CHRONIC BRONCHIAL OBSTRUCTION AND ENDOTHELIAL DYSFUNCTION: SOME IMMUNOLOGICAL ASPECTS OF INTERACTION

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Abstract. According to modern data, systemic inflammatory process with vascular endothelial dysfunction (ED) is the base of chronic obstructive pulmonary disease (COPD) pathogenesis whith chronic bronchial obstruction and the formation of comorbidity. Immunological investigations of relationship with severity of ED and risk of fatal cardiovascular events remain actual at COPD, although many studies of their dependence on the severity of COPD have been conducted.

The aim of the study is to evaluate the special features of cellular immunity in patients with COPD in relation to the severity of clinical manifestations of the disease (assessed by the COPD Assessment Test –CAT), and the presence of ED.

Methods. 141 patients with COPD stage II-III were examined, at the age of 43-72 years, beyond the period of exacerbation and 24 practically healthy persons as a control group for laboratory indices. Cellular immunity was studied by indirect immunofluorescence reaction using monoclonal antibodies. Dependence of cellular immunity on the value of CAT, the level of the ED laboratory marker — endothelin-1 — and the expressiveness of cardiovascular risk (CVR) were analyzed.

Results. At the examined patients immune dysfunction was manifested by suppression of T-lymphocytes, disturbances in their subpopulations ratio, increased readiness of lymphocytes to apoptosis and expression of $CD54^+$, which characterizes the adhesive properties of cells. It was also proposed to calculate the adhesion index ($CD54^+/CD3^+$), which links the elevation of the lymphocytes adhesive properties with the development of immune dysfunction. It was shown that the severity of the cellular immune system dysfunction is primarily associated with the intensity of clinical manifestations of COPD, assessed by CAT. At the same time, significantly higher endothelin-1 level in COPD patients served as an objective confirmation of ED presence. It was found that the elevation of endothelin-1 level in serum and the increasing in CVR are accompanied by an increased predisposition of lymphocytes' apoptosis. These changes contribute to increased immune dysfunction and elevation of lymphocytes' adhesive properties, assessed by the expression of $CD54^+$ and indirectly confirm the participation of cellular immune mechanisms in the development of ED.

Conclusions. Patients with COPD demonstrate increased expression of $CD54^+$ on lymphocytes and elevation of the adhesion index $CD54^+/CD3^+$. It characterizes the activation of lymphocytes adhesive properties and their increased readiness for Fas-dependent apoptosis and related immune dysfunction. These results confirm the participation of cellular immune mechanisms in the development of endothelial dysfunction.

Key words: chronic bronchial obstruction, cellular immunity, endothelial dysfunction.