

Brief Communication

Profile of Pollen Allergies in Patients with Asthma, Allergic Rhinitis and Urticaria in Hyderabad

B. Anuradha, V. Vijayalakshmi, G. Suman Latha, V. Hari Sai Priya and K. J.R. Murthy

Immunology Unit, Bhagwan Mahavir Hospital and Research Center, Hyderabad, India

Allergic rhinitis, asthma and urticaria are atopic diseases caused in humans due to environmental allergens, though genetic factors may also contribute towards the manifestation of allergies. Atopic allergy is caused due to high levels of IgE and has a multifactorial inheritance pattern. Among the environmental factors, aeroallergens play a major role and pollens are the most common aeroallergens. Therefore, the objective of the present study was to determine the profile of sensitivity to pollen allergens in the local population in Hyderabad, India.

A retrospective analysis was carried out on 500 patients attending the Allergy Clinic at Bhagwan Mahavir Hospital and Research Center, Hyderabad. Skin test reactivity for 20 pollen allergens were studied by intradermal injections, using buffer saline as negative control and histamine phosphatase as positive control¹. Immediate and late phase cutaneous responses were recorded at 20 minute and 6-8 hours after allergen challenge, respectively. Pollen antigens were selected based on the local aerobiological calendar. Skin testing was not performed in the control group for ethical reasons. The total IgE levels were performed by using commercially available ELISA kit from General Biologicals Corp., Taiwan. The cut-off value for IgE levels was 325 IU/ml².

Out of the 500 patients, 46.5% of the atopic asthma patients, 10.5% of the non-atopic asthma patients, 31.8% of the atopic urticaria and 13% of the non-atopic urticaria patients had positive family history, while none of the patients with rhinitis/urticaria had a family history. When seasonal variations were analysed, 84% suffered throughout the year (perennial) and 10.8% and 5.8% suffered in winter and rainy seasons, respectively. There were no differences as far as gender, age, type of atopy, pollen season or duration was concerned. The most predominant pollen allergens in asthma and urticaria patients were *Sorghum vulgare* (54.9% & 64.7%) followed by *Pennisetum typhoides* (53.1% & 56.7%) and *Artemisia scoparia* (48.1% & 51.9%). The IgE levels were high in 53.5% of asthma patients as against 36.1% in urticaria patients. Large differences in the serum IgE levels, SD values, mean and median were observed in patients with different types of allergies. One way ANOVA was done for untransformed data and pooled within group SD was found to be 638.6 and the

calculated F value with 3 and 496 degrees of freedom was 2.719 (P=0.044). About 47% of patients were found positive to >5 pollens with an IgE value of >325 IU/ml and 36 (69.2%) of patients were positive to only one pollen with an IgE value of ≤ 325. Chi-square test of association was not significant when the levels of IgE were tested against the number of positive pollens. Chi-square value with 3 degrees of freedom is 6.324 (P<0.10) [see Table]. While 41.4% asthma patients and 36.1% urticaria patients showed positivity to greater than five pollens only 7.2% and 15.2% of patients with rhinitis and rhinitis/urticaria were positive to greater than five pollens.

Table. Patients with number of pollens positive compared with their IgE levels

No. of Pollens	N	≤325	>325
0	31	16 (51.6%)	15 (48.3%)
1	52	36 (69.2%)	16 (30.7%)
≤ 5	154	76 (49.3%)	78 (50.6%)
> 5	263	139 (52.8%)	124 (47.1%)

Note: Chi-square value with 3 degrees of freedom is 6.324 at P<0.10.

Out of the 121 patients suffering for less than one year, 25% were positive to more than 10 pollens. Among the patients who suffered since more than one year but less than four years, 40% of them are positive to more than 10 pollens. However, no patient was tested positive to more than 10 pollens among 12 patients who suffered since childhood. In this study, majority of the patients allergic to pollens suffer throughout the year, allergens other than pollen, such as house-dust mites, animal danders and molds may be causing allergy.

The three predominant pollens in this study, *Sorghum vulgare* (fodder grass), *Pennisetum* (pearl millet) followed by *Artemisia* are grass-pollens (poaceae). In India, a large number of patients have hypersensitivity to grass pollen³, though it is thought to be too large to gain access into the lower airways to trigger an asthmatic response^{4,5}. The high sensitivity to *Sorghum* (59%) was not reported from other parts of India. The most common pollens reported to cause allergy in India are: *Parthenium* in Kolhapur⁶ (only 30% in this study); *Amaranthus* in Delhi⁷ (23% in this study); *Prosopis* in Bikaner⁸; *Brassica* in Bhopal⁹ and Kanpur¹⁰. In

Vishakhapatnam, 26% were positive to *Artemisia*¹¹ as against 50% in this study. Also, the observations of this study are different from an earlier study conducted about ten years ago¹², wherein the most predominant pollen was *Gynandropsis gynandra*, followed by *Parthenium*. *Parthenium* was the predominant pollen in the semi urban area of Secunderabad¹³. These differences could perhaps be attributed to environmental changes.

The number of pollens to which patients were sensitive was inversely proportional to the duration of symptoms, also observed by Raju *et al*¹¹. It would be interesting to see if some sort of tolerance is developed for certain allergens over an extended period of time.

The low IgE levels observed in this study were also seen in an earlier study². However, patients who were positive to a higher number (1-24) had normal levels of IgE². The present study suggests that low levels of circulating IgE may not necessarily indicate the absence of allergic disease. However, specific allergen exposure may be associated with levels of sensitisation to specific allergen, but it is not strongly correlated with overall atopic sensitisation¹⁴.

In order to overcome the difficulty of wide variations in the IgE values in the evaluation of inter-group differences the data were cast into two groups, namely those having an IgE value of less than and those having more than 325 IU/ml. The mean value in rhinitis/urticaria and urticaria patients was relatively low compared to those with asthma and rhinitis. Also majority of the asthma patients were positive to higher number of pollens when compared to patients with urticaria and rhinitis. However within the asthma group, a larger number of patients are positive to single pollen. This may act as an advantage in the selection of patients for immunotherapy since the role of allergen immunotherapy in the treatment of most patients with asthma is likely to be influenced by the selection of the patient.

The findings of this study indicate an atopic nature in majority of the patients with asthma and rhinitis, unlike in large number of patients with urticaria. The influence of seasonal changes on allergic symptoms is marginal. As the association between skin test with pollen and serum IgE levels is inconsistent, it is crucial

to search for better diagnostic parameters, or use parameters such as specific IgE. Grass pollens seem to be the major pollen allergens, the predominant pollen being *Sorghum vulgare*. Since there seem to be geographical differences in the prevalence of pollens causing allergy, there is a need to carry out more such studies in different regions.

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