

Immunological biomarkers of allergic bronchopulmonary aspergillosis in patients with asthma

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Objectives

To study the immunological biomarkers of allergic bronchopulmonary aspergillosis (ABPA) in patients with bronchial asthma.

Methods

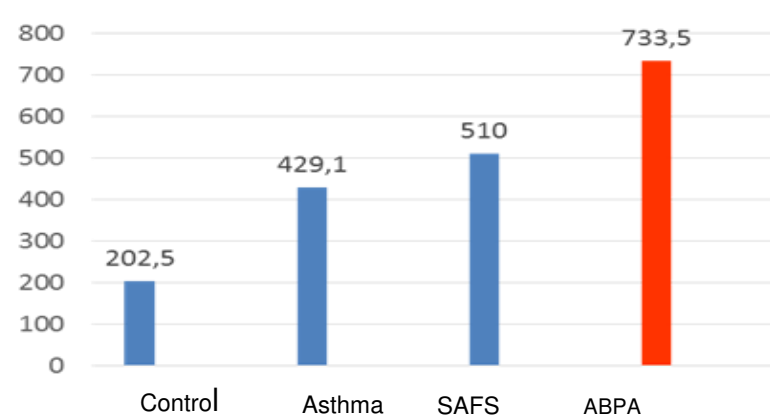
In prospective study were included 44 adult patients (Me - 43 years) with severe asthma. The control group consisted of 12 healthy people, matched by age and sex, without a history of allergic diseases (Me - 33 years). The severity of asthma and level of symptoms control were determined with GINA 2016 criteria. The pulmonary function was assessed with FEV1 and FVC. An Asthma Control Test (AST) questionnaire was used. Allergy examination included skin testing with *A. fumigatus* allergen («Allergopharma», Germany), determination of the serum total IgE level («Polygnost», Russia) and specific IgE (sIgE) for fungal allergens («AlkorBio», Russia). Determination of the serum concentration of TARC («R&D Systems», USA), TSLP («R&D Systems», USA), IL-8 («Vector-Best», Russia) was performed with ELISA.

The obtained data were processed using the software system STATISTICA 10 and presented as the median (Me) and upper and lower quartiles (Lq-Hq). Severe asthma with fungal sensitization (SAFS) and ABPA were diagnosed with R. Agarwal et al. 2013 criteria.

Results

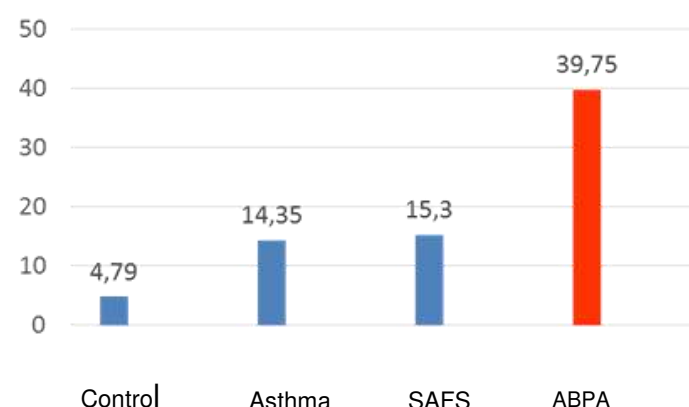
SAFS (positive skin test results and fungal allergens sIgE levels (0.35 IU/ml) was diagnosed in 14 (32%) patients, ABPA – 13 (30%). AST score and FVC, FEV1 were significantly lower in ABPA patients. The TSLP serum levels did not differ between ABPA patients – 12.0 (8.8 ÷ 24.7), SAFS – 16.8 (9.7 ÷ 27.7), asthma – 22.8 (14.6 ÷ 31.8) and the control group – 13,2 (9,1 ÷ 22,1) pg/ml. The serum TARC concentration was significantly higher in ABPA patients – 733.5 (540.0 ÷ 812.0) compared with the asthma group – 429.1 (218.0 ÷ 571.3, p=0.001) and control group 202.5 (195.9 ÷ 256.0, p=0.001) pg/mg (Fig.1).

Fig.1 Proinflammatory TARC (pg/ml)



In ABPA patients serum IL-8 levels – 39,8 (28,4 ÷ 54,0) were significantly higher than in other groups (Fig.2)

Fig.2 Proinflammatory IL-8(pg/ml)



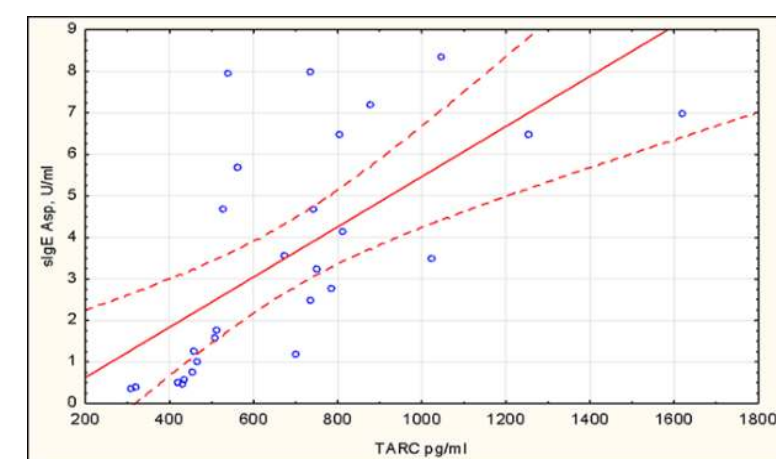
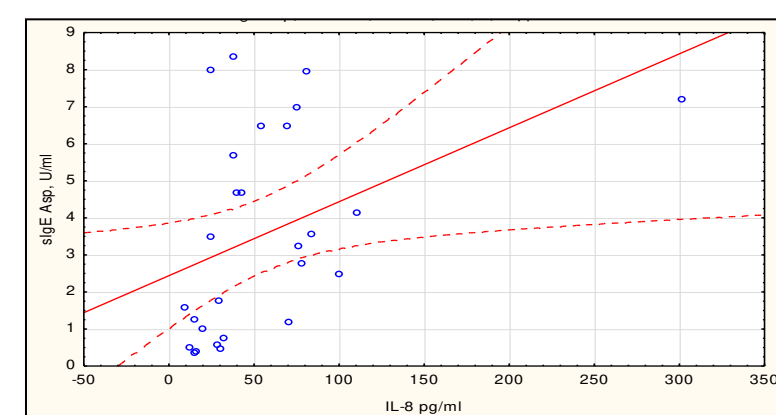
A negative correlation between TARC levels and FVC (r = - 0.47, p<0.05) and FEV1 (r = - 0.41, p<0.05) was established.

Results

The serum TARC concentration did not differ between patients with SAFS and asthma, but was significantly higher in relation to the control group (p = 0.001; p = 0.02).

Positive correlation of sIgE level to *A. fumigatus* with eosinophils absolute number (r = 0.45, p <0.05), total IgE level (r = 0.38, p <0.05), TARC concentration (r = 0.48, p <0.05), and IL-8 (r = 0.55, p <0.05) confirm the importance of pro-inflammatory chemokines in the development of allergic inflammation in patients with fungal sensitization (Fig.3).

Fig.3 TARC and IL-8 serum levels in patients with fungal sensitization



Conclusions

The use of immunological biomarkers may help to early diagnosis of ABPA in patients with bronchial asthma and evaluation of therapy effectiveness.

