

Determination of sensitivity to inhalant allergens in patients with allergic rhinitis in West Athens*†

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SUMMARY

In this study we have determined the sensitivity to inhalant (pollen and non-pollen) allergens in patients with allergic rhinitis from West Athens, Greece. The frequency of SPT positivity was highest for Dactylis glomerata, Parietaria, Olea europea, Dermatophagoides and several moulds.

Key words: allergic rhinitis, aero-allergens, skin prick test

INTRODUCTION

Allergic rhinitis (AR) is a disease with great medical and social interest. Several authors have reported a prevalence of 10% in the total population. In the USA 38 million people are suffering from allergy; in Greece, however, the exact rate of the sickness is not known. The expression of the symptoms is due to inhalant allergens such as pollen, dust, pets, and moulds. Allergen composition of the atmosphere differs from area to area and depends on the geographical area, the climate, the vegetation, the hygienic conditions of houses and working areas, and the intensity and direction of the wind.

MATERIAL AND METHODS

In this study we included 98 patients, who are suffering from AR, and they were examined in the ENT Clinic of the General Hospital of Nikea. All patients were living in West Athens. Patients were selected on basis of a history of AR, seasonal or perennial. Patient's evaluation was assessed by a physician and included a case history, clinical examination, SPT, and serum IgE determination.

The age of the patients ranged from 17-68 years (mean: 37 years). In 57 patients AR was characterized as seasonal, and in 41 as perennial. Fifty patients were female and 48 were male (female/male ratio 1:1). Patients were tested by a prick puncture of glycerinated allergenic extracts (10,000 PNU/ml; UCB-Stallergenes, France), using a panel of 40 inhalant allergens. This panel included: *Gramineae* (sweet vernal grass, *Agropyron*, *Dactylis glomerata*, *Holcus lanatus*, rye-grass, *Pleum pratense*, meadow-grass, meadow foxtail, *Avena sativa*, rye), ragweed, *Artemisia vulgaris*, dandelion, *Medicago sativa*, clover, *Parietaria*, goose-foot, English plantain, *Chrysanthemum*, *Dahlia*, *Zinnia*, trees (picaster, cypress, aspen, alder, silver birch, chestnut tree, beech, walnut, noisetier, *Moraccae*, planetree, *Olea europeae*, *Ulmaceae*), *Dermatophagoides*

pteronysinus, *D. farinae*, cat and dog dander, and moulds (*Alternaria*, *Cladosporium*, *Aspergillus*, *Penicillium*, and *Mucor*).

The tests were done on the palmar surface of both forearms. Reactions were read after 30 min using a millimetre ruler. The wheeling reaction was compared to the size of the histamine positive control (1 mg/ml) and to the negative control, according to the Scandinavian Society of Allergy Standardisation. The wheal with the same size as that induced by histamine was indicated as "+++", and a reaction similar to that induced by the negative control was indicated as "-". The gradings "+" and "++" were used for reactions between the negative and positive controls. For reactions larger than "+++", a "+" was added for each doubling of the average diameter.

RESULTS

Classifications of the patients on history, IgE, and SPT are summarized in Tables 1-3. One patient has been excluded because of dermatographia. The frequencies of SPT positivity to the various aero-allergens allowing the poly-sensitizations are addressed in Table 4.

Table 1. Classification of patients on basis of their history.

AR	No. of patients	%	females	males
seasonal	57	58	20	37
perennial	41	42	17	24

Table 2. Classification of patients based on IgE.

IgE	No. of patients	%
increased	59	60
normal	39	40

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Table 3. Classification of patients based on SPT.

SPT	No. of patients	%
one allergen	29	30
2-7 allergens	54	55
all allergens	3	3
negative	11	12

Table 4. Frequency of SPT positivity to various aero-allergens.

<i>pollen aero-allergens:</i>	
1. Graminae	80%
<i>Dactylis glomerata</i>	46.4%
meadow foxtail	14.3%
grasses	20.2%
rye	23.8%
wheat	23.8%
2. <i>Parietaria</i>	52.4%
3. <i>Oleaceae</i>	40.5%
4. ragweed	8.3%
<i>non-pollen aero-allergens:</i>	
1. <i>Dermatophagoides pteronyssinus</i>	48.8%
2. moulds	27.4%
<i>Aspergillus</i>	30%
<i>Penicillium</i>	60%
<i>Alternaria</i>	10%

DISCUSSION

West Athens has a Mediterranean climate, which is characterized by the mildness of its winters, and the average monthly temperature does not fall below 8°C. The summer drought is the most typical feature with average temperatures generally exceeding 27°C, whilst rain is scarce for almost all of June and July. Rainfall generally is poor, it falls mainly in two seasons, autumn and winter. The winter wind blows from various directions with a prevalence generally from the south. This region is a densely populated urban area, 5 km from the sea and surrounded by dense plantation and pine-trees. In the south-east there are *Oleaceae*, which are also used as decoration along the sidewalks.

Like most Mediterranean areas, in this region we find a typical vegetation with the presence of allergenic plants such as *Parietaria* and *Olea europaea* as well as various species of *Gramineae* and mugwort. Based on our study we found that the most common aero-allergens are the *Gramineae*. These data are similar to those obtained in Piemonte (Valenzano et al., 1986), but in Naples *Graminae* are the second most common allergen (D'Amato et al., 1989).

The most common grasses are *Dactylis glomerata*, meadow foxtail, Bermuda grass, soft grass, rye-grass, meadow-grass, and rye. In the second place, we found *Parietaria*, which is a very important hay-fever-provoking plant in West Athens and all of the Mediterranean area. It grows on walls and under trees and bushes, and is favoured by the climate. These data are in accordance with the investigations by D'Amato et al. (1989) and Valenzano et al. (1986). We found a frequency of sensitization of 52.4%.

From the trees, at third place in the table (Table 4), we found *Olea europea*, the pollen of which is responsible for frequent severe pollinosis, with a frequency of 40% positivity of SPT. This frequency follows other areas in Southern Italy, where the

Olea sensitization follows *Parietaria* and *Gramineae* (Valenzano et al., 1986), but in some areas is more frequent than that induced by grasses, for instance in Spain where it amounts to 30-70% (Blanca et al., 1983), in Naples (Italy) to 23% (D'Amato et al., 1989), and in Montpellier (France) it is 15% (Bousquet et al., 1984). The olive trees are not directly present in the environment, but the air movements carry this pollen to the suburban areas. In terms of frequency of SPT positivity, we found ragweed (*Ambrosia*) to be the fourth most important allergenic pollen in Western Athens air.

Except for pollen, a large number of patients (48.8%) were found to be SPT positive for other kinds of inhalant allergens, such as *Dermatophagoides*. These results are in accordance with other European studies (Valenzano et al., 1986).

A very great number (27.4%) of SPT positivity was found for moulds. The most common moulds were *Aspergillus* (30%), *Penicillium* (60%), and *Alternaria* (10%). These can be characterized as indoor moulds. In the literature (Lowenstein et al., 1986) prevalence of type I allergy to moulds range from 2-30% of an allergy population. Valenzano et al. (1986) in their study report a rate of 4% for moulds. These discrepancies may be explained by variable climatological factors (such as temperature and humidity) as well as the vegetation, which influence the composition of mould flora.

Fungal growth encountered indoors is often a result of constructive faults in the house, such as poor insulation or poor ventilation. As the climatological factors in our region (low humidity, increased sunshine) do not promote the proliferation of moulds, the high rate of positive SPT might be due to low housing conditions, i.e. poor ventilation.

Indeed, a great number of the patients work in factories that are poorly ventilated, while even their houses are not of a good construction. In houses the most potent source of allergen usually is bed dust, although high concentrations are often found in the dust from carpets, and clothing in other parts of the house. It has to be noted that the "cleanliness" of the house or the presence of a central heating system was not associated with low concentrations of the allergens.

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