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Title: The deterioration of bronchi patency in asthmatics is accompanied by the hyperresponsiveness to distilled water

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Body: Introduction: Airway patency and the level of hydrogen peroxide (H_2O_2) in the exhaled breath condensate (EBC) are the markers of the bronchial asthma (BA) activity. Their role in the formation of bronchospastic reaction to the osmotic stimulus is unknown. Aim: to study the correlation of bronchi patency, airway reaction to distilled water (DW) and the level of H_2O_2 in EBC in asthmatics. Methods: The lung function (FEV_1), the airway reaction (ΔFEV_1) to 3-minute inhalation of ultrasonically nebulized DW, to 3-minute isocapnic cold air hyperventilation (ICAH), and the initial level of H_2O_2 in EBC were estimated in 289 asthmatics (mean age 34.9±1.15). Results: The patients were divided into four groups: with the exessive airway reaction to each bronchoprovocation and without it. The groups did not have significant differences in the reaction to DW (ΔFEV_1 -19.9±1.06 and -3.26±0.96%; $p<0.001$) and ICAH (ΔFEV_1-19.5±1.06 and -4.49±1.96%; $p<0.001$), respectively ($p>0.05$). Significantly lower FEV_1 was found in the group of patients with hyperresponsiveness to DW in comparison with the group without it (3.12±0.16 and 3.74±0.16 l; $p<0.05$), and with the patients with hyperresponsiveness to ICAH (3.63±0.12 l) ($p<0.05$). A direct correlation between FEV_1 and the degree of reaction to DW ($r=0.56$; $p<0.05$) was found, whereas in the group with hyperresponsiveness to ICAH it had a reverse character ($r=-0.64$; $p<0.01$) and depended on the level of H_2O_2 in EBC ($r= 0.50$; $p<0.05$). Conclusion: The airway hyperresponsiveness to DW in asthmatics is associated with bronchi patency deterioration and is not connected with the level of H_2O_2 in EBC.