



Contribution ID: 10

Type: Oral presentation

Patterns of sensitization to birch pollen of children in Ukraine

Pollen of allergenic species is an important issue in the healthcare system in Ukraine. It is especially important in cities and suburbs as potential sources of allergenic pollen. What is more, allergenic tree species were planted in the urbanized territories before and their planting continues, despite the potential ability of their pollen to cause allergies. Thus, at the moment, large territories are occupied by birches, which are known as an important source of allergenic pollen. What is more, birches are grown at kindergartens and schools and on their territories too. This, in turn, provokes sensitization to birch pollen allergens from early childhood.

However, it is well-known that people who are sensitive to birch pollen may develop allergies to the pollen of other tree species of the Betulaceae family and to some foods (so-called “pollen-fruit syndrome”) over time. Consequently, the symptoms of pollinosis may begin before the flowering of the birch starts and continue after it completes.

“Pollen-fruit” syndrome caused by the Bet v 1-related allergens the most likely associated with the consumption of Rose family fruits: apples, peaches, plums – and vegetables of the carrot family. This condition is manifested by the syndrome of oral allergy.

To determine the level of sensitization of the child population to birch pollen allergens, we analysed the results of molecular diagnostics obtained using the Alex test in 2018-2020. The analysis included data from 8016 patients, including 3549 children under the age of 10. Results: Analysis of the results showed that 27.07% of these children had sensitization to birch pollen with IgE antibody concentrations of 0.30 kU/l and above.

By age, this sensitivity was distributed as follows. Among children sensitized to birch pollen, children under 1 year of age constituted 0.42 %, children aged 1 year – 1.14 %, 2 years – 4.58 %, 3 years – 7.28 %, 4 years – 10.09 %, 5 years – 11.86 %, 6 years – 14.88 %, 7 years – 13.01 %, 8 years – 12.59 %, 9 years – 12.38 % and 10 years – 11.76 %.

Based on these data, we see a trend towards an increase in the sensitivity of children to birch pollen. From birth to 6 years of age, the number of sensitive individuals constantly increases until this indicator reaches a plateau (7-10 years).

It is also necessary to take into account the physical and geographical zoning of Ukraine. The lowest number of children sensitive to birch pollen was found in the south of Ukraine in the Steppe zone (Odesa – 11.11 %, Kherson – 14.58 %) and in the forest zone in the Ukrainian Carpathians (Ivano-Frankivsk – 12.12 %, Lviv – 18.63%). This can be explained by the fact that there is no large number of natural arboreal associations in the Steppe. Concerning the Carpathians, other representatives of the flora predominate there. They are oak, beech, hornbeam, fir, spruce, and pine. The exception to this tendency is the city of Dnipro, located in the Steppe zone, where 28.59 % of children were sensitive to birch pollen. We believe that the reason for this is the artificial plantation of birch for city greenery.

The highest sensitivity was found in cities located in the zone of Mixed forests (Zhytomyr – 42.11%, Kyiv – 32.31%) and in the Forest-steppe zone (Kharkiv – 27.69%, Ternopil – 26.32%). Both territories are the natural area of birch.

Conclusions: Our results suggest that in cities, especially those located in the birch natural area, it is necessary to control the artificial planting of birch. It is especially important for the places of children activity. Such places, in particular, include the territories of kindergartens, schools, playgrounds, and areas around them.

It is necessary to look for the safe alternative of allergenic plants for city greenery and to inform the public about the high probability of developing pollen allergy and the “pollen-fruit” syndrome following primary

sensitization to birch pollen.

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