

INFLUENCE OF CONTROLLING THE COURSE OF BRONCHIAL ASTHMA ON BIOPHYSICAL CHARACTERISTICS OF ERYTHROCYTES

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Abstract. *The aim* of the work: to study and evaluate the influence of the control of the course of bronchial asthma on the biophysical characteristics of red blood cells. *Materials and methods:* 165 patients with asthma in the phase of remission of the disease were examined. The diagnosis was made according to the medical history, clinical symptoms, parameters of external respiration, reversibility of airway obstruction to bronchodilators. The selection of patients was conducted

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in accordance with the Order No. 128 of the Ministry of Health of Ukraine dated March 19, 2007 "On the Approval of Clinical Protocols for the Provision of Medical Aid in the Specialty "Pulmonology". As a control, 30 healthy volunteers were examined, but not those who had a severe, clinically significant pathology. All patients received standard basal therapy of the remission period, including inhaled corticosteroids, as well as a short-acting β_2 -agonist to reduce asthma symptoms. In the follow-up, patients were divided into 3 groups: 50 (30.3 ± 3.8) % 60 (37.5 ± 3.5) % — patients with partially controlled asthma and 55 (33.3 ± 3.8) % — with severe uncontrolled asthma. The study of the degree of deformation of erythrocytes was carried out with using the method of boundary dehydration of biological fluids and using the electron microscope "NU 2" of "VEB Carl Zeiss" company with photographic system MRS 60 and using BioVision program, the study of the ventilation function of the lungs was performed in all patients according to the spirographic analysis of the flow-volume curve and general plethysmography of the body on the Master Scope and MasterScreen BodyDiff from Erich Jaeger (Germany). Dynamic observation was conducted for 10 years. After 10 years in patients with asthma the most significant change was observed in patients with moderate BA: normocytes decreased (47.1 ± 1.0) %, echinocytes increased (16.8 ± 0.3) %, target cells increased (14.5 ± 0.6) %, the number of generative forms of erythrocytes increased (21.3 ± 1.2) %. In patients with severe asthma level of normocytes decreased (36.7 ± 0.5) % echinocytes increased (18.4 ± 0.8) %, target cells — to (21.8 ± 0.9) %, the number of degenerative erythrocytes increased to (23.0 ± 1.2) %. *Conclusions.* As a result of this work, for the first time changes in the morphological structure of red blood cells in patients with bronchial asthma were studied and compared, depending on the control of the course of the disease with standard treatment for a long ten-year dynamic observation. Our studies confirm that the course of the BA is accompanied by a staggering change in the morphological profile of the erythrocytes, depending on the degree of disease control. The compensatory reaction of the part of the red blood in the form of rounding cells in response to the persistence of bronchial obstruction led to a certain extent to the leveling of hypoxic and circulatory shifts in the body, while creating prerequisites for strain, depletion of the erythrocytic system in the regulation of intercellular co-operative interactions, maximally expressed with severe course of asthma. In addition, the erythrocytic membrane is a sensitive factor, indicating that it may be an indicator of the risk of loss control even in the absence of clinical symptoms in the remission of the disease. Taking into account the received data, in the future, it is necessary to improve the methods of diagnosing the risk factors of loss control of asthma in view of the results obtained.

Key words: bronchial asthma in adults, blood rheology, morphological and functional characteristics of red blood cells.

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