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Allergic rhinitis (AR) in geriatric patients

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A R T I C L E   I N F O

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ABSTRACT

Allergic rhinitis (AR) can be defined as an inflammatory disease of the nose and the paranasal sinuses, characterized by a specific IgE-mediated hypersensitivity reaction. The aim of this study was to evaluate the correlation between the symptoms of AR and the prick test results in geriatric patients presenting with symptoms of AR by comparing these with those of a young control group. Thirty-two geriatric patients (Group 1) were analyzed retrospectively, and 37 patients (Group 2) were selected as the control group. Diagnosis of AR was made based upon the physical examination findings, nasal endoscopic examination findings and the skin prick test results. While the skin prick test positivity was 50% in Group 1, this rate was found as 75.7% in Group 2. The difference was found to be statistically significant (p = 0.044). A statistically significant difference was found between the two groups in terms of susceptibility to mugwort pollen and fish (p = 0.048, p = 0.033). In conclusion, in geriatric patients presenting with AR symptoms, systemic treatment should not be initiated before performing skin prick test, due to the adverse effects of the drugs.

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Diagnosis of AR was made based upon the physical examination findings, nasal endoscopic examination findings and the skin prick test results. Sneezing, runny nose, nasal obstruction and nasal itching, presence of serous secretion in the nasal cavity, pale nasal mucosa, edematous, and pale or purplish conchae were interpreted in favor of AR. Patients were analyzed in terms of skin findings and presence of erythema, itching, urticaria and eruption and these were recorded. Cough, dyspnea and wheezing were investigated as pulmonary symptoms. Itching, redness and edema were questioned as ocular symptoms.

Alyostal ST-IR (Stalleleges S.A. France) standard allergen extracts were used for the skin prick test. For the test, antihistamines had to be withdrawn 10 days previously, H2 receptor blockers had to be withdrawn 24 h previously, and antidepressant drugs withdrawn 20 days previously. Allergen extracts that were taken in standard doses in quick test applicators with 8 distinct edges were applied onto the skin after having cleaned the ventral part of the forearm with alcohol. The results were evaluated 15 min later. Histamine-HCl was used as positive control and isotonic NaCl was used as negative control. The validity criterion for the test was accepted as >3 mm for positive control and <3 mm for negative control. Skin reaction against the allergen with an enduration of >3 mm in diameter was accepted as a positive reaction (Polosa et al., 2005).

The most common 30 allergen extracts and positive and negative controls were applied using a total of 4 applicators onto the skin of forearm for the skin prick test. Two house dust mites, 3 fungal spores, 1 insect, 3 animal epithelia, 15 pollens and 6 food allergens were used.

The skin prick test was not applied on patients who had been treated with the diagnosis of asthma, or on those who had suspicion of asthma and who were on beta-blocker agents.

2.2. Statistical analysis

Statistical analysis was performed using the SPSS 15.0 program. Consistency of the data with a normal distribution was assessed using the Kolmogrov Smirnov test. Parametric measurements were elaborated by using the intergroup independent sample t-test and the non-parametric measurements were made using the Wilcoxon and the Mann–Whitney U-test. A p < 0.05 was considered statistically significant.

3. Results

Of the 69 patients, 32 were above 65 years of age (Group 1), and 37 were aged between 40 and 45 years (Group 2). Of the patients in Group 1, 21 were females (65.6%), 11 were males (34.4%); of the patients in Group 2, 27 were females (73%) and 10 were males (27%), and a significant difference was not found between the two genders. Nasal symptoms were scored out of 7 points, ocular symptoms were scored out of 3 points and pulmonary symptoms were scored out of 3 points and comparisons were made. The total symptom scores have been presented in Table 1. Nasal symptoms are displayed in Fig. 1, and dermatological, ocular and pulmonary symptoms are displayed in Table 2. There was no significant difference between the groups in terms of symptoms on presentation and nasal examination findings.

While the skin prick test positivity was 50% in Group 1, this rate was found as 75.7% in Group 2. The difference was found to be statistically significant (p = 0.044).

All the cases in both groups had at least one of the nasal symptoms. The rate of having one of the ocular symptoms was 90.3% in Group 1 and 83.3% in Group 2. The likelihood of having any of the pulmonary symptoms was 71% in Group 1 and 78.4% in Group 2. The likelihood of having any of the dermatological symptoms was 51.6% in Group 1 and 64.9% in Group 2. The frequency of symptoms was similar in both groups (p > 0.05).

The number of the allergens to which patients with positive skin prick test were susceptible was 6.1 ± 5.8 (1–19) in Group 1 and 7.4 ± 6.1 (1–23) in Group 2, and no significant difference was found (p = 0.32). A statistically significant difference was found between the two groups in terms of susceptibility to mugwort pollen and fish. Susceptibility to mugwort pollen was found as 12.5% in the elderly group and 35.1% in the young group (p = 0.048). Susceptibility to fish was found to be 3.2% in the elderly group and 2.6% in the young group (p = 0.033).

4. Discussion

AR is an inflammatory disease of the mucous membranes developing related to type 1 hypersensitivity reaction. Type 1 hypersensitivity reaction is also referred to as early hypersensitivity, and IgE located on the surfaces of basophils and mast cells plays a role in this reaction (Prussin and Metcalfe, 2006). The allergen is usually the inhalant particles in AR and this phenomenon begins with T-cell, B-cell and plasma cell cascade. Specific antigen binds with two specific IgE antibodies on the surfaces of mast cells located in the mucosa of the respiratory and gastrointestinal

**Table 1**

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal symptoms</td>
<td>3.4 ± 1.6</td>
</tr>
<tr>
<td>Eye symptoms</td>
<td>1.7 ± 0.8</td>
</tr>
<tr>
<td>Pulmonary symptoms</td>
<td>1.3 ± 1.1</td>
</tr>
<tr>
<td>Dermatologic symptoms</td>
<td>1.2 ± 1.5</td>
</tr>
</tbody>
</table>

Notes: for all group-differences (p < 0.05).

**Table 2**

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itching eye</td>
<td>87.1</td>
<td>73.0</td>
</tr>
<tr>
<td>Red eyes</td>
<td>58.1</td>
<td>54.1</td>
</tr>
<tr>
<td>Eye edema</td>
<td>25.8</td>
<td>37.8</td>
</tr>
<tr>
<td>Coughing</td>
<td>54.8</td>
<td>54.1</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>48.4</td>
<td>54.1</td>
</tr>
<tr>
<td>Wheezing</td>
<td>32.3</td>
<td>35.1</td>
</tr>
<tr>
<td>Skin eruption</td>
<td>25.8</td>
<td>40.5</td>
</tr>
<tr>
<td>Skin itch</td>
<td>40.9</td>
<td>48.6</td>
</tr>
<tr>
<td>Skin erythema</td>
<td>38.7</td>
<td>40.5</td>
</tr>
<tr>
<td>Urticaria</td>
<td>22.6</td>
<td>16.2</td>
</tr>
</tbody>
</table>

Fig. 1. Frequency of nasal symptoms (p > 0.05).
system, subconjunctiva and subcutaneous layer of the skin. This
IgE-mediated reaction then leads to mast cell degranulation and
triggers the development of an inflammation by release of
histamine, leukotrien, cytokine, prostaglandin and platelet
activating factor. This is called the early phase or humoral reaction
and occurs in 10–15 min following allergen exposure (Prusssin and
Metcalfe, 2006).

Release of histamine is responsible for sneezing, runny nose,
itching, increase in vascular permeability, vasodilatation and
hypersecretion of the glands. Release of cytokines and leukotrienies
causes the migration of inflammatory cells, mainly eosinophils,
toward the affected area. This inflammatory response is the
delayed phase or the cellular reaction, and begins 4–6 h after the
first sensitization and it can prolong the allergic cascade up to 48 h
and increase its severity. This response is mainly responsible for
nasal congestion and post-nasal drip in AR (Kay, 2001). In our
study, the rates of nasal congestion were found to be 78.4% in the
young and 61.3% in the elderly; post-nasal drip was found as 81.1%
in the young and 61.3% in the elderly. When these results are taken
into consideration, it can be concluded that allergic nasal
symptoms are more common among the young compared to the
elderly, despite the fact that this is statistically insignificant.

Although AR is common in the young population, its prevalence
is gradually increasing among the elderly. The reason for this is
desensitization developing in the past years and decrease in
outdoor exposure. Studies have shown that higher exposure of the
elderly to indoor allergens increases the amount of IgE against
these allergens and mite allergen positivity in the skin prick test
(Rogers et al., 2002; King and Lockey, 2003). In our study, the
number of allergen sensitivity was found to be lower in the elderly
compared to the young, which was consistent with the literature.

Concurrence of asthma and AR, which is a risk factor for
development of asthma, is common and AR is present in 75% of
asthmatic patients. Prevalence of asthma has been reported to vary
between 10% and 40% in AR patients (Linneberg et al., 2002).
Mortality rates are higher among asthmatic patients of 65 years
and older compared to young asthmatic patients (Moorman et al.,
2007).

Treatment of AR comprises environmental control, pharma-
cotherapy and immunotherapy. Intranasal and systemic antihista-
mines, intranasal and systemic corticosteroids, decongestants,
intranasal anticholinergics, intranasal chromoline and leukotriene
antagonists are used for pharmacotherapy (Howarth, 2003). In
allergic disease, the main effects of histamine are upon histamine-
1 (H-1) receptor; in hypotension, tachycardia, flushing and
headache. Its effect is mediated by H-1 and H-2 receptors, and
in skin itching and nasal congestion, its effect is mediated by H-3
and H-4 receptors (Tiligada et al., 2009).

Antihistamines prevent reactions induced by histamine, such as
increased vascular permeability, smooth muscle contraction,
increased mucus production and itching, by blocking the H1
receptor areas. Antihistamines are effective in the early phase
reaction and decrease symptoms like sneezing, runny nose, and
itchy nose (Kay, 2001). They have very few effects on nasal
congestion developing as a result of delayed phase reaction.

First generation antihistamines should be used carefully in old
patients due to their adverse effects including sedation, memory
disruptions, psychomotor dysfunction and anticholinergic ad-
verse effects, whereas second generation antihistamines have less
effects on the central nervous system as they permeate the blood–
brain barrier to a lower extent (Bousquet et al., 2003).

Of the second generation antihistamines, terfenadine and
astemizole have cardiac adverse effects (Estelle and Simons,
1999). This is a factor restricting their use in the elderly. Intranasal
antihistamines are effective on itching, rhinorrhea and sneezing
symptoms. Azelastine used twice a day decreases seasonal AR
symptoms not responding to oral antihistamines. It has adverse
effects like mild sedation and metallic taste (Berger and White,
2003).

Medical history and diagnostic tests are used in the diagnosis of
AR. Presence of 2 or more of the symptoms of watery rhinorrhea,
sneezing, nasal obstruction and itchy nose lasting for more than 1 h
in most days of the week should urge one to suspect AR. Skin test
and serum specific IgE level are the diagnostic tests. Demonstra-
tion of susceptibility to specific antigens with the skin test is
essential in the diagnosis of AR (Murphree and Kniker, 1979). The
skin prick test is the most sensitive test that can be applied easily in
the diagnosis of AR (Brown et al., 1985; Scozlo et al., 1989; Akbas
and Saatci, 2003). Prevalence of AR decreases with age (Jones,
2004). Richards et al. (1992) reported that the incidence of AR
decreased above the age of 45. In our study, while the positivity of
the skin prick test were found to be 50% in the elderly, it was found
as 70% in the young, which consistent with the literature.

AR can be defined as an inflammatory disease of the nose
characterized with specific IgE-mediated hypersensitivity reac-
tion, clinically arising following exposure of the nasal mucosa to
allergens. This condition can also be defined as allergic rhinosi-
nusitis as it also affects the paranasal sinuses (Guerra et al., 2002).
Allergy is a predisposing factor for chronic rhinosinusitis (Sanders,
1971). Diagnosis must be performed for AR, especially in the
treatment of the elderly, owing to its high morbidity.

Vasomotor rhinitis is a condition triggered by alterations in
various smells, heat and pressure, and characterized with nasal
obstruction, rhinorrhea and nasal congestion (Druce, 1998).
Vasomotor rhinitis is non-AR, the prevalence of which increases
with age and is related to autonomic dysregulation of nasal
functions (Bickmore, 1981). Performing skin tests before initiating
the treatment of AR considering the probability of vasomotor
rhinitis is a safe way to avoid the adverse effects of the drugs, as it is
not IgE-mediated (Li, 2002). In our study, although the symptoms
were more frequent among the young compared to the elderly who
had presented with symptoms of AR, the difference was not found
to be statistically significant. The skin prick test is an important
diagnostic tool for AR, and its importance is gradually increasing,
especially in the geriatric population when adverse effects of the
systemic drugs used for treatment are taken into consideration.
According to the results of our study, in geriatric patients
presenting with AR symptoms, systemic treatment should not be
initiated before performing skin prick test, due to the adverse
effects of the drugs.

Conflict of interest statement

None.

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