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Title: Various biomarkers of oxidative stress in patients with uncontrolled asthma

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Body: The aim of this study was to measure the dynamics of various biomarkers of oxidative stress in patients with uncontrolled asthma after 2 weeks of standard treatment. Methods: 33 patients with moderate-to-severe uncontrolled asthma were recruited in the study (20 male, age 48.6±8.4 yrs, ACT<20 scores). Besides clinical data and functional parameters, we assessed the structural-functional parameters of erythrocyte membranes, the content of the products of lipid peroxidation - malondialdehyde (MDA), Schiff bases, diene conjugates (DC) and activity of antioxidant enzymes - superoxide dismutase (SOD) and catalase, tocopherol in the membranes of erythrocytes and plasma. Results: There were significantly improved clinical signs of asthma and pulmonary ventilation parameters after treatment. The intensity of cough, dyspnea and relief medication decreased ($p<0.05$); FVC, FEV_1 and FEV_1/FVC ratio increased by 16%, 60% and 38% respectively ($p<0.05$). We found significant improvements of the structural-functional properties of the erythrocyte membranes: decreasing of microviscosity and polarity annular lipids, increasing of the lipid layer polarity. There was found decreasing of lipid peroxidation activity in erythrocyte membranes: the concentration of DC, MDA and Schiff bases significant decreased in 1.5; 1.8 and 1.4 times respectively ($p<0.05$). The activity of antioxidant enzymes such as catalase and SOD increased by 24% and 45% ($p<0.05$). Also the concentration of tocopherol increased in 1.5 times in comparison with the initial level ($p<0.02$). Conclusion: The dynamics of various biomarkers of oxidative stress in patients with uncontrolled asthma is a reliable method for assessing and monitoring airway inflammation.