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Original Research Article

Correlation of Blomia Tropicalis Sensitization with Asthma Severity in Children

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Conflict of interest: Nil

Abstract

Objective: To study Correlation of Blomia Tropicalis sensitization with Asthma severity in children.

Methods: In this observational study, Children with Pediatric Asthma were enrolled to undergo skin-prick testing. Sensitivity was checked for Blomia Tropicalis. Then, Correlation of Blomia Tropicalis sensitization with Asthma severity in children was analyzed.

Results: Total 100 Asthmatic Children between the age of 5-15 years underwent skin-prick test; 20 (20%) showed significant positivity to Blomia Tropicalis. Out of 20 children sensitized to B. Tropicalis 50% (10) were having uncontrolled asthma symptoms. All the patients (2 children) who were having SPT reaction size of > 8mm were having uncontrolled asthma symptoms.

Conclusion: Sensitization of B. Tropicalis in asthmatic children between 5-15 years of age was a significant number. Those who were sensitized to B. Tropicalis were having more chances of uncontrolled asthma in comparison to non-sensitized children.

Introduction

Allergic diseases are a group of immune-mediated disorders mainly caused by an IgE-dependent immunological reaction to an innocuous environmental antigen (allergen). The prevalence of the allergic diseases is increasing dramatically both in India and worldwide.

Asthma, atopic dermatitis, allergic rhinitis, and food allergy are the most common allergic diseases affecting children, and the prevalence of these conditions has risen in recent years.

Allergic asthma is the most common type of asthma. About 90% of kids with childhood asthma have allergies, compared with about 50% of adults with asthma [1].

In allergic asthma, airways are extra sensitive to certain allergens. Once they get into the body, the immune system overreacts. The muscles around the airways tighten. The airways become inflamed and over time are flooded with thick mucus [2]. In allergic asthma the symptoms are generally:

Cough, Wheeze, Shortness of breath, Fast breathing, Chest tightness.

Some of the most common indoor allergens include House Dust Mite, Cockroaches, Mold Spores, Pollen, Cat Dander, Dog Dander, Fabric. House dust mite allergy is an allergic reaction to tiny bugs that commonly live in house dust. House dust mites like Dermatophagoide farinae, Dermatophagoides pteronyssinus and Blomia tropicalis are important and major causes of allergic sensitisation in allergic asthmatic children.

The advances in knowledge regarding the allergenicity of B. tropicalis and its profile of reactive allergens are imperative for the design of clinical interventions as well as the diagnosis of Blomia allergy [3]. Data for sensitivity to Dermatophagoide farinae and Dermatophagoides pteronyssinus are available but data for Blomia tropicalis sensitisation are lacking. There are only one or two studies available on Blomia tropicalis sensitisation in south India but in north India data regarding this is lacking.So this study was planned to find out the correlation of Blomia tropicalis sensitisation asthma severity in children.

Material and Methods

The study was conducted in the department of Pediatric Medicine, at tertiary care center of North west India. Data was collected between June 2020 to May 2021. This was an hospital based Observational Study. Children between 5 to 15 years of age with either sex, diagnosed to be having On the basis GINA guidelines 2018, were chosen.

The informed written consent of the parent or guardian was taken. Ethical clearance was taken from the institutional ethics committee before the start of this study.

Inclusion Criteria: Children aged between 5-15 years with Asthma.

Exclusion Criteria:- Patients who have any known Immuno-compromised state or any form of malignancy. Children who were on any form of antihistamines, Beta-blockers or any other immunosuppressant drug within 96 hours preceding the test. Children having severe Atopic dermatitis or Eczema. Children having Dermatographism.

Methodology

The history, clinical examination and investigation were noted in a Proforma specially designed for the study.

Methods: The tests were performed after cleaning the skin with and a lancet or 25 or 26 gauge needle piercing through a drop of allergen extract placed over the skin.

The skin was pierced at an angle of 45 degree into the epidermis up to a depth of 0.5 mm and slightly bevelled upwards producing a pricking sensation, so as to allow an adequate entry of the antigen beneath the stratum corneum. The site of prick may be on the volar aspect of the forearm or back.

The site was observed after 15 -20 minutes for wheal.

A wheal of 3 mm diameter is regarded as positive.

10mg/ml Histamine hydrochloride was taken as positive control and buffered saline was taken as negative control.

Positive response was defined as a wheal ≥3 mm in size.

All statistical analysis was done using licensed SPSS software version 21.0 (Chicago, Illinois) and a 'P' value < 0.05 was taken as significant

Results

Baseline demographic data are given in [Table 1]. Which shows, Mean age of 10 years, Male-female ratio of 2.1, Family history of atopy 56%.

Table 1: Baseline demographic data

Mean age	10 years
Male : female ratio	2.1
Family history of Atopy	56% of cases

Distribution of study children according to B. Tropicalis skin prick test results are depicted in [table 2], which shows out of a total 100 asthmatic children 20% (20) were sensitized to B. Tropicalis.

Table 2: Distribution of study children according to B. Tropicalis skin prick test results

B. Tropicalis skin prick test	Frequency	Percent
Positive	20	20.0
Negative	80	80.0
Total	100	100.0

Distribution of study children according to B. Tropicalis skin prick test results and severity of asthma is depicted in Table 3, out of 20 children sensitized to B. Tropicalis 50% (10) were having uncontrolled asthma symptoms and 35% (7) and 15% (3) were having partially controlled and well controlled asthma symptoms respectively. While in the rest of 80 children who were not sensitized to B. Tropicalis only 12.5% (10) were having uncontrolled asthma symptoms followed by 28.4% (23) and 58.8% (47) were having partially controlled and well controlled asthma symptoms respectively. This difference was found to be statistically significant indicating positive correlation of B. Tropicalis sensitization to the asthma severity [Table 3].

Table 3: Distribution of study children according to B. Tropicalis skin prick test results and severity of asthma

Asthma	Total Number	B. Tropicalis skin prick test				p-value
		Positive		Negative		
		Count	%	Count	%	
Well controlled	50	3	15.0%	47	58.8%	0.0001
Partially controlled	30	7	35%	23	28.4%	
Uncontrolled	20	10	50%	10	12.5%	
Total	100	20	100.0%	80	100.0%	

Distribution of study children according severity of asthma and reaction size is depicted in Table 4, all the patient (2 children) who were having SPT reaction size of > 8mm were having uncontrolled asthma symptoms and 50% (2) of the children who were having SPT reaction size of 7-8 mm were having uncontrolled asthma followed by partially controlled and well controlled asthma symptoms 25% (1) each. This difference was statistically significant depicting a positive correlation between SPT wheal size and asthma severity symptoms [Table 4].

Table 4 :Distribution of study children according severity of asthma and reaction size:

	Reaction size				p - value
	3-4 mm	5-6 mm	7-8 mm	>8mm	
Well controlled	1(12.5%)	1(16.7%)	1(25%)	0	0.0001
Partially controlled	3(37.5%)	3(50%)	1(25%)	0	
Uncontrolled	4(50%)	2(33.3%)	2(50%)	2(100%)	
Total	8(100%)	6(100%)	4(100%)	2(100%)	

Discussion

Patient's characteristics: Out of 100 children, 75 were in the age group of 5-10 years and 25 were above the 10 years of age. Mean age of the children in our study was 10 years.

Okasha et al [4] included patients with a mean age of 11.40 ±2.82 years. However this study did not categorise the patients according to age group.

Doshi et al [5] included a total 90 children aged from 9 months to 46 months.

Susanto AJ et al [6] conducted a study among the adult population and mean patients' age was 40.2 years.

The main indoor allergens to which infants and children are commonly exposed are being considered to be HDM. Up to two-thirds of children with asthma and up to 1/2 of adults having asthma suffer from allergies. Of these patients who suffer from asthma and allergies, about 40%-85% of them are allergic to the HDM. This trend is observed all over America, Europe, south- east Asia, and Australia.

In our study, out of 100 children, 20 were sensitized for B. Tropicalis skin prick test.

Another aeroallergen sensitization study of childhood asthmatics was done in Allahabad city by Raj et al [7]. 2013 and found that 180 children above 5 years of age exhibited 7.8% sensitivity to HDM allergens.

In 2011, a HDM sensitization study depicted 52.5%, 46.0% and 19% SPT reactivity for Dp, Df and B. Tropicalis respectively. This study was performed on 139 bronchial asthma patients in the Bangalore region. [8]

Doshi et al[5] conducted a study in the city of Mumbai, a SPT-based investigation was performed to identify HDM sensitivity in children with Allergic asthma. In total 92 children underwent an SPT; 49 (53.2%) showed significant positivity to one or more dust mite (Doshi and Tripathi 2016). This study revealed 12.2% children sensitization to B. Tropicalis. Most common was D. pteronyssinus followed by D. farina and B. Tropicalis sensitized aeroallergen eliciting 12.2% SPT in children.

HDM prevalence study was done in Delhi and Allahabad during 2008–2011 by (Kumar et al. 2012). [9] SPT was performed on a total of 918 patients [548 (59.7%) males and 370 (40.3%) females] for 58 types of aeroallergens. HDM sensitivity was found in 12.4% of patients. In our study, B. Tropicalis sensitization was 20% which was almost similar to other studies done in different parts of India. The minor difference in sensitization can be due to climatic and geographical differences of the study population.

In our study, out of 20 children who were sensitized to B. Tropicalis, 3 (15%) children were having well controlled asthma, 7 (35%) children were having Partially controlled and 10 (50%) children were having uncontrolled asthma while out of 80 negative children who were not sensitized to B. Tropicalis, 47 (58.8%) children were having well controlled asthma, 23 (28.4%) children were having Partially

controlled asthma and 10 (12.5%) children were having uncontrolled asthma. This difference was found to be statistically significant. Adham and Tawfik (2012) results were inconsistent with our study and found that atopic patients with HDM hypersensitivity suffered more severe and more chronic forms atopic diseases. [10]

Our study also found that out of 20 children, maximum i.e. 40% (8) had reaction size of 3-4 mm followed by 30% (6) had reaction size of 5-6 mm and a statistically significant difference was found between asthma severity and reaction size and all patients reaction size >8mm had uncontrolled asthma.

Our study depicted that children with uncontrolled asthma are having more chance of B. Tropicalis sensitization indicating B. Tropicalis sensitization to the asthma severity.

Conclusion

- We concluded in our study that sensitization of B. Tropicalis in asthmatic children between 5-15 years of age was 20% which is a significant number.
- We also found that those who were sensitized to B. Tropicalis were having more chances of uncontrolled asthma in comparison to non - sensitized children.
- We also found that children with SPT wheal size of > 8mm were falling into the uncontrolled asthma category totally. Although we could not found any similar study correlating wheal size with asthma severity symptoms in literature.

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