THE ROLE AND SIGNIFICANCE OF THE FENO TEST IN DIFFERENT ASTHMA ENDOTYPES

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Abstract. Bronchial asthma (BA) is one of the most frequent cause of inflammations of the airway and frequently characterized by eosinophilia, IgE production, and Th2 cytokine expression. Despite the wide prevalence of spirometry in BA diagnostic, the significance of FeNO test is the one of sensitive marker of eosinophilic inflammation in early asthma diagnosis. The pathogenesis of allergic inflammation has different endotypes which is poorly understood.

The aim of our study is to evaluate the relation between different allergic inflammation indicators (eosinophils and IgE levels) and rates of FeNO results in patients with BA.

Materials and methods. In this work we analyzed the basal levels of FeNO NIOX® test, serum IgE levels and eosinophils in patients with first diagnosed asthma before the treatment. In our study we included 125 patients with BA and 20 healthy control. Group 1 (n = 67) were the patients with BA and high IgE (Th-2 endotype), Group 2 (n = 58) — BA and normal IgE levels, but increased eosinophils (eosinophilic asthma). The levels of serum IgE was determined using ELISA. The FeNO results determined by NIOX VERO® analyzer.

Results. The serum concentrations of IgE was higher in Group 1 (267.3 ± 57.6) IU/ml, Group 2 (37.2 ± 14.7) IU/ml and had no significant difference than healthy control (24.9 ± 7.7) IU/ml, $p < 0.05$. Eosinophils were higher in Group 2 (684 ± 228) cells/mcl than in Group 1 (456 ± 177) cells/mcl and control (104 ± 53) cells/mcl, $p < 0.01$. Also we determined positive strong correlation between serum IgE and blood eosinophils in Group 1 patients ($r = 0.823$) and no correlation in Group 2 ($r = 0.324$). The results of FeNO were significantly higher (47.2 ± 6.4) ppb in patients with higher IgE and high eosinophils (Group 1) than in Group 2 (34.6 ± 5.9) ppb and healthy control (12.4 ± 4.3) ppb, $p < 0.05$.

Conclusion. The higher FeNO results were in patient with Th2 asthma endotype than in eosinophilic asthma. We could conclude that patients, which eosinophils induced by allergy, have association between serum IgE, blood eosinophils and FeNO results. Instead, patients with eosinophilic asthma and low serum IgE have other not Th2-induced mechanism of eosinophils activation (recurrent infections, haptens influence, non-steroidal anti-inflammatory drugs intolerance and ect.). We can assume that eosinophils can crystallize in the bronchi of the patients with eosinophilic asthma caused by other cytokines rather than Th2. In this case, FeNO activity depends on the Th2 eosinophils maintenance and more sensitive in patients with allergic exogenous asthma.

Key words: endotype, asthma, nitric oxide, eosinophil.