



CLINICAL STUDY

RETROSPECTIVE ANALYSIS OF REGIONAL SKIN PRICK TEST RESULTS

Serkan KAYABAŞI¹, MD; Funda KEMERİZ², MD; Serkan ÇAYIR¹, MD

¹Aksaray üniversitesi, Kbb Anabilim Dalı, Aksaray, Turkey ²Aksaray üniversitesi, Dermatoloji Anabilim Dalı, Aksaray, Turkey

SUMMARY

Objective: In this study, we aimed to investigate the distribution of allergens in our region according to admission diagnosis and age in patients and to determine the positivity rate in children and adults who underwent the skin prick test.

Methods: The results of 300 patients who underwent the skin prick test were evaluated retrospectively, the skin prick test results were investigated. Prick test positivity was compared between pediatric and adult patients.

Results: Patients with the most positive response to the administered allergen extracts were found to be angioneurotic edema (75%) and allergic rhinitis patients (63.75%). The allergens with the highest positivity were determined to be the tree and shrub pollen (53.74%), house dust mites (53.06%), meadow and grass pollen (35.37%), respectively. Of the 300 patients who required the prick test, 80 (26.6%) were allergic rhinitis, 65 (21.6%) were chronic cough, 58 (19.3%) were chronic idiopathic urticaria, 45 (15%) were generalized pruritus, 24 (8%) were atopic dermatitis, 18 (6%) were contact dermatitis, 6 (2.3%) were allergic asthma and 4 (1%) were angioneurotic edema patients. The highest test positivity in the pediatric patient population was in patients with allergic rhinitis (70.3%) and atopic dermatitis (48%). Prick test positivity and multiple allergen positivity rates were not observed to be significantly different between children and adults ($p > 0.05$).

Conclusion: Allergic rhinitis was found to be the most common prick test indication. Patient groups with the highest prick test positivity were angioneurotic edema and allergic rhinitis. Tree and shrub pollens were the most common allergens.

Keywords: Allergic Rhinitis, Allergy, Skin Prick

BÖLGESEL DERİ PRİCK TESTİ SONUÇLARININ RETROSPEKTİF ANALİZİ

ÖZET

Amaç: Çalışmamızda bölgemizde görülen alerjenlerin başvuru tanısı ve yaşa göre hastalar üzerindeki dağılımını incelemeyi ve deri prick testi yapılmış çocuk ve yetişkinlerde pozitiflik oranını belirlemeyi amaçladık.

Yöntem ve Gereçler: Deri prick testi yapılan 300 hastanın sonuçları retrospektif olarak incelenerek prick test sonuçları araştırıldı. Çocuk ve yetişkin hastalar arasında prick testi pozitifliği açısından karşılaştırma yapıldı.

Bulgular: Uygulanan alerjen ekstrelerine karşı en fazla pozitif cevap alınan hastalar anjionörotik ödem (%75) ve alerjik rinit hastaları (%63,75) olarak bulundu. En çok pozitiflik gösteren alerjenler ise sıklık sırasıyla ağaç ve ağaçsı polenler (%53,74), ev tozu akarları (%53,06), çayır ve ot polenleri (%35,37) olarak saptandı. Prick testi istenen 300 hastadan 80 (%26,6) 'i alerjik rinit, 65 (%21,6) 'i kronik öksürük, 58 (%19,3) 'ü kronik idiyomatik ürtiker, 45 (%15) 'i jeneralize pruritis, 24 (%8) 'ü atopik dermatit, 18 (%6) 'i kontakt dermatit, 6 (%2,3) 'i 5 alerjik astım ve 4 (%1) 'ü anjionörotik ödem hastasıydı. Çocuk hasta popülasyonunda en yüksek test pozitifliği alerjik rinit (%70,3) ve atopik dermatit (%48) hastalarındaydı. Prick test pozitifliği ve çoklu alerjen pozitifliği oranları arasında çocuk ve yetişkinler açısından anlamlı fark izlenmedi ($p > 0.05$).

Sonuç: Alerjik rinit en sık saptanan prick test endikasyonu olarak bulundu. Prick testi pozitifliğinin en yüksek olduğu hasta grupları anjionörotik ödem ve alerjik rinit hastalarıydı. Ağaç ve ağaçsı polenler ise en sık duyarlılık saptanan alerjendi.

Anahtar Sözcükler: Alerjik Rinit, Alerji, Deri Prick

INTRODUCTION

Allergy diagnosis is based on the determination of allergen-specific IgE and the history of complaints after contact with the allergen. Determination of allergen-specific IgE is possible with blood tests and/or skin prick tests¹.

The skin prick test is a diagnostic test that helps to detect sensitization with the allergen in IgE-mediated Type 1 immunological reactions in various preliminary diagnoses such as asthma, eczema, allergic rhinitis, anaphylaxis, atopic dermatitis, and angioneurotic edema². The skin prick test is performed by administering a relatively small dose of allergen extracts with a thin needle into the epidermis. When appropriate allergens are placed on the skin, erythema and edema develop which can be measured quantitatively in the skin area with the release of histamine and other mediators from the mast cells in which IgE specific to the allergen is present. The positive skin prick test demonstrates

Corresponding Author: Serkan KAYABAŞI MD Aksaray Üniversitesi, KBB Anabilim Dalı, Aksaray, Turkey, E-mail: drserkankayabasi@gmail.com

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the presence of specific IgE in the dermal mast cells³. Allergy skin tests are widely used because of their minimally invasive properties, low cost, relatively fast applicability, giving quick results, and reliability^{3,4}. There is a prick test indication in situations which occur in relation to early type allergic reactions such as asthma, allergic rhinitis, anaphylaxis, food and insect allergies, eczema, urticaria, atopic dermatitis, and eosinophilic gastroenteritis⁴.

In our country, the incidence of allergens belonging to different regions and prick test results differ on a regional basis⁵⁻⁷. In our study, we investigated retrospectively the test results in which positivity was determined against at least one allergen. This study aimed to investigate the relationship between allergens detected in skin prick tests and age, gender, pre-diagnosis on admission, and seasons and to determine the positivity rate in patients who underwent the skin prick test.

MATERIAL and METHODS

This retrospective study was planned in accordance with the Helsinki Declaration of the World Medical Association and approval was obtained from the Human Research Ethics Committee of Aksaray University (2019/03-07). Three hundred patients who underwent the skin prick test for various reasons between January 2018 and December 2018 were included in the study. The skin prick test kit (ALK-Madrid) we used was composed of 30 allergens, except for positive (histamine) and negative control (0.9% saline) (Table 1). Allergy test evaluation forms included the patient's name, age, gender, characteristic of accompanying symptoms, the seasons when these symptoms increase, admission diagnosis, family history, and skin prick test results. Patients who used antihistaminic, steroid and immunosuppressive drugs that might affect the test result for the last one week, who had an active infection, who were pregnant and/or were breastfeeding, who underwent immunotherapy, who had dermographism were not tested and were excluded from the study.

Allergen solutions were dripped on the inside of the forearm at 2 cm intervals. Then without making the skin bleed, the epidermal

puncture was applied to the application areas with the help of lancets with a tip of 1 mm. The evaluation was made after 20 minutes. The test was considered valid if the positive control was $3\text{mm} >$ and the negative control was $<3\text{ mm}$. The test results were graded according to 0-4 degrees in accordance with the diameter of induration, and skin reaction was considered positive against allergens with an induration diameter of 3 mm and above.

Statistical Analysis

All statistical analyses were performed using SPSS 16.0 (SPSS, Inc, Chicago, IL) software for Windows. Demographic data were presented as mean (min-max), and the prick test results were presented as number and percentage (%). The chi-square test was used to compare test positivity between the pediatric and adult groups. The p-value smaller than 0.05 was considered significant.

RESULTS

Of the 300 patients included in the study, 142 (47.3%) were male, and 158 (52.3%) were female. While the mean age of the males was 27.9 (3-70) years, the mean age of the females was 29.2 (3-72) years. There was no significant difference between patients with positive and negative skin prick test results in terms of age and gender ($p > 0.05$). Of the 300 patients included in the study, 74 (24.7%) were pediatric (3-16 years) patients, and 226 (75.3%) were adult patients. In the pediatric age group, the number of patients in whom test positivity was detected was 30 (40.54%), while in the adult patient group, it was found to be 117 (51.76%). There was no statistically significant difference between the children and adults in terms of test positivity ($p > 0.05$).

The number of patients with positivity to each allergen was presented in Table 1. The most common allergens according to their frequencies were tree and shrub pollens (Alder, Birch, Pine, Oak) (36.73%) (Red, Birch, Hazelnut) (23.8%), house dust mites- (*D. Pteronyssinus*) (27.21%) and (*D. Farinae*) (25.85%), meadow pollens- (Orchard grass, Meadow Fescue, Perennial Rye Grass, Timothy Grass, Kentucky Blue Grass) (21.8%) and weed pollens (Wall Pellitory, Stinging Nettle) (13.6%), respectively. A patient,



who had an allergy against carrot, banana, chicken meat, and egg white, was not detected.

Of the 300 patients who underwent the skin prick test, 80 (26.6%) patients had the pre-diagnosis of allergic rhinitis, 65 (21.6%) had chronic cough, 58 (22.1%) had chronic idiopathic urticaria, 50 (15.1%) had chronic pruritus, 45 (15%) had generalized pruritus, 24 (8%) had atopic dermatitis, 18 (6%) had contact dermatitis, 6 (2.3%) had allergic asthma, and 4 (%) had angioneurotic edema (Table 2).

During the period of the study, positivity against at least one allergen was detected in 147 (49%) of the 300 patients who underwent the skin prick test. When the pre-diagnosis of the patients with test positivity was examined, it was observed that 50 (34.01%) patients underwent the test with allergic rhinitis diagnosis, 27 (18.36%) patients with chronic cough diagnosis, and 24 (16.32%) patients with chronic idiopathic urticaria diagnosis. According to the diagnosis and pre-diagnosis, patients with the highest test positivity according to their frequencies were 75% angioneurotic edema, 63.75% allergic rhinitis, 55.5% contact dermatitis, 54.6% atopic dermatitis, 50% allergic asthma, 41.5% chronic cough, 41.37% chronic idiopathic urticaria, and 35.5% generalized pruritus patients, respectively (Table 2).

28 of the pediatric patients (37.83%) had chronic cough, 20 (27.02%) had allergic rhinitis, 12 (16.21%) had chronic idiopathic urticaria, 8 (10.81%) had atopic dermatitis, 5 (6.75%) had generalized pruritus, and 1 (1.35%) patient had atopic dermatitis pre-diagnosis. When the test positivity was examined, while the highest test positivity was determined in patients with allergic rhinitis (65%) and atopic dermatitis (50%), the test positivity rate was only 28.57% in patients with chronic cough. When 30 pediatric patients with test positivity were examined, positivity was detected at most against tree and shrub pollens (in 15 patients, 50%), against house dust mites- *D. Pteronyssus*- (in 15 patients -50%), and meadow pollens (in 7 patients- 23.33%). Diagnosis distributions of the pediatric patients who underwent the test, diagnosis distributions of the pediatric patients with test positivity, and

test positivity rates for each pre-diagnosis in pediatric patients are presented in Table 3.

The distribution of each applied allergen sensitivity according to the pre-diagnosis is presented in Table 4. Of the 51 patients with the pre-diagnosis of allergic rhinitis and with test positivity, 32 patients (40%) were determined to have a positive allergic reaction against house dust mites, 25 patients (31.25%) against tree and shrub pollens, 14 patients (17.5%) against meadow and grass pollens, 7 patients (8.75%) against the animal epithelium, and 7 patients (8.75%) against fungi. Food allergy was detected in 12 patients (15%) who were diagnosed with allergic rhinitis and had test positivity.

In the 27 patients with prick test positivity and with the diagnosis of chronic cough, the most common positive allergens were tree and shrub pollens (18 patients- 27.69%), house dust mites (16 patients-24.61%), meadow and grass pollens (13 patients-20%), animal epithelium (4 patients-6.15%), and fungi (3 patients-4.61%). Food allergy was determined in 3 patients (4.61%) who had applied with the pre-diagnosis of cough and in whom test positivity was detected.

In the 24 patients who were diagnosed with chronic idiopathic urticaria and in whom prick test positivity was detected, the most common positive allergens were house dust mites (13 patients-22.41%), tree and shrub pollens (12 patients-20.68%), meadow and grass pollen (9 patients-15.51%), animal epithelium (5 patients-8.62%), and fungi (3 patients- 5.17%). Food allergy was detected in 6 patients (10.34%) who had applied with the pre-diagnosis of urticaria and in whom test positivity was detected.

In the 16 patients who were diagnosed with generalized pruritus and in whom prick test positivity was detected, the most common positive allergens were house dust mites (9 patients-20%), tree and shrub pollens (8 patients-33.3%), meadow and grass pollens (1 patient-4.16%), animal epithelium (3 patients-6.66%), and cockroach (3 patients-2.22%). From food allergens, positivity was determined in 7 patients (15.55%).



In the 13 patients who were diagnosed with atopic dermatitis and in whom prick test positivity was detected, the most common positive allergens were tree and shrub pollens (7 patients-27.78%), and meadow and grass pollens (4 patients-22.2%). From food allergens, positivity was determined in 3 patients (12.5%).

In the 10 patients who were diagnosed with contact dermatitis and in whom prick test positivity was detected, the most common positive allergens were tree and shrub pollens (5 patients-15.55%), house dust mites (4 patients-16.66%), animal epithelium (2 patients-11.1%), and meadow and grass pollens (1 patient-4.16%). From food allergens, positivity was determined in 2 patients (11.1%).

When the distribution of the prick test results by months was examined, the most frequent prick test positivity was determined in April (66.6%), May (60%) and June (57.3%), and the rarest prick test positivity was determined in January (30.4%).

When 107 adult patients with positive test results were examined, 42 (39.25%) patients were observed to have multiple allergen positivity. Of the 30 pediatric patients with positive test results, 13 (43.3%) patients had multiple allergen positivity. There was no significant difference between pediatric and adult patients in terms of multiple allergen positivity ($p>0.05$).

Table 1. Number of patients with positive susceptibility to each allergen in the skin prick test

Allergens	Number of positive patients, n: 147
Tree Pollens (Red, Birch, Hazelnut)	35 (23.8%)
Meadow Pollens (Orchard grass, Meadow Fescue, Perennial Rye Grass, Timothy Grass, Kentucky Blue Grass)	32 (21.8%)
House dust mites (D.Farinae)	38 (25.85%)
House dust mites (D.Pteronyssinus)	40 (27.21%)
Shrub pollens (Alder)	20 (13.6%)
Shrub pollens (Birch)	12 (8.16%)
Shrub pollens (Pine)	12 (8.16%)
Shrub pollens (Oak)	10 (6.8%)
Weed pollens (Steep Pine Grass)	10 (6.8%)
Weed pollens (Dead nettle)	10 (6.8%)
Mold (Alternaria Alternata)	10 (6.8%)
Mold (Aspergillus Fumigatus)	7 (4.76%)
Dog fur	10 (6.8%)
Cat fur	15 (10.2%)
Cockroach	1 (0.68%)
Rye flour	4 (2.72%)
Barley flour	5 (3.4%)
Wheat flour	4 (2.72%)
Oat flour	3 (2.04%)
Egg whites	0 (0%)
Egg yolk	4 (2.72%)
Chicken meat	0 (0%)
Cow milk	3 (2.04%)



Hazelnut	4 (2.72%)
Walnut	1 (0.68%)
Peach	1 (0.68%)
Banana	0 (0%)
Carrot	0 (0%)
Tomato	1 (0.68%)
Peanut	1 (0.68%)

Table 2. Evaluation of admission diagnosis of patients, number of positive patients and test positivity rates

Pre-diagnosis and diagnosis	Number of total patients	Number of positive patients	Test positivity rates
Allergic rhinitis	80 (26.6%)	51 (34.69%)	63.75%
Chronic cough	65 (21.6%)	27 (18.36%)	41.5%
Chronic idiopathic urticaria	58 (19.3%)	24 (16.32%)	41.37%
Generalized pruritus	45 (15%)	16 (10.88%)	35.5%
Atopic dermatitis	24 (8%)	13 (8.84%)	54.16%
Contact dermatitis	18 (6%)	10 (6.8%)	55.5%
Allergic asthma	6 (2.3%)	3 (2.04%)	50%
Angioneurotic edema	4 (1%)	3 (2.04%)	75%
Total	300 (100%)	147 (100%)	48.2%

Table 3. Evaluation of admission diagnosis of pediatric patients, number of positive pediatric patients and test positivity rates

Pre-diagnosis and diagnosis	Number of pediatric patients	Number of positive pediatric patients	Test positivity rates
Allergic rhinitis	20 (27.02%)	13 (43.3%)	65%
Chronic idiopathic urticaria	12 (16.21%)	4 (13.3%)	33.3%
Chronic cough	28 (37.83%)	8 (26.6%)	28.57%
Generalized pruritus	5 (6.75%)	1 (3.3%)	20%
Atopic dermatitis	8 (10.81%)	4 (13.3%)	50%
Contact dermatitis	1 (1.35%)	0 (0%)	0%
Angioneurotic edema	0 (0%)	0 (0%)	0%
Total	74 (100%)	30 (100%)	40.54%



Table 4. Distribution of allergens with positive response according to pre-diagnosis

	Allergic rhinitis (80) * (51-63.75%)&	Chronic cough (65)* (27-41.5%)&	Chronic idiopathic urticaria (58)* (24-41.37%)&	Generalized pruritus (45)* (16-35.5%)&	Atopic dermatitis (24)* (13-54.16%)&	Contact dermatitis (18)* (10-55.5%)&	Allergic asthma (6)* (3-50%)&	Angioneurotic edema (4)* (3-75%)&
Tree Pollen (Red, Birch, Hazelnut)	10 (12.5%)	5 (7.69%)	5 (8.62%)	5 (11.1%)	5 (20.83%)	3 (17%)	1 (16.6%)	1 (25%)
Meadow Pollens (Orchard grass, Meadow Fescue, Perennial Rye Grass, Timothy Grass, Kentucky Blue Grass)	10 (12.5%)	9 (13.84%)	5 (8.62%)	3 (6.7%)	0	2 (11.1%)	2 (33.3%)	1 (25%)
House dust mites (D.Farinae)	14 (17.5%)	8 (12.3%)	7 (12.06%)	5 (11.1%)	2 (8.33%)	0	1 (17%)	1 (25%)
House dust mites (D.Pteronyssinus)	18 (22.5%)	8 (12.3%)	6 (10.34%)	4 (8.89%)	2 (8.33%)	0	1 (17%)	1 (25%)
Shrub pollens (Alder)	8 (10%)	6 (9.23%)	2 (3.44%)	2 (4.44%)	1 (4.17%)	0	1 (5.55%)	0
Shrub pollens (Birch)	3 (3.75%)	3 (4.6%)	2 (3.44%)	1 (2.22%)	1 (4.17%)	1 (5.55%)	1 (5.55%)	0
Shrub pollens (Pine)	2 (2.5%)	1 (1.5%)	1 (1.72%)	0	0	0	2 (33.3%)	0
Shrub pollens (Oak)	2 (2.5%)	3 (4.6%)	2 (3.44%)	1 (2.22%)	1 (4.17%)	1 (5.55%)	0	0
Weed pollens (Steep Pine Grass)	2 (2.5%)	2 (3.07%)	2 (3.44%)	2 (4.44%)	1 (4.17%)	1 (5.55%)	0	0
Weed pollens (Dead nettle)	2 (2.5%)	2 (3.07%)	2 (3.44%)	2 (4.44%)	0	1 (5.55%)	0	1 (25%)
Mold (Alternaria Alternata)	4 (5%)	1 (1.5%)	2 (3.44%)	0	0	0	3 (50%)	0
Mold (Aspergillus Fumigatus)	3 (3.75%)	2 (3.07%)	1 (1.72%)	0	0	0	1 (16.6%)	0
Dog fur	3 (3.75%)	1 (1.53%)	2 (3.44%)	1 (2.22%)	0	1 (5.55%)	2 (33.3%)	0
Cat fur	4 (5%)	3 (4.6%)	3 (5.17%)	2 (4.44%)	0	1 (5.55%)	2 (33.3%)	0
Cockroach	0	0	0	1 (2.22%)	0	0	0	0
Rye flour	2 (2.5%)	0	0	1 (2.22%)	1 (4.17%)	0	0	0
Barley flour	2 (2.5%)	0	1 (1.72%)	0	1 (4.17%)	0	0	1 (25%)
Wheat flour	2 (2.5%)	0	1 (1.72%)	1 (2.22%)	0	1 (5.55%)	0	0
Oat flour	1 (1.25%)	1 (1.5%)	1 (1.72%)	0	0	0	0	0
Egg whites	0	0	0	0	0	0	0	0
Egg yolk	2 (2.5%)	0	1 (1.72%)	1 (2.22%)	0	0	0	0
Chicken meat	0	0	0	0	0	0	0	0
Cow milk	1 (1.25%)	0	1 (1.72%)	1 (2.22%)	0	1 (5.55%)	0	0
Hazelnut	1 (1.25%)	1 (1.5%)	0	0	1 (4.17%)	0	0	1 (25%)
Walnut	0	0	0	0	0	0	0	1 (25%)
Peach	1 (1.25%)	0	0	0	0	0	0	0
Banana	0	0	0	0	0	0	0	0
Carrot	0	0	0	0	0	0	0	0
Tomato	0	1 (1.5%)	0	0	0	0	0	0
Peanut	0	0	1 (1.72%)	0	0	0	0	0

* Number of patients undergoing skin prick testing with this admission diagnosis & Number and percentage of patients with positive allergic reaction

DISCUSSION

In this study, we retrospectively examined the results of the skin prick tests performed within the last year in order to determine the allergen sensitivity of Aksaray province. In the present study, we detected sensitivity to at least one allergen in 49% of the patients who underwent the skin prick test. In various studies carried out recently, the

sensitivity rate of the skin prick test varies between 29% and 72%⁵⁻⁷.

In a study conducted by Talay et al. in Düzce in 2008, they determined positivity mostly against mites (71%), fungi (42%) and grass pollen (36%), respectively, in the skin prick tests⁸. In a study conducted on patients with allergic rhinitis in Şanlıurfa, while in the skin prick test the most frequent positivity was determined against grass pollen (67%) and cereal



pollen (31%), the positivity rate against house dust mites (18%) was found to be quite low⁹. Another study conducted on children with allergic rhinitis in Ankara reported that the most frequent positivity was against mites (66%) in individuals who had a perennial allergy, and against pollens (68%) in individuals who had a seasonal allergy¹⁰. In a study conducted by Sin A et al. in Izmir, skin prick test positivity was found to be 55.2%, and the most common positive allergen was determined to be house dust mites¹¹. In our study, while positivity was determined most frequently against tree and shrub pollens (53.74%), in the second rank, positivity was determined against mites (53.06%) and then against meadow and grass pollens (35.37%). When the climatic conditions and vegetation of our region are examined together, it is an expected result that tree and shrub pollens, house dust mites, meadow and grass take place in the first ranks in terms of allergen positivity.

In a study conducted by İğde et al. in Samsun province, the frequency of sensitization to mites was found to be $52.5 \pm 13.44\%$ throughout Turkey¹². In another study conducted in Turkey, mite density was investigated in regions showing different climatic conditions, and mite density was found to be the highest in the Mediterranean region (48.4%) with the highest humidity rate and in the Black Sea region (46%). The region with the lowest mite density was reported to be the Southeastern Anatolia region, and *D. Pteronyssinus* (83%) and *D. Farinae* (12%) mites were detected most frequently⁷. In the same study, three factors affecting mite density at most were indicated as high humidity, temperature over 15 degrees, and low altitude. Climatic conditions affect mite density and may lead to different results in different studies. While mite allergy is more common in regions with high moisture density, more sensitization to pollens is reported in regions with low moisture density. In our study, *D. Pteronyssinus*- (27.21%) and *D. Farinae* (25.85%) mites were detected most frequently, while the density of mites was consistent with the literature.

In a study conducted by Subiza et al. in Spain using a volumetric method, although tree

and shrub pollens were found in the air more intensively, meadow and grass pollens were found to be more allergenic according to the results of skin tests¹³. Frank Wu LY et al. investigated tree pollen, meadow pollen, and fungal spores in the air volumetrically and they also compared their allergenicity with skin tests¹⁴. In this study, the skin test positivity of tree and shrub pollens was higher compared to meadow and grass pollens, and this situation is consistent with the results of our study. Allergenic pollens may have different structure and allergenicity in the case of the presence of different species belonging to the same genus, and differences in climate and geography. Therefore, different sensitivities may occur to the same pollens in different regions.

When pollen distribution in the Central Anatolia region is examined, in the early spring period -Cupressaceae (Juniperus), Betula (birch), Populus (poplar); in the spring period- Pinus (pine), Cupressaceae (cypress), Gramineae (grass); in the summer period- Gramineae (grass), Chenopodiaceae/Amarant (cereal), Artemisia (Veronica prostrata); in the autumn period- Gramineae (grass), Chenopodiaceae/Amaranthaceae (Amaranthaceae), Artemisia (mugwort) are the most common pollens in the atmosphere¹⁵. It is noteworthy that months between March and June are the months when pollens are observed at most. When the pollen distribution of our region is examined, it is observed that the most common pollens are tree and shrub pollens in the early spring period, meadow pollen in early summer, and weed pollen from early summer to autumn. In our study, the pollen frequency was determined as tree and shrub pollen (Alder, Birch, Pine, Oak) (36.73%) and (Red, Birch, Hazelnut) (23.8%), meadow pollen (Orchard grass, Meadow Fescue, Perennial Rye Grass, Timothy Grass, Kentucky Blue Grass) (21.8%) and grass pollen (Steep Pine Grass, Nettle Grass) (13.6%), respectively.

In our study, 80 (26.6%) of the 300 patients who underwent the skin prick test were allergic rhinitis, 65 (21.6%) were chronic cough, 58 (19.3%) were chronic idiopathic urticaria, 45 (15%) were generalized pruritus, 24 (8%) were atopic dermatitis, 18 (6%) were contact



dermatitis, 6 (2.3%) were allergic asthma and 4 (1%) were angioneurotic edema patients. Furthermore, angioneurotic edema (75%) and allergic rhinitis (63.75%) patients were found to have the highest positivity against the applied allergen extracts. Since the number of patients who underwent the prick test with the diagnosis of angioneurotic edema was as low as 4 (1.3%), we do not think that it was sufficient for reflecting the overall ratio. In our study, while positivity was found against walnut, hazelnut and barley flour tests among food allergies in patients who underwent the test with angioedema diagnosis, drug and bee venom tests, which are common causes of angioedema, were not in our prick test panel.

Prick test positivity in individuals with allergic rhinitis was reported to be between 62-85.5%¹⁶. In our study, prick test positivity of the patients who applied with the diagnosis of allergic rhinitis was determined to be 63.75%. Of the 51 patients who applied with the pre-diagnosis of allergic rhinitis and in whom test positivity was detected, at most 32 patients (40%) were determined to have an allergic reaction to house dust mites, and 25 patients (31.25%) to tree and shrub pollens. Of the patients with allergic rhinitis, 14 patients (17.5%) were determined to have an allergic reaction to meadow and grass pollens. In our study, the rate of positivity against cat-dog epithelium and fungi was determined to be higher in patients with allergic asthma accompanied by allergic rhinitis in comparison with patients with only allergic rhinitis. Fungal allergies are often associated with allergic asthma and sensitivity against fungi up to 80% has been reported in asthmatics¹⁷.

In the skin prick test results of patients applying with pulmonary symptoms such as shortness of breath and cough in the Thrace region, the most common allergy was to house dust mites with 39.8%, and the second one was to tree pollens with 26%¹⁸. In our study, in the skin prick tests of the patients who applied with chronic cough complaint, positivity was detected most frequently against tree and shrub pollens at a rate of 27.69% and against house dust mites at a rate of 24.61%.

The conducted studies have demonstrated that approximately 40% of patients with chronic urticaria are idiopathic. Foods, food additives and inhalants may cause the emergence of urticaria symptoms¹⁹. In urticaria patients, allergic positivity was determined most frequently against house dust mites (22.41%), tree and shrub pollens (20.68%), and meadow and grass pollens (15.51%). Arıcan et al. detected prick test positivity against one or more food allergens in 30% of 30 patients with chronic urticaria, and in the same study, the most common positive food allergens were determined to be egg, peanut, and wheat²⁰. In our study, positivity was found in one each of the patients against barley flour, wheat flour, rye flour, oat flour, egg yolk, cow's milk and peanut extracts in chronic idiopathic urticaria cases.

Generalized pruritus accounts for 30% of all itching. In the evaluation stage of the patient, it is necessary to investigate allergy, atopy, and the external factors that increase itching, besides the history and drug use of the patient. External factors that increase itching also include mites, molds, animal hairs, and food²¹. In our study, 35.5% of the patients with generalized pruritus exhibited a positive reaction to at least one or more allergens.

Allergens that are blamed at most in atopic dermatitis are house dust mites, animal hairs, and pollen. Furthermore, fungi and cockroach were also suspected. The most critical triggering factor determined by clinical trials is house dust mites²². In our study, while tree and shrub pollen allergy was determined in 27.78% of the patients with atopic dermatitis, we detected rye flour and barley flour sensitivity in one each patient among nutritional allergens. While the negative diagnostic value of the prick tests performed with foods was about 95% in atopic dermatitis, the positive diagnostic value was found to be around 30-50%²³. In a study conducted by Şentürk et al. on children with atopic dermatitis, prick test positivity was found in 54% of the patients. In our study, this rate was found to be 54.16% for adults and 50% for children²⁴.

Although the prevalence of food allergies is not known precisely, it is known that at least



15-20% of the society believes that a nutrient taken disturbs himself/herself. Although the skin prick test demonstrates sensitization to a specific allergen, it gains significance, only when it is associated with the clinical picture. Therefore, just by examining the prick test result, deciding that a patient has a food allergy can lead to unnecessary applications. In these patients, clinical compliance of the test with anamnesis and examination should be sought, and if necessary, the diagnosis should be confirmed by oral provocation tests²⁵.

In our study, the total positive response rate of the patients against food allergens such as peanut, banana, tomato, carrot, peach, hazelnut, cow's milk, peach, chicken meat, egg yolk, egg white, rye flour, oat flour, wheat flour, and barley flour was 21.08%.

Not having measured the total and specific IgE values, a relatively small patient population, and not having performed oral provocation tests, which are the gold standard especially in the diagnosis of food allergy, were the limitations of our study.

CONCLUSION

Our study presents the skin prick test results of a province hospital in the Central Anatolia region. Allergic rhinitis was the pre-diagnosis which we detected to be the most common skin prick test indication. The highest test positivity was detected in patients with angioneurotic edema and allergic rhinitis. Allergens with the most frequent reaction were tree and shrub pollens. Determination of sensitivity to allergens with skin prick tests in patients with allergic complaints and allergic disease diagnosis can help in protection from allergens and better treatment of allergic diseases.

Compliance with Ethical Standards:

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Disclosures:

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