

The clinical and immunological features of obstructive bronchitis in children under five years of age

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WHO statistics show that more than 10% of world population suffers from symptoms of allergies, or have atopic backgrounds. Acute respiratory infections constitute for more than 1/2 of the causes of death in children under 5 years old, and 30-40% are preschool or school children. Bronchial obstruction is found in 20-25% of cases and 1-2% of them needed hospitalization. Obstructive bronchitis represents a medical and social problem considering that other risk factors in childhood may increase the risk of persistency of bronchial problems and asthmatic development.

Eighty-nine children under the age of 5 entered the study, 57,7% boys and 42,3% girls. Study participants were divided into three subgroups: the 1st group – children with wheezing, the 2nd group – children with asthma, and the 3rd group – children with pneumonia and wheezing. Every subgroup included children of the following ages: 1-12 months, 1-3 years, and 3-5 years. A structured questionnaire was applied to collect the data. Laboratory examination included: complete blood count, chest radiology, determination of sanguine gases, spirometry, immune status, skin prick tests, total immunoglobulin E (IgE), serum levels of the immunoglobulin A, immunoglobulin G, immunoglobulin M, and circulating immune complexes (CIC).

The first study group mostly consisted of children 1 to 3 years old, and the second group, children 3 to 6 years old. In the first group there was an insignificant prevalence of urban residents compared with rural (56,7%, vs. 43,3%; $p > 0,001$) and a significant prevalence in the 3rd group (80,0% vs. 20,0%; $p < 0,01$). Associated diseases were seen in all studied groups, being more prevalent in children from the first group compared with the others (50%; $p < 0,05$). The highest significance was found in 16,6% of children from the 1st group ($p < 0,01$), 10,3% from the 2nd group ($p < 0,05$), and 6,6% from the 3rd group ($p < 0,01$). Prenatal risk factors were recorded predominantly in the wheezing group. Analysis of the postnatal risk factors in the wheezing group showed that 40% suffered from atopic dermatitis, 23,3% had a family history of allergy, 23,3% lived in unfavorable living conditions, and 23,3% lived in a passive smoking environment. In the asthma group, the children's risk factors included 63,3% with recurrent respiratory infections, 83,3% suffered from atopic dermatitis, and 40% reported family history of allergic disorders. These factors showed to be insignificant in the 3rd group. Noticeably, a more severe general condition was seen in the 3rd group (56,6%, $p < 0,01$) in comparison with the

1st (20%, $p < 0,01$) and the 2nd groups (13,2%, $p < 0,001$). This shows a negative impact of asthma and pneumonia on macro-organism than on obstructive bronchitis alone.

A marked incidence showed atopic dermatitis amongst associated diseases (40% in the 1st group and 83,3% in the 2nd one), thymus enlargement (10% in the 1st group and 3,3% in the 2nd one), that underline the presence of allergic mechanisms in first two groups of children. Intoxication syndrome was seen in 93,3% of children from the 3rd group ($p < 0,05$) and 53,3% in the first group ($p < 0,05$). Because wheezing was frequently present in association with pneumonia, clinically it begins with the onset of the disease, later expiratory dyspnea and dry cough developed. Clinical features were similar with asthma ones, but were more expressive. Children from the 3rd group showed intercostal retractions, tachypnea and peripheral cyanosis. Analysis of the blood gases examination results revealed the following: group 1 – severe hypoxia, Pa O₂ < 60 mmHg in 20% of patients (23,3%; $p < 0,05$); in the 3rd group of children hypoxia was very severe (PaO₂ < 40 mmHg), and in 6,6% it was extremely severe ($p < 0,01$).

The spirometric examination identified respiratory dysfunction only in 20% of children in the asthma group ($p < 0,01$). In the 2nd group it was present in 16,6% ($p < 0,05$) and in 13,3% in the 3rd ($p < 0,01$). The immune status was examined in the wheezing and asthma groups and found that levels of the total serum IgE were significantly higher in the asthma group in comparison with the wheezing one (86,6% vs. 53,3%, respectively; $p < 0,05$). Also, IgA was decreased in the wheezing group and CIC levels were significantly higher in the wheezing group (83,3% vs. 50% of asthmatics; $p < 0,01$). Analysis of the skin prick tests results showed a prevalence of positive reactivity to pollen (16,6% $p < 0,01$). Average length of the hospitalization in first two groups was 9 days in comparison with 14 days in the pneumonia group.

A positive family history for allergy and the presence of the pre and postnatal risk factors were identified more frequently in children with asthma as compared with those with wheezing. High serum total IgE levels, decreased IgA levels, and increased CIC levels confirm the allergic substrate and mechanisms of wheezing. Blood gas examinations indicated the severity of the disease and help to guide appropriate treatment management.

Key words: wheezing, family history of allergy, serum total immunoglobulin E, children.