

Sensitization to *Alternaria* in children in Samara

SCO — краткое сообщение

<https://doi.org/10.53529/2500-1175-2023-2-47-49>**K. S. Mazokha, M. V. Manzhos, N. N. Zhukova, E. V. Makova, T. V. Moiseeva**

Medical university «Reaviz», 443030, Samara, Chkalova str., 100, Russia

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Сенсибилизация к грибам рода *Alternaria* у детей в Самаре

<https://doi.org/10.53529/2500-1175-2023-2-47-49>**К. С. Мазоха, М. В. Манжос, Н. Н. Жукова, Е. В. Макова, Т. В. Моисеева**

Медицинский университет «Реавиз», 443030, г. Самара, ул. Чкалова, д. 100, Россия

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Mold spores might cause the formation of sensitization and development of allergic disease in humans. The main way of sensitization is aerogenic. More than 300 taxons of mold fungi with allergenic characteristics have been described. *Alternaria*, *Cladosporium*, *Aspergillus*, *Penicillium* [1] are dominant in the sensitization development. Samara region is characterized by the dominance of *Alternaria* over *Cladosporium*. Meanwhile, the maximum permissible concentration of *Alternaria* spore population (100 spore/м³) range from 6 to 81 % per month with maximum values in July, August, September [2].

Mold spores can penetrate respiratory tract and be an etiological factor, initiating the development of respiratory allergopathology, including asthma and allergic rhinitis [3]. Mold spores are much smaller than pollen grains, their size is about 2–30 micron (pollen size — 10–100 micron), which causes the possibility of their quite deep penetration in the distal bronchi division, therefore, fungal sensitization is often connected with bronchial asthma development [1, 4].

Objective — to study frequency and clinical allergological features of sensitization to *Alternaria* in children in Samara.

Materials and methods

There was clinical allergological examination of 336 patients with the symptoms of rhinitis and asthma, aged 3–17 years (the average age 7,7 ± 3,8).

Determination of specific IgE-AT to respiratory allergens was performed by the immunoblot method (“Respiratory panel” RIDA Allergyscreen, R-Biopharm, Germany). The level of IgE-specific antibodies was defined in international units (IU/ml) as well as in class 0–6. Allergic rhinitis and bronchial asthma were diagnosed according to Federal clinical guidelines. Statistical data processing was carried out using methods of variation statistics. Significance of differences for frequency indicators was analyzed by χ^2 criterion. Relative risks (RR) were counted. The data were processed with the application package AtteStat, version 10.5.1, statistical program formula Microsoft Excel, version 5.0.

Results

As a result of allergological examination 74,1 % (249/336) of children were diagnosed sensitization to one or several respiratory allergens, клинически clinically manifested as allergic rhinitis and (or) asthma.

Fungal sensitization was diagnosed in 43,4 % (108/249) children’s cases. The combination of fungal and pollen hypersensitivity is detected in 25,7 % (64/249) cases, co-sensitization to fungal and epidermal/household allergens was diagnosed 2,7 times as seldom — in 9,6 % (24/249) of children ($\chi^2 = 25,7$, $p = 0,0001$). Sensitization to *Alternaria* is diagnosed in 42,2 % (105/249) of children with allergic rhinitis (AR) and allergic bronchial asthma (BA).

In the structure of fungal sensitization there is a dominance of sensitization to *Alternaria* that occurs in 97,2 % of children. The proportion of children with IgE-AT to *Cladosporium* allergens was 36,1 % (39/108), *Aspergillus* – 20,4 % (22/108), *Penicillium* – 3,7 % (4/108). Monovalent sensitization to *Alternaria* was diagnosed in more than half of patients with fungal sensitization: in 58,3 % (63/108) of children. 56,2 % (59/105) experienced a combined hypersensitivity to pollen in the structure of sensitization to *Alternaria*. It is shown that a medium and high level of sensitization to *Alternaria* is common in 52,3 % children's cases (medium/high class of IgE-AT is diagnosed).

Allergic rhinitis is the main nosological form in patients with fungal sensitization in the region, observed in 98,0 % of the children, bronchial asthma is diagnosed in 25,9 % of the children, comorbid pathology (combined AR and BA) is detected in 24,0 % of the children.

We estimated the frequency of AR/BA clinical forms in the patients with *Alternaria* co-sensitization to pollen allergens and without pollen hypersensitivity. Allergic rhinitis is diagnosed at the same frequency in the children with co-sensitization to *Alternaria* and pollen of plants, and with no associated sensitization to pollen of plants – 98,3 % и 95,6 %, respectively ($\chi^2 = 0,7$, $p = 0,7206$). Bronchial asthma is detected in 35,6 % of the children with co-sensitization and in 17,4 % – with no associated sensitization to pollen of plants ($\chi^2 = 4,3$, $p = 0,1174$). The frequency of comorbid pathology (AR + BA) in the children with co-sensitization to *Alternaria* and pollen is 2,6 times as high, compared to clinical

variants with no associated pollen allergy: 33,9 and 13,0 %, respectively ($p = 0,0489$).

The study evaluated the risks of BA development in children different variants of pollen and fungal sensitization. The calculations showed that combined sensitization to *Alternaria* and pollen of plants is a risk factor for BA in childhood (RR = 2,625; 1,035–6,655). At the same time, the risk for BA increases in 44 % – RR 1,443 (1,049–1,986).

Discussion and conclusion

Alternaria is one of the most important mold fungi in Europe and the Mediterranean, being a risk factor for BA [5]. Sensitization to fungal allergens often occurs in patients with hypersensitivity to allergens of other groups, including pollen of plants; the proportion of such patients reaches 75–80 % [6]. The frequency of combined pollen and fungal sensitization among patients with suspected allergy was 8,41 % by diagnostic patch tests in the Moscow region. Combined hypersensitivity to pollen allergens and *A. Alternata* was diagnosed in 36,36 % [7] of patients with fungal sensitization. According to some authors, hypersensitivity to *Alternaria* is a risk factor for bronchial asthma in children and schoolchildren [8]. Fungi antigens possess adjuvant properties and can increase inflammation, caused by other respiratory allergens (pollen of plants) [9].

Therefore, the study characterizes the spectrum of fungi sensitization in patients with rhinitis and asthma, evaluates the risk for AR and BA with combined pollen and fungi sensitization. The data should be considered in diagnosing allergic diseases in children in order to optimize treatment and respiratory allergic disease prevention.

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