

Computed tomography of the lungs and artificial intelligence as the main tool in modern diagnostics of interstitial lung diseases

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Conflict of interest: none

BACKGROUND. Despite the standardization of terminology for thoracic radiology in accordance with the Fleischner Society, the use of baseline chest computed tomography (CT) data in patients with interstitial lung diseases (ILD) and other pulmonary pathologies remains a challenging task. In recent years, diagnostic approaches use computer-based tools to improve disease detection, monitoring, and accurate prognosis, which are based on artificial intelligence (AI). The complexity of CT-based diagnosis of ILD lies in the fact that CT findings are very similar in various idiopathic interstitial pneumonias such as idiopathic pulmonary fibrosis, nonspecific interstitial pneumonia etc., which leads to misdiagnosis of ILD.

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■ АКТУАЛЬНІ ПРОБЛЕМИ

OBJECTIVE. To study and summarize the latest scientific data on the diagnosis of ILD, where the main method remains high-resolution CT with using AI, which will increase physicians' awareness of modern methods for timely verification of ILD.

RESULTS AND DISCUSSION. Lung interstitial damage is defined as a group of ILD in which the pathological process may affect the vessels, bronchial tree, and pleura. For qualitative diagnosis of ILD, radiologists must identify and characterize CT findings using the current standardized terminology provided by the Fleischner Society. In current conditions, chest CT analysis for ILD diagnosis can be performed using AI, which is divided into several stages: segmentation of various anatomical structures, detection, and evaluation of pathological patterns using deep learning and radiomic features.

The ILD group is characterized by common clinical manifestations such as progressive dyspnea and non-productive cough. Therefore, before the diagnosis of ILD, it is necessary to conduct a comprehensive differential diagnosis based on clinical manifestations, CT imaging findings, cytological analysis of bronchoalveolar lavage, pulmonary function testing (PFT), laboratory markers of connective tissue diseases (CTD), and histopathological evaluation of lung biopsy samples when indicated.

CONCLUSIONS. The ILD should be diagnosed by a multidisciplinary team consisting of a pulmonologist, radiologist, and pathologist, who discuss a combination of lung CT images with the possible use AI, PFT results, histological data, and laboratory markers of CTD that can reduce misdiagnosis of ILD.

KEY WORDS: computed tomography of the lungs, interstitial lung diseases, radiological patterns, Fleischner Society glossary of terms, artificial intelligence, pulmonary function testing.
