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Evaluation of the relationship between cockroach sensitivity and house-dust-mite sensitivity in Turkish asthmatic patients

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Summary Exposure to cockroach has been identified as an important source of indoor allergens in patients with asthma and allergic rhinitis.

We evaluated the relationship between cockroach sensitivity and other allergens in patients with asthma. A total of 114 patients, defined asthma according to GINA, were enrolled in this study. A questionnaire including age, sex, duration of asthma, history of cockroach presence at home, and total IgE, blood eosinophil count, pulmonary function tests, standard skin prick test additional cockroach and shrimp allergen were performed.

There were 84 (73.7%) female and 30 (26.3%) male patients with a mean age of 38.1+10.1 years. The average duration of asthma was 7.7+7.2 years. Sixty five (57%) patients were determined atopic and 49 (43%) nonatopic. Polen allergen was the most common allergen in 59 (51.8%) patients with asthma, and second common allergen was mite allergen in 43 (37.7%) patients. Cockroach sensitivity were detected in 23 (20.2%) of 114 all asthmatics and 23 (35%) of atopic asthmatics. High rates of house-dust-mite allergy (73.9%) was determined in patients with cockroach sensitivity ($P<0.05$), while we found no relationship with other allergens. There was no difference for cockroach sensitivity between rural and urban population. Cockroach sensitivity was more common in mild bronchial asthmatics and a female predominance was observed. In addition, there was no association between shrimp and cockroach sensitivity.

As a result, a high rate of cockroach sensitivity alone or with mite sensitivity was seen in patients with bronchial asthma in Turkish population. Because of cross-reactivity between mites and cockroach, cockroach sensitivity should be

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investigated in patients with house-dust-mite allergy. In addition, a high rate of cockroach sensitivity, in terms of IgE sensitization, may be important for the development of new sensitizations.

Introduction

Allergic response to aeroallergens is considered as an important factor in the asthmatic process and life style of modern world is likely to be associated with increases in its prevalence.

It has been reported that cockroach sensitivity is one of the most important indoor allergen sensitivities.[1] Cockroach allergen levels are correlated with severity of asthma and increases in its morbidity.[2] Tropomyosin is known to cause a cross reaction between house-dust-mite allergen and cockroach allergen. Tropomyosin is also present in shrimp.[3]

We aimed to investigate the rate of cockroach sensitivity and its coincidence with other aeroallergen sensitivities, comparison of serum IgE level, blood eosinophil count, severity of asthma, numbers of asthma attack in the preceding year in populations with/without cockroach sensitivity in Turkish asthmatic patients. In addition, we evaluated the relationship between cockroach sensitivity and shrimp.

Materials and methods

A hundred and fourteen patients, defined asthma according to GINA, admitted to our asthma outpatient clinic of education and research hospital between January and April 2003 were included in this study.[4] All of the patients were recruited consecutively. Only one patient refused to participate in the study.

Subjects under the age of 18, those who were pregnant, patients with COPD and congestive heart failure and patients on acute asthmatic attack were excluded from the study. All of the patients gave their written informed consent, having been informed about the details of the study. This study was conducted in accordance with the Declaration of Helsinki amended the 52nd WMA General Assembly (Edinburgh, 2000), and approved by local ethics committees.

We applied a questionnaire to the patients including age, sex, duration of illness, history of cockroach presence in their house, characteristic of environment they lived in and number of asthmatic attacks in the preceding year.

Pulmonary function tests

Spirometry was undertaken using a flow sensor spirometer (Sensormedics, Vmax 229, Yorba Linda-California) at morning for each subjects.

Measurements of serum total IgE level and blood eosinophil count

Venous blood samples were collected from patients after 8 h of fasting early in the morning. After centrifuging for 10 min at 3000 rpm serum samples were extracted. Tusah AIA—Pack Reagent in Eurogenetics-Tusah AIA-21 Automated Enzyme Immunoassay Analyser was used during the procedure. EIA (Enzyme Immunoassay) method was used for the measurements. Periferal blood eosinophil count was performed using standard hematologic techniques.

Bronchoprovocation test

Methacoline inhalation challenge test was performed with Devilbiss model 646 nebulizer according to the method described by ATS statement.[5]

Several bronchodilatator agents were withdrawn before challenge as recommended in ATS guideline. Patients were allowed to continue their inhaled steroids as usual. They were not allowed to drink coffee, cola drinks and to eat chocolate at least 6 h prior to challenge.

Skin prick tests

Allergy was evaluated by the presence of sensitization to the most common classes of aeroallergens by performing a skin prick test. The allergen panel consisted of the following: House dust mites (*Dermatophagoides pteronyssinus*, *Dermatophagoides farinae*), mold mix, epithelia and feathers (cat and dog), grass mix, weed mix, cereals mix, trees mix and others (Cockroach—*Blatella germanica*, shrimp) (Stallergenes S.A, France). A histamine solution in distilled water (10 mg/ml) was used as the positive control and glycerol-buffered diluent of the allergen preparations as the negative control. Each patient was skin tested on the volar surface of forearm using prick lancets. The skin reaction was recorded after 15 min by evaluating