maintain public health standards within the Armed Forces of Ukraine with regard to blood-borne infections, including HIV and hepatitis B, C and D, and prevent an epidemic of aerosol-transmitted tuberculosis, including drug-resistant tuberculosis, amongst military personnel [6].

A clinical case of pulmonary tuberculosis in a patient with combat-related trauma is of particular interest. The authors draw clinicians' attention to the need to take into account, in clinical practice, the specific features of the diagnosis and course of tuberculosis in patients with combat-related trauma. They point out that, in patients with severe combat injuries, vigilance is required regarding the activation of latent tuberculosis against a background of psycho-emotional and physical exhaustion [7].

A group of authors analysed the characteristics of the development of tuberculosis infection among military personnel and the need to implement innovative measures for its prevention, early diagnosis and treatment. A link has been established between the rise in TB incidence among Ukrainian Armed Forces personnel and armed aggression by the Russian Federation. From 2021 to 2023, a trend towards a sharp rise in the incidence rate among military personnel was observed. Ensuring effective treatment of TB, including multi-drug-resistant forms, through the use of innovative methods for the early diagnosis of the infection, is one of the top priorities for the Ukrainian medical sector. It is essential to identify the co-factors contributing to the development of tuberculosis [8].

The authors concluded that the average age of military personnel with tuberculosis is 39.1 years, indicating a high incidence rate amongst the most active section of the population. The median time between the start of service and the diagnosis of TB indicated rapid progression of the disease under the influence of factors associated with military service. The first symptoms of TB appeared in the majority of patients within the first 4–5 months of service, highlighting the need for early monitoring of military personnel's health. Disseminated lung involvement and a high rate of bacterial shedding (80.0 %) indicate an infectious risk to those around them and the risk of transmission. Only 40 % of TB cases were detected when service personnel sought medical attention, highlighting the need for regular preventive screening and vigilance regarding early signs of TB, as well as improvements in the effective organisation of healthcare provision for service personnel. Timely diagnosis, appropriate treatment and prevention of TB will help to safeguard the health of military personnel and ensure they can carry out their duties effectively [9].

Based on an analysis of the literature, the aim of this study was to analyse the characteristics of the diagnosis and management of military personnel with pulmonary tuberculosis who were treated as inpatients.

Materials and methods

A retrospective analysis was carried out of the medical records of 57 military personnel with pulmonary tuberculosis, all male, who were treated as inpatients at the Ternopil Regional Phthisiopulmonology Medical Centre.

Research findings and discussion

An analysis of the medical records of inpatients revealed that 48 (84.2 %) were new cases and 9 (15.8 %) were recurrent cases. On admission, 4 (7.0 %) patients were in a serious condition, 50 (87.7 %) in a moderate condition, and only 3 (5.3 %) in a condition close to satisfactory. At the time of admission, 49 (86.0 %) patients reported symptoms affecting the bronchopulmonary system (cough, shortness of breath, chest pain and others). The duration of symptoms varied considerably: 18 (36.7 %) had experienced symptoms for one month prior to admission, whilst the remaining 31 (63.3 %) had experienced symptoms for between 2 and 6 months. When analysing patients by age, the 41–50 age group was the most common, with a slightly smaller number in the 31–40 age group. Together, these accounted for 73.7 %.

Mycobacterium tuberculosis (MTB) was detected in 42 patients (75.0 %). In all patients, bacterial excretion was confirmed by molecular genetic methods; by smear examination, TB bacteria were detected in 15 out of

42 patients, and by culture, in 33 out of 42 patients. The majority of patients presented with symptoms (57.9 %); 17.5 % were identified during routine screening, and 15.8 % whilst receiving treatment for injuries (Table 1).

Table 1

Methods for detecting pulmonary tuberculosis in patients

Pathways of detection	Absolute number (n=57)	%
When presenting with symptoms	33	57.9
Routine screening	10	17.5
During a medical assessment	3	5.3
When providing first aid following an injury	9	15.8
Screening of people who have been in contact with TB patients	2	3.0

MBT were sensitive to anti-tuberculosis drugs (ATDs) in 71.4 % of patients (Table 2).

Table 2

Classification according to MBT sensitivity to anti-tuberculosis drugs

Sensitivity	Absolute number (n=42)	%
Sensitive to all anti-tuberculosis drugs	30	71.4
Isoniazid-resistant TB	1	2.4
Rifampicin-resistant TB	1	2.4
Multidrug-resistant TB (MDR-TB)	7	16.7
Extensively drug-resistant TB (XDR-TB)	3	7.1

The medical history revealed that information regarding previous X-ray examinations was provided by only 28 patients: 18 within the first year, 7 within the first three years, and 3 patients more than three years ago. The examination revealed that in 15 out of 48 (31.3 %) of newly diagnosed patients, old residual changes following previous tuberculosis (fibrosis, pneumocirrhosis, dense foci, tuberculomas) were observed on X-rays. It was established that, following the detection of changes in the lungs by X-ray, the initial diagnosis in 20 (35.1 %) of the patients was pneumonia, and only after ineffective treatment were the patients further investigated for tuberculosis. The medical history revealed that 11 (19.3 %) of the patients had sustained injuries. The predominant clinical forms of pulmonary tuberculosis in the

patients were infiltrative (50.9 %) and disseminated (43.9 %).

Pulmonary tissue destruction was detected in 31 (55.4 %) patients. A widespread process in the lungs (involvement of more than two segments) was observed in 50 (87.7 %) patients. Complications of the primary disease were present in 23 (40.3 %) patients; the results are presented in Table 3. A single patient may have had several complications. A total of 52 such complications were diagnosed.

Table 3

Complications of pulmonary tuberculosis

Complications of pulmonary tuberculosis	Absolute number (n=52)	%
Intoxication syndrome (exhaustion)	21	40.5
Respiratory failure	15	28.9
Exudative pleurisy	6	11.5
Tuberculosis of the larynx	2	3.8
Tuberculous bronchitis	1	1.9
Pulmonary emphysema	4	7.7
Severe anaemia	2	3.8
Haemoptysis	1	1.9

The most common complications were intoxication syndrome (exhaustion) – 40.5 %, respiratory failure – 28.9 %, and exudative pleurisy – 11.5 %.

Concomitant conditions were noted in 37 (64.9 %) patients. One of these patients may have had several concomitant conditions. A total of 77 such conditions were diagnosed (Table 4).

Table 4

Comorbidities in patients with pulmonary tuberculosis

Comorbidities	Absolute number (n=77)	%
1	2	3
Cardiovascular system: metabolic cardiomyopathy, hypertension, coronary heart disease and others	19	24.7
Hepatobiliary system: hepatitis of various aetiologies	6	7.8
Gastrointestinal system: gastric and duodenal ulcers, gastroduodenitis	6	7.8

Continuation of Table 4

1	2	3
Musculoskeletal system: diseases of the spine and joints	7	9.1
Respiratory system: COPD, pulmonary emphysema, bullous disease	6	7.8
Central nervous system: encephalopathy, emotionally labile disorders, adjustment disorder, brain diseases, sequelae of traumatic brain injury	13	16.8
Circulatory system: hypochromic anaemia, thrombocytopenia	3	3.9
Alcohol-related behavioural and mental disorders (ARBMD)	9	11.7
HIV infection	3	3.9
Other diseases	5	6.5

The following conditions were the most common comorbidities: cardiovascular disorders (24.7 %), including metabolic cardiomyopathy, hypertension, ischaemic heart disease and others. Lesions of the central nervous system were also diagnosed (in 16.8 %), in particular encephalopathy, emotionally labile disorders, adjustment disorder, brain diseases and the sequelae of traumatic brain injury. ARBMD was observed in 11.7 % of individuals. Comorbidities were also identified involving the musculoskeletal (9.1 %), hepatobiliary (7.8 %), gastrointestinal (97.8 %) and respiratory (7.8 %) systems.

Treatment was carried out in accordance with the 'Tuberculosis' clinical practice guidelines [10]. Patients with drug-sensitive TB were prescribed the following regimens: a 4-month regimen – isoniazid, rifapentine, pyrazinamide, moxifloxacin; or a 6-month regimen – isoniazid, rifampicin, pyrazinamide, ethambutol.

For patients with drug-resistant tuberculosis, drugs were prescribed based on the sensitivity of *Mycobacterium*

tuberculosis to anti-tuberculosis drugs. In most cases, patients received bedaquiline, pretomanid and linezolid. In some cases, moxifloxacin was added to this regimen.

Patients were hospitalised for an average of (49±8.6) days. Following discharge from hospital, they continued treatment on an outpatient basis.

Conclusions

1. A survey of military personnel with pulmonary tuberculosis revealed that 48 (84.2 %) were new cases and 9 (15.8 %) were recurrent cases. On admission, 4 (7.0 %) patients were found to be in a serious condition, 50 (87.7 %) in a moderate condition, and only 3 (5.3 %) in a condition close to satisfactory.

2. The majority of patients presented with symptoms (57.9 %); 17.5 % were identified during routine screening, and 15.8 % whilst receiving treatment following injury.

3. In 15 out of 48 (31.3 %) of newly diagnosed patients, X-rays revealed old residual changes following a history of pulmonary tuberculosis (fibrosis, pneumosclerosis, dense foci, tuberculomas).

4. Following the detection of pulmonary changes by X-ray in 20 (35.1 %) patients, the initial diagnosis was pneumonia, and only after ineffective treatment were the patients further investigated for tuberculosis.

5. Destruction of lung tissue was diagnosed in 31 (55.4 %) patients, and *Mycobacterium tuberculosis* was detected in sputum in 42 individuals (75 %). Complications of pulmonary tuberculosis were observed in 23 (40.3 %) patients. Concomitant conditions were present in 37 (64.9 %) of them.

6. To ensure the timely diagnosis of pulmonary tuberculosis in military personnel, doctors of all specialties should take a thorough medical history, taking into account previous illnesses, stressful situations and injuries. Patients should be referred promptly for X-ray examinations and their sputum should be tested for the presence of *Mycobacterium tuberculosis*.

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Особливості діагностики та ведення військовослужбовців, хворих на туберкульоз легень, у стаціонарних умовах

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РЕЗЮМЕ. Мета роботи – проаналізувати особливості діагностики та ведення військовослужбовців, хворих на туберкульоз легень, які лікувались стаціонарно.

Матеріали і методи. Здійснено ретроспективний аналіз медичних карт 57 хворих на туберкульоз легень військовослужбовців, усі чоловічої статі, які лікувались стаціонарно у Тернопільському регіональному фтизіопульмонологічному медичному центрі.

Результати досліджень. При аналізі встановлено, що нові випадки туберкульозу легень були у 48 (84,2 %), рекурентні – у 9 (15,8 %) пацієнтів. При аналізі шляхів виявлення туберкульозу у пацієнтів, більшість з них звертались у зв'язку зі скаргами (57,9 %), при профілактичному огляді виявлено у 17,5 %, при наданні допомоги після поранення – 15,8 %. Встановлено, що у 15 з 48 (у 31,3 %) вперше діагностованих хворих на рентгенограмах спостерігались старі залишкові зміни після перенесеного туберкульозу легень (фіброз, пневмоцироз, щільні вогнища, туберкуломи). Деструкції легеневої тканини діагностовані у 31 (55,4 %) хворого, мікобактерії туберкульозу виявлені в мокротинні у 42 хворих (75,0 %). Ускладнення туберкульозу легень спостерігались у 23 (40,3 %) хворих. Супутні захворювання відзначені у 37 (64,9 %) пацієнтів. Після виписування зі стаціонару хворі продовжували лікування в амбулаторних умовах.

Висновки. З метою своєчасної діагностики туберкульозу легень у військовослужбовців, лікарям усіх

спеціальностей слід ретельно збирати анамнез, враховувати перенесені захворювання, стресові ситуації, поранення. Своєчасно скеровувати пацієнтів на рентгенологічне обстеження і досліджувати мокротиння на наявність мікобактерій туберкульозу.

Ключові слова: туберкульоз легень, військовослужбовці, діагностика, стаціонарне лікування.

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