The Aeroallergen Sensitivity of Asthmatic Patients in Şanlıurfa

Erkan Ceylan, Mehmet Gencer

Harran University, Faculty of Medicine, Department of Chest Diseases, Şanlıurfa, Turkey

Abstract

Aim: Skin prick tests are rapid and reliable tests to demonstrate sensitivity against allergens. Our aim in this study was to detect the prevalence of aeroallergens that are common in our region in asthma patients using the skin prick test. **Material and Method:** In this study, 420 patients with asthma (55.5% female, 44.5% male) with a mean age of 32.8±8.4 years were evaluated prospectively. The patients were investigated regarding history, physical examination, pulmonary function test and skin prick test. **Results:** We detected skin prick test positivity in 311 (74%) patients. We detected allergic rhinitis, nasal polyp, and Samter syndrome in 154, 16, and 8 patients, respectively. Of the skin prick test-positive patients, 77 (18.3%) had allergy against house-dust mite, 93 (22.1%) against tree-mix, 296 (70.5%) against grass-mix, 129 (30.7%) against cereal-mix, 52 (12.4%) against weed-mix, 18 (4.3%) against epidermal-mix, 21 (5%) against mold-mix, and 47 (11.2%) against cockroach. **Conclusion:** Although in our region the low humidity and sunny and very hot climate keep pollen levels very high, such conditions prevent an increase in the level of home dust. In conclusion, allergic complaints among people living in and around Şanlıurfa city are caused mostly by grasses and cereal pollens.

Keywords: asthma, allergy, skin prick test

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INTRODUCTION

Asthma is a chronic inflammatory airway disease. Some heredity and environmental factors are effective in the occurrence of this inflammation. One of the most important environmental factors is exposure to allergens, and allergic asthma accounts for 50% of adult asthma [1,2]. Sensitization to asthma develops via allergen exposure in early childhood in patients genetically predisposed to the disease. This exposure is a risk factor, but is not the only etiologic factor for asthma development [3]. The aeroallergens are of importance in asthma etiology, and breathing the antigen particles in the air causes reaction [4]. Indoor allergens are the most important allergens in patients with asthma, since most of their activities are conducted indoors. The pollens are the most important factors triggering asthma in outdoor life. The density of the allergens varies depending on the seasons. Thus, the symptoms of allergy occur mostly in specific seasons. The pollens bring the symptoms of seasonal rhinitis and/or conjunctivitis and/or asthma into existence [3].

An allergic disposition is a risk factor for asthma. This allergic disposition is evaluated using skin prick test, intradermal test and specific IgE tests. Skin prick test is the most commonly used method for the diagnosis of allergy [5]. This test is the most appropriate, least expensive and the most specific scanning method to determine the presence of IgE antibodies in patients with history of contact [6]. Intradermal tests are more sensitive than skin prick tests, and thus false-negativity is reported less. However, the disadvantages of the intradermal tests are extensive time needed for application, difficulties faced by patients during application, and risk of systemic reactions. Intradermal tests are not appropriate for scanning [5]. Specific IgE measurement (by Radioallergosorbent test [RAST] and enzyme-linked immunosorbent assay [ELISA]) and serum allergen-specific IgE measurement were performed. The sensitivity was 75% of that of the skin tests, thus explaining the preference for skin tests. RAST and ELISA may be preferred in severe atopic dermatitis patients without adequate area to perform the skin test, in patients with dermographism, and in antihistaminic users [7].

Aeroallergen sensitivity in patients with asthma varies among regions in Turkey [8-17]. No large study about the prevalence of aeroallergens in patients with asthma has been conducted previously in our city. Thus, in the present study, we detected the prevalence of aeroallergens that are common in our region in patients with asthma using the skin prick tests.

MATERIALS AND METHODS

Four hundred and twenty patients with asthma who applied to Harran University Medical Faculty Chest Diseases Outpatient Clinic for medical treatment between February 2003 and February 2004 were included in this study. The patients were investigated regarding history, physical examination, pulmonary function test and skin prick test.

A questionnaire was applied to all patients. Face-to-face interview method was performed by the investigators. The questionnaire consisted of two parts with a total of 30

Corresponding Author: Erkan Ceylan, Harran University, Faculty of Medicine, Department of Chest Diseases, Şanlıurfa, Turkey, Phone: +90 414 3161756,
E-mail: drerkanceylan@yahoo.com

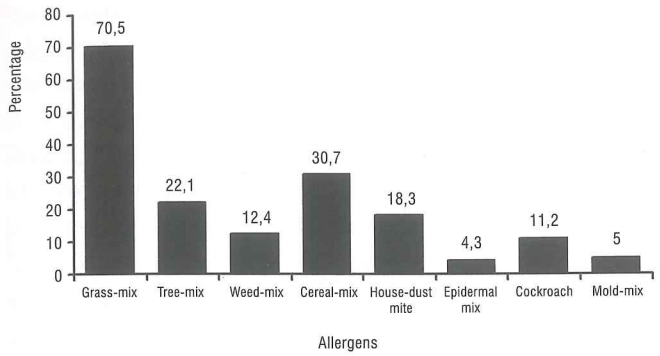

Figure 1. The aeroallergen sensitivity of asthmatic patients in Şanlıurfa.

Table 1. Demographic characteristics of the patients

Features	Patients [n (%)]
N	420
Age (years)	32.8±8.4
Female gender	233 (55.5)
Duration of asthma	8.6±9.2
Skin test positivity	311 (74)
Allergic rhinitis	154 (36.7)
Family history of asthma	102 (24.3)
Family history of allergy	152 (36.2)
Smoking	11 (2.6)

The values represent the mean ± SD.

questions. The first part comprised 20 questions regarding the present complaints of patients; their past histories; family history of allergy, asthma, and other diseases; duration of asthma; history of smoking; past and present life condition (urban or rural); pet feeding; social and economic level; history of allergy to food and drugs; physical properties of their houses; job; drugs used previously or currently; history of immunotherapy; and diseases accompanying asthma (e.g. allergic rhinitis, atopic dermatitis, or allergic conjunctivitis). The second part included results of physical examination, forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), FEV_1/FVC, peak expiratory flow (PEF) change, reversibility test, and skin prick tests. All patients were informed of the aim of the experiment and their informed consent was obtained. The questionnaire also included a form, modified from Mansman's form, for asthma diagnosis [18]. Posterior-anterior chest X-ray was performed in all patients.

Skin prick test was applied to the front side of the forearm. The area was cleaned with alcohol before the application, and allowed to dry. Antihistaminics, oral-topical corticosteroids, H_2 receptor antagonists, antidepressives, theophylline, oral β_2 agonist and similar medicines were ceased 72 hours before the skin prick test. Skin prick testing (Center Laboratories, Port Washington, NY, USA; Multi-Test applicator, Lincoln Diagnostics Inc, Decatur, IL, USA) was carried out using house-dust mite, tree-mix, grass-mix, mold-mix, cereal-mix, weed-mix, epidermal-mix, and cockroach; and positive (histamine hydrochloride) and negative (glycerol with phenol) controls. Allergens were studied in detail when necessary. The skin tests were to be checked in approximately 20 minutes. Skin prick tests were regarded as positive if the maximum weal diameter was at least 3 mm or greater than negative control for any of the allergens tested. Taking into consideration the symptoms, general status, physical examination findings and the result of laboratory tests, patients were divided into four groups according to asthma consensus criteria. The level of severity of asthma was evaluated with respect to PEF and FEV_1/FVC variability values. The four levels of severity and related PEF and FEV_1/FVC values were as follows: mild intermittent ≥80%, <20%; mild persistent ≥80%, 20-30%; moderate persistent 60%-80%, >30%; and severe persistent ≤60%, >30%, respectively [19].

Statistical analysis

Data were presented as mean ± SD or percentages. Categorical variables were analyzed with contingency tables using the chi-square test and the Fisher's exact test when appropriate. A p-value <0.05 was considered statistically significant.

RESULTS

In this prospective study, 420 asthma cases were examined. Demographic characteristics of subjects are shown in Table 1. All of the patients were from the Şanlıurfa city center or its counties, with 29% living in rural and 71% in urban regions. No specific profession that may influence skin prick test and asthma frequency was determined in our study.

Patients were evaluated regarding the severity of asthma. Fifteen (3.6%) patients were in mild intermittent, 124 (29.5%) in mild persistent, 260 (61.9%) in moderate persistent and 21 (5%) in severe persistent asthma. Each phase of severity of asthma and aeroallergen sensitivity was matched. The allergen sensitivities were similar in all phases ($p>0.05$). Immunotherapy was not reported in the patient history. Of the patients with asthma, 343 (81.7%) employed inhaled corticosteroids, 327 (77.9%) long-acting β_2-agonists, 127 (30.2%) leukotriene receptor antagonists, and 82 (19.5%) theophylline for treatment. None of the patients employed any regular medication for the treatment of allergic rhinitis. Diseases accompanying our cases are given in Table 2.

Skin prick tests showed that 311 (74%) cases had aeroallergen sensitivity and 77 (18.3%) had house-dust mite sensitivity, 93 (22.1%) had tree-mix sensitivity, 129 (30.7%) had cereal-mix sensitivity, 296 (70.5%) had grass-

Table 2. Accompanying diseases

Diseases	n	%
Allergic rhinitis	154	36.7
Sinusitis	147	35
Nasal polyp	16	3.8
Samter syndrome	8	1.9
Drug sensitivity	44	10.5
Food allergy	17	4.1
Atopic dermatitis	21	5
Urticaria	19	4.5
Conjunctivitis	23	5.5

mix sensitivity, 52 (12.4%) had weed-mix sensitivity, 18 (4.3%) had epidermal-mix sensitivity, 21 (5%) had mold-mix sensitivity, and 47 (11.2%) had cockroach sensitivity (Figure 1). In our region, we detected Cynodon dactylon and Lolium perenne from grass allergens, pistachio nut pollens and Olea europea from tree allergens, Agropyron repens from weed allergens, Secale cereale from cereal allergens and Aspergillus fumigatus from mold sporium in asthmatic patients.

While 61% of symptomatic cases showed seasonal increase, there was day-and-night symptom variance in 65% of symptomatic cases. Of skin prick test-positive patients, 65 (20.9%) were perennial and 151 (48.6%) were seasonal. The indoor conditions and social and economical levels of the patients were similar ($p>0.05$). None of the patients fed pets at the time of the study. No skin disorder that may have disabled skin prick test application was determined in our patients, nor any drug usage that may have caused problems in skin prick test interpretation.

DISCUSSION

In the present study, we conclude that the low rate of humidity and sunny and very hot climate maintain high levels of pollens but prevent an increase in the level of home dust mite in Şanlıurfa.

Indoor allergens are important risk factors for asthma since rooms not sufficiently ventilated render a warm and moist environment for allergens [20]. Leung and colleagues conducted a study in which they compared three different South-East Asian populations and reported that the most commonly encountered allergens in asthmatic patients were house-dust mite and cockroaches [21]. In our country, susceptibility rate to house-dust mite in asthmatic patients shows a regional variability. In the Black Sea region where humidity is high, 94% of asthmatic patients demonstrate susceptibility to house-dust mites, whereas in Diyarbakir, a Turkish city with a dry climate, the rate is 21.4%-28.1% [8-11]. In a study investigating the presence of mite in house-dust in various regions of Turkey, authors failed to identify mite in dust samples from the Southeastern Anatolian region, whereas it was present in 46% of samples from the Black Sea region [12]. In the present study, the prevalence of house-dust mite was found to be 18.3%. It is plausible that this low prevalence is due to the high temperature and the low humidity rate of the Şanlıurfa region. Also, between April and September, all carpets are removed in order to keep out the heat, and houses are washed regularly a few times a week. The hot and dry climate of the region, together with lifestyle, possibly hinders the vitality and proliferation of house-dust mites.

In the outside air, pollens stand at the forefront of allergens triggering asthma. Grass, tree, and weed pollens are the main allergens responsible for this triggering [22,23]. The types of pollens present in the air show seasonal variability, causing seasonal complaints in people with this type of sensitivity [24]. Grass pollens are the most potent allergens in many parts of the world as well as in Turkey [13-15]. Classically, pollination of grass starts towards the beginning of May and ends in July. Pollen susceptibility rates in asthmatic patients have been reported to vary from 25 to 62.5% [16,17]. Between mid-April and mid-July, a marked increase in the number of patients with allergic symptoms presenting to our clinic was noted. In our cohort, skin prick tests were positive for grass, weed and tree pollens in 70.1%, 12.4% and 22.1% of the cases, respectively. It is known that pollen levels increase in dry and sunny weather [25]. We believe that the low humidity and the sunny climate present in our region contribute to continuously high levels of pollens. Seasonal allergic asthma was found as 48.6% in our region. High pollen sensitivity was considered as the main reason for the high seasonal asthma rate in our region.

Studies conducted in Diyarbakir and Gaziantep, two cities in the southeastern region of Turkey, reported small numbers of patients and conflicting results. Sensitivity to house-dust mite was 21.4%-28.1% and 55.1% in Diyarbakir and Gaziantep, respectively. In another study, sensitivity to grass-mix was 12.1% in Diyarbakir. In the same study, sensitivity to Phleum pratense, a subgroup of grass-mix, was 46.9% in Gaziantep. In that study, sensitivity to grass-mix was not studied in Gaziantep. Sensitivity to mold-mix was 12.5% in Diyarbakir. In that study sensitivity to mold-mix was not studied in Gaziantep. Sensitivity to Alternaria sporium and Cladosporium sporium was 48.9% and 41.8%, respectively, in Gaziantep. Sensitivity to grass-mix, house-dust mite, and mold-mix was 70.1%, 18.3%, and 5%, respectively, in our city [9-11]. The drier climate of our city and the greater number of patients in the present study may be the factors affecting the results.

Although in our region low humidity rate and sunny and very hot climate keep the level of pollens very high, they block any increase in the level of house-dust mites. It is possible to conclude that allergic complaints among people who live in and around Şanlıurfa city are caused primarily by grass pollens.

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