

ALLERGEN SKIN TEST REACTIVITY IN ADULT BRONCHIAL ASTHMATIC PATIENTS

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Abstract

Aim: This study was carried out to identify the type of allergen sensitivity associated with bronchial asthma in adult bronchial asthmatic patients.

Methods: Allergen skin prick tests were done by Pepy's skin prick method. There are 30 asthmatic patients (Group A) and 30 age and sex matched control subjects (Group B) collected from outpatient department of Bangabandhu Sheikh Mujib Medical University, Dhaka and Asthma center, Mohakhali, Dhaka.

Results: In this study, maximum numbers of asthmatic patients had positive Skin Prick Test (SPT) for dust mite (40%) and was followed by house dust (16.7%) and by cockroach (6.5%). Frequency percentage for dust mite was significantly higher ($p < 0.05$) than that of house dust and cockroach. It was also significantly higher in house dust than that of cockroach ($p < 0.001$).

Conclusion: Therefore, it can be concluded that different allergens like, house dust, dust mite and cockroach are responsible for bronchial asthma in Bangladesh and can be detected by SPT. Thus it can be used for identification of type of actual allergens responsible for bronchial asthma. This may be a useful measure for earlier detection of allergens and for hyposensitization or desensitization of that patients accordingly with those allergens.

Keywords: Allergen, bronchial asthma, skin prick test

Introduction

Allergic diseases like asthma, hay fever, allergic rhinitis are important causes of morbidity. Different observers found relationships between allergy skin prick test (SPT) in general population¹. Allergy represents a specific alteration in biologic reactivity mediated by an immunologic mechanism and resulting in an adverse physiologic response. In their study, most of them had shown that atopy is closely related to asthma². Allergy plays a role in wide range of the disease, ranging from itching of the skin to potentially fatal condition such as bronchial asthma³. Asthma due to allergy is often associated with a personal and family history of allergic diseases such as rhinitis, urticaria and eczema with positive wheal and flare skin reactions to injection of intradermal indoor and outdoor airborne allergens⁴.

Allergens trigger asthmatic attacks in 60% to 90% of children and in 50% of adults. Approximately 75% to 90% of the patients with asthma had positive skin test results². Majority of allergens that provoke bronchial asthma are airborne. Again, asthma due to allergy is frequently seasonal. A non seasonal perennial form may results from allergy to house dust, house dust mite, animal dander, feather, mold and other allergens present continuously in the environment⁵. Again, a high prevalence of positive skin reaction was reported in children with asthma but a very little information is available on the prevalence of immediate skin test reactivity in adult patients with asthma. It was shown that among 260

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patients of adult asthma, 60% had reacted to house dust, 51% reacted to house dust mite⁵⁻⁹. Sensitization and exposure to indoor allergens act as risk factor for asthma. Therefore, housing condition play an important role in asthma, especially among lower socioeconomic population^{10,11}.

In Bangladesh, bronchial asthma is one of the common respiratory diseases. Most of the cases are commonly treated without knowing the specific allergen which may be a causative factor for the disease. Again, both indoor and outdoor allergens may have some role in the occurrence of the disease. If specific allergens have been identified, which trigger asthma symptoms, better management of the patients can be done, which may lead them to a symptom-free life. In addition, identification of the specific allergens prior to the treatment may also help the physician in planning better management of the asthmatic patients especially by hyposensitization (Immunotherapy). Furthermore, physician (can) monitor the effect of immunotherapy by repeating the skin test reactivity at regular interval and thereby adjust the dose of hypo sensitization to particular allergens accordingly.

The present study was designed to perform allergen skin test reactivity with various indoor allergens in adult asthmatic subjects in order to find out the common variety. The study also aimed to utilize the findings of skin prick test as background information for the clinicians in desensitizing the common allergens present in the asthmatic patients in Bangladesh and better management of bronchial asthma and also to create awareness among this group of patients so that they can take early and regular treatment.

Materials and Method

This observational study was done at the Department of Physiology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka and Asthma center, Mohakhali, Dhaka. In this study a total number of 60 subjects with age range of 20 to 40 years of both sexes were included. Of them 30 apparently healthy and 30 asthmatic adult subjects were included in group A (Control) and in group B (Asthmatic patients) respectively.

Detailed procedures and objectives of the study were explained to the subjects and their written consents were taken before performing the study. Sociodemographic data including age, sex, family history and monthly income were taken. Allergic history regarding different types of allergens including food was also taken. Both physical and clinical examinations were done for each subjects and all the information were recorded in a prefixed data sheet. Detailed procedure about the SPT was briefed to all the asthmatic patients and the tests were performed with the help of different allergens (house dust, dust mite and cockroach, which were numbered accordingly in result 1,2 and 3). Assurance was given to the patients that the study would not bring any health hazards.

Findings were considered positive when mean diameter of wheal was observed to be 3 mm or more at least for a single allergen. Statistical analysis of collected data was performed as required. Values were considered statistically significant if p value is less than 0.05.

Results

Anthropometric details of all subjects and sex distribution are shown in table I and figure I. Both groups are matched for age, sex and BMI. Among 30 patients 5 were positive in house dust, 12 were in dust mite and 2 were in cockroach allergens. Maximum percentage of asthmatic patients showed positive reaction with dust mite which was statistically significant ($p < 0.001$).

Table -I: Age, sex, height, weight and BMI in different study groups (n=60)

Parameters	Group A (n=30) Mean ± SD	Group B (n = 30) Mean ± SD	p value
Age (years)	27.77 ± 5.75	29.10 ± 6.053	0.50
Height (cm)	159.63 ± 5.461	160.57 ± 3.910	0.10
Weight (Kg)	61.73 ± 7.488	63.93 ± 6.933	0.50
BMI	24.13 ± 1.71	24.7 ± 4.02	0.10

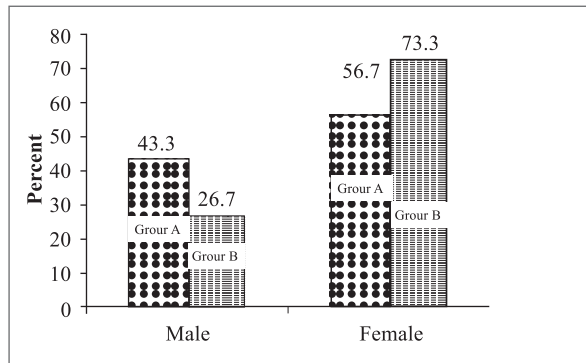


Fig 1: Showing distribution of the subject by sex [n= 60, Group A (control)=30 and Group B (experimental)=30]

Discussion

In this study, SPT were performed by using common indoor allergens like, house dust, dust mite and cockroach among asthmatic patients in order to detect type of allergens present in Bangladeshi population with bronchial asthma. Because of non availability, SPT for other allergens were not done. In this study, maximum numbers of asthmatic patients had positive SPT for dust mite which significantly higher than that of house dust and cockroach. Similar types of observations were made by many investigators of different countries including Bangladesh¹²⁻¹⁴.

Some investigators suggested that among the indoor allergens dust mite was the major offender in bronchial asthma. House dust and cockroach allergens are also important risk factors for bronchial asthma. Accumulation of surface dust, uncleanness of house specially bedroom and kitchen are the source of indoor allergens. Dust mite, mostly present in carpets, soft furnishings, bedding and pet-derived allergens are important factors in provocation of asthma¹².

Several mechanisms have been proposed about the allergens induced bronchoconstriction in bronchial asthma. It has been suggested that the inhalation of an allergen in a sensitized asthmatic patient results in two-phase bronchoconstrictor response, early and late. The inhaled allergen rapidly interacts with mucosal mast cells via an IgE-dependent mechanism resulting in the release of mediators such as histamine and the cystinyl leukotriens which lead to bronchoconstriction¹⁵⁻¹⁷.

Different allergens like, house dust, dust mite and cockroach are responsible for bronchial asthma in

Bangladesh which can be detected by SPT. Though only three indoor allergens were studied but other indoor allergens like, pet-derived allergens, molds including outdoor allergens like industrial fumes, ozone, pollens, grass etc may have some important role in causing bronchial asthma^{18,19}. Because of non availability of all the above mentioned allergens, it was not possible to include in this study.

The above findings indicates that this test can be done along with SPT may be a useful measure for earlier detection of allergens. Accordingly hyposensitization or desensitization of patients with those allergens may be the preventive and therapeutic measures. All these measures can be adopted to minimize the risk of complications specially in young adults and thereby can improve their quality of life.

Conclusion

Different allergens like, house dust, dust mite and cockroach are responsible for bronchial asthma in Bangladesh and dust mite is the commonest. Presence of all these allergens can be detected by SPT.

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