

INTERSTITIAL LUNG DISEASES AS A MANIFESTATION OF COMBAT-ASSOCIATED RESPIRATORY PHENOTYPE IN MILITARY PERSONNEL

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Abstract. Interstitial lung diseases (ILDs) in military personnel after deployment to combat zones represent an important but insufficiently studied component of chronic combat-associated respiratory pathology. Repeated inhalational exposures in the combat environment may contribute to the development of mixed structural and functional lung injury phenotypes, the diagnosis of which requires a combination of morphological and functional assessment methods.

Aim. To determine the frequency and characterize the computed tomography and functional features of ILDs in military personnel who had been deployed to combat zones.

Materials and methods. Data from 197 military personnel with chronic respiratory pathology and a confirmed history of deployment to combat zones were analyzed. Signs of ILD were identified in 41 patients. Clinical data, chest computed tomography (CT) findings, and pulmonary respiratory function parameters were assessed, including FVC, FEV₁, MEF₂₅₋₇₅, and diffusing capacity of the lung for carbon monoxide (DLCO). Correlation analysis was performed to determine the relationship between CT changes and functional parameters.

Results. ILDs were identified in 41 out of 197 military personnel, accounting for 20.8 % of the study cohort. Among patients with ILD, men accounted for 63.4 % and women for 36.6 %; the mean age was (38.9 ± 0.9) years. The most frequent CT findings were reticular changes – 75.6 %, emphysematous changes – 68.3 %, subpleural lesion location – 63.4 %, areas of ground-glass opacity – 58.5 %, and interlobular septal thickening – 53.7 %. Mosaic attenuation or air trapping was detected in 43.9 % of patients. In patients with signs of fibrosis on CT DLCO was significantly lower than in patients without a pronounced fibrotic component: (58.4 ± 8.7) % versus (70.6 ± 7.9) % of predicted, $p < 0.001$. This group also demonstrated a significant reduction in MEF₂₅₋₇₅: (48.6 ± 13.2) % versus (60.4 ± 14.1) %, $p = 0.011$. The strongest inverse correlation was found between the CT injury index and DLCO: $r = -0.61$; $p < 0.001$.

Conclusions. In military personnel with chronic respiratory pathology after deployment to combat zones, ILDs were identified in every fifth examined patient and were characterized by a mixed structural and functional phenotype. DLCO was the most informative functional marker of structural lung injury. The obtained data supports the combined use of chest CT and assessment of lung diffusing capacity for the diagnosis and phenotyping of ILDs in military personnel after combat-related inhalational exposures.

Key words: interstitial lung diseases, military personnel, combat-related inhalational exposures, computed tomography, diffusing capacity of the lung for carbon monoxide, small airways.