

Problems of nontuberculous mycobacterial pulmonary disease and difficulties to their solution

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ABSTRACT. Nontuberculous mycobacteria (NTM) are ubiquitous environmental opportunistic pathogens that can cause serious disease. The incidence of non-tuberculous mycobacterial pulmonary disease (NTM-PD) is increasing worldwide. The aim of this paper is to review the problems of NTM-PD and difficulties to their solution according to the literature data. Risk factors for NTM-PD include structural lung pathology, immunodeficiency, and other comorbidities. In susceptible individuals mycobacteria induce granulomatous inflammation that damages the airways and lung parenchyma. The diagnosis of NTM-PD is based on clinical (pulmonary and systemic symptoms), radiographic (nodular or cavitary lesions) and microbiological criteria. For diagnosis >1 positive sputum culture should be obtained, and the same NTM species (or subspecies in the case of *Mycobacterium abscessus*) should be isolated in ≥ 2 separate sputum cultures or in ≥ 1 bronchoscopic specimen. Current management of NTM-PD involves medical treatment (at least three antibiotics) and non-pharmacological interventions. Due to the genetic variability of NTM strains, there is no single standardized treatment plan. Treatment continues for 12 months after a negative sputum culture. The main problems of NTM-PD are the difficulties with diagnosis and treatment. The first group of problems has been resolved positively over time due to the advent of computed tomography and molecular microbiological studies, while the second remains difficult. In NTM-PD

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the treatment failure rate can reach 70 % due to the ineffectiveness of available antibiotics, immunodeficiency disorders and a weakened immune response in a significant proportion of patients. Obstacles to overcoming the problems of NTM-PD include the difficulty in correlating *in vitro* drug susceptibility testing results with clinical outcomes, comorbidities and drug interactions in patients treated for other diseases, the difficulty of finding new drugs and treatment regimens for NTM-PD, the unusual structure of the mycobacterial cell wall and the biological features of the pathogen.

KEY WORDS: non-tuberculous mycobacteria, non-tuberculous mycobacterial pulmonary disease, epidemiology, diagnosis, management.
