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Features of pollination in Kharkiv region

Keywords: *pollinosis, allergic reaction, specific IgE.*

Over the last years an increasing prevalence of allergic diseases in the population is observed. According to different researchers, as much as from 10.0-15.0 % to 35.0-40.0 % of the world population suffer from allergic diseases. [11, 12] In Europe alone, more than 150 million people suffer from allergic diseases, and based on this data the European Academy of Allergy and Clinical Immunology (EAACI) makes a poor prognosis for the next 15 years, according to which, roughly more than one half of the European population is expected to suffer from one or another type of allergy. [6] According to WHO experts' estimates, the world's population will annually lose 15 million years of healthy life due to bronchial asthma. Of the same importance for public health is a problem of allergic rhinitis. Only in the U.S.A. the direct costs associated with allergic rhinitis amount to 3.5 billion dollars a year, in Europe these costs amount to 1-1.5 billion euro, and indirect costs add another 1.2-2 billion. The development of pollinosis is associated with hypersensitivity to pollen allergens. [9] According to different researchers, the prevalence of pollinosis in the world ranges from 7 % to 22 % and in Ukraine (by estimate) this value is 3-8 %. This disease significantly reduces quality of patients' life as well as their performance capability, and in 40-82 % of cases it transforms into bronchial asthma. [3] The treatment efficacy depends largely on the timely identification of the causative allergen and elimination of exposure or reduc-

tion of sensitivity to this allergen. Currently, the possibility for timely detection and treatment of a large number of patients with pollinosis is artificially limited. This primarily concerns the investigation of pollinosis epidemiology and characteristics of its course in the industrial regions. Nowadays, a problem of alteration of natural exogenous allergens under the influence of environmental factors is widely discussed [1]. Some authors have established a connection between increased manifestations of hypersensitivity under the influence of substances contained in atmospheric air, such as ammonia, chlorine, fluorine, phenol, formaldehyde, oxygenic radicals, sulfites, nitrates, sulfur dioxide, etc. Moreover, environmental pollution extends the duration of plant pollination and changes the antigenic structure of the pollen itself [7], thereby significantly increasing its sensitizing properties. In addition, the ability of contaminated pollen to induce sensitization and to increase the reactivity of nasal and bronchial mucosa is proved. An important role in diagnosis of the causes of pollinosis belongs to aeropollenologic studies, which allow drawing of pollen calendars and fungal spore calendars, identification of the structure of pollen and spores, etc. In the world, the technique used for aeropollenologic research, namely collection and counting of pollen grains present in the air, has been implemented in the United States since as far back as 1916 and in the UK - since 1942. It were the

scientists in the European countries, in particular in Austria, Finland, France, Netherlands, Spain, Sweden, Great Britain, Italy, Poland, and Germany, who has made a considerable contribution to the solution to the problem of creating a general modern European net for aeropollinologic monitoring [6, 12]. The modern history of aeropollinology in Ukraine comprises only a few years. In our country pollinosis is most frequently caused by pollens of birch, oak, alder, poplar (less often of acacia and pine), weeds: ambrosia, sagebrush, saltbush, and meadow grasses and cereals, including rye, fescue, orchard grass, timothy-grass, and rye-grass. At the same time, in different climatic and geographical zones of Ukraine the structure of causative pollen allergies differs significantly. In Ukraine three peaks of plant pollination and the related pollinosis exacerbations are defined: in spring (end of March - May), which is caused by tree pollen; in summer (end of May - June), which is associated with cereal pollen; in autumn (August - October), which is caused by pollen of weeds and crops (corn, sunflower). The long-term studies of pollinosis conducted in Zaporozhye have established two peaks of pollen concentrations that take place in May and September. [8] The peak in May is caused by mulberry pollen, while in August-September – by ambrosia. Exactly these plants are the leading allergens in Southern Ukraine. The etiological structure of pollinosis in other countries also varies and depends on climate and geographical conditions. For example, in Central Europe the main factor responsible for pollinosis development constitute grasses and trees, in Northern Europe - grasses and weeds, and in Southern Europe - trees, shrubs and herbs, in the United States - ambrosia. In Central Russia seasonal symptoms are associated with hypersensitivity to pollen of grasses, trees and weeds, while in the South of Russia the main allergens are ambrosia, sunflower and corn. Significant role in the development of hypersensitivity play cross-reactions between different allergens, which belong to one group of plants, as well as cross-reactions between pollen and food allergens. The latter group of reactions may cause aggravation of pollinosis also beyond the plant pollination season.

The aim of the study was to improve the efficacy of diagnosis of patients with pollinosis by studying the regional characteristics and optimizing methods of diagnostics of this disorder.

We examined 69 patients with pollinosis in 2013 in the Allergy department of the Communal Health Protection Institution „Regional Clinical Hospital - The Centre for Emergency and Disaster Medicine“, which was clinically manifested mainly as rhinoconjunctivitis and bronchial obstruction. The age of the examined patients ranged from 18 to 51 years, with the mean age ($M \pm m$) of 32.3 ± 9.3 years which corresponds to the existing age structure of allergic diseases in Ukraine. Among 69 patients with pollinosis 36 (51%) were men and 33 (49%) were women. The duration of pollinosis (from the moment of diagnosis) ranged from 1 to 16 years, mean 4.6 ± 2.7 years.

The diagnosis of pollinosis in the patients was based on the „National protocols of care for patients with allergic diseases“ [2].

All patients underwent a comprehensive allergological examination, which included medical history and diagnostic skin prick testing (SPT) with common for Ukraine allergens produced by Vinnitsa Small Business Enterprise “Immunologist” (Ukraine). For skin prick test standard sets of allergens were used, such as a set of pollen (ambrosia, sunflower, sagebrush, saltbush, corn), household (sets with house dust and mites – *Dermatofagoides pteronissimus*, *Dermatofagoides farinae*), epidermal and insect allergens, each in concentration of 10000 PNU/ml. The test was carried out, and its results were evaluated according to the approved instructions. Specific IgE were determined by ELISA. As a material for testing venous blood samples collected after 12 hours of fasting were used. A control serum containing specific IgE was tested in each series of samples on the day of analysis. The results obtained are shown in the Table.

Table
Spectrum of sensitization in adults residents of the Kharkiv region suffering from pollinosis (n=69).

Allergen	Cases	
	Number	Percent
Ambrosia	32	47
Timothy	41	60.3
Sunflower	45	66.1
Dandelion	18	26.4
Orchard grass	15	22
Sumpfwweed	14	20.5
Upright brome	9	6.3

It is well known that pollinosis in most cases is accompanied by the development of hypersensitivity to multiple allergens [4, 5, 10]. Thus, in the overwhelming majority of the examined patients (54 cases, 79.4 %), positive skin reactions to pollens of 3 or more plants were observed. The results of the study showed that almost all patients with pollinosis had sensitization to pollen plants with pollination in summer-autumn (91 cases), while only 68 patients suffered from spring-summer pollinosis, including 42 cases with sensitization to wild plant pollen. The analysis of sensitization spectrum allowed us to determine the most frequent allergens for the population of the Kharkiv region, which included ambrosia pollen - in 47 % of cases, timothy - in 60.3 % of cases, sunflower - in 66.1 % of cases. Thus, the population of the Kharkiv region is characterized by sensitization to allergens of the first and third waves of pollination, such as ambrosia, timothy and sunflower. The overwhelming number of patients ($83.6\% \pm 2.1\%$) were hypersensitive to three or more pollen allergens, almost a half ($41.0\% \pm 2.7\%$) of patients had pollinosis associated with sensitization to house dust allergen ($34.0\% \pm 2.6\%$), *Dermatophagoides farinae* and *D. pteronyssinus* mite allergens ($22.2 \pm 2.3\%$), as well as epidermal allergens of pet animals ($6.8\% \pm 1.4\%$).

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ОСОБЛИВОСТІ ПОЛІНАЦІЇ В ХАРКІВСЬКОМУ РЕГІОНІ

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Резюме. Мета дослідження: підвищення ефективності діагностики хворих на поліноз шляхом вивчення його регіональних особливостей. Було обстежено 69 хворих на поліноз (ПЛ). Всі хворі проходили всебічне алергологічне обстеження, яке включало вивчення анамнезу і діагностичні шкірні проби уколом (prick test). Специфічні IgE визначали методом імуноферментного аналізу. Аналіз спектра сенсibilізації дозволив визначити провідні алергени для мешканців Харківської області, до яких відносяться пилок амброзії — в 47 % випадків, тимофіївки — 60,3 %, соняшника — 66,1 %. У 41,0 ± 2,7 % хворих поліноз поєднувався з сенсibilізацією до алергену домашнього пилу (34,0 ± 2,6) %, кліщів *Dermatophagoides farinae* та *Dermatophagoides pteronyssinus* (22,2 ± 2,3) %, епідермальних алергенів домашніх тварин (6,8 ± 1,4) %.

Ключові слова: поліноз, алергічна реакція, специфічний IgE.

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FEATURES POLLINATION IN KHARKIV REGION

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Abstract. Aim: increase of efficiency of diagnostics pollinosis patients by investigating its regional characteristics. Were surveyed 69 patients with pollinosis (P). All patients underwent a comprehensive sent to the Allergy survey, which included the study of anamnesis and diagnostic skin tests (prick test). Specific IgE was determined by enzyme immunoassay. The analysis of the spectrum of sensitization has allowed to define the leading allergens for the inhabitants of the Kharkiv region, which include pollen, ragweed in 47 % of cases, Timothy — 60.3 % of cases, sunflower — 66.1 % of cases. The 41.0 ± 2.7 % of patients hay fever combined with sensitization to house dust allergen (34.0 ± 2.6 %), ticks *Dermatophagoides farinae* and *pteronyssinus* (22.2 ± 2.3) %, epidermal allergens (6.8 ± 1.4) %.

Key words: pollinosis, allergic reaction, specific IgE.

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