

Full Length Research Paper

A study of the prevalence of fungal, pollen and dust allergens by intradermal skin test in nasobronchial allergic patients

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Nasobronchial allergy is one important type of respiratory disorder. Aero allergens like pollen, dust, fungus, dander and many others play important role in nasobronchial allergies particularly in asthma and rhinitis. The prevalence of nasobronchial allergy among populations all over the world has been increasing rapidly. The role of different inhalant allergens in nasobronchial allergy varies with environmental conditions, type of allergen and degree of exposure. The awareness on the prevalence of allergens and seasonal variations is essential for better diagnosis and immunotherapy. The present study was aimed to assess the prevalence of fungal, pollen and dust allergens by intradermal skin test in nasobronchial allergic patients in district Kupwara of Jammu and Kashmir State.

Key words: Allergens, nasobronchial allergy, intradermal skin test, immunoglobulin-E.

INTRODUCTION

Asthma is a chronic lung disease that leads to inflammation and restricts the airway passage. Asthma is on the rise worldwide including developing countries like India. More than 30% of the world's population is suffering from different allergic disease. In India alone, roughly 15% of the people suffer from asthma and 20% from allergic rhinitis. India has huge diversity in the flora and fauna of different regions as it is a climatically diverse country. For efficient diagnosis and treatment, it is beneficial to know the prevalence and seasonal variations of allergens of the district kupwara. Asthma and allergic rhinitis are often named as atopic diseases as they develop Immunoglobulin-E antibodies in response to various types of allergens. The atopic nature of these diseases can be detected by high levels of total serum IgE and positive response of intradermal skin test. If the levels of total serum IgE and specific IgE is normal they are termed as non atopic and non allergic. However,

the atopic nature of asthma and allergic rhinitis is not yet understood clearly.

MATERIALS AND METHODS

Subjects

The study was carried out among 257 patients of either sex suspected to have asthma and allergic rhinitis and attending the Allergy clinic Department of Immunology and Molecular Medicine, S.K. Institute of Medical Sciences, Srinagar. Children, pregnant ladies and lactating women were excluded from the study. A questionnaire was given to all patients in order to obtain data on family history and complaints. All the patients were subjected to physical examination, clinical examination, total serum IgE and chest X-Ray.

Intradermal skin test

Intradermal skin test for 13 fungal allergens, 12 pollens and 7 dust allergens was performed. Allergens were acquired from Curewel India Limited (New Delhi, India). Allergens were given a concentration of 1: 500 dilutions. With the help of tuberculin syringe

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0.01 to 0.02 cc. of the antigen was taken and intradermally injected into the patient. Histamine phosphate and buffer saline were used as positive and negative controls, respectively. Skin test response was noted after 20 min.

Total serum IgE by ELISA

Patient serum total IgE levels were measured by ELISA test using General Biologicals Corp, Taiwan. The cut off value for IgE levels was 325 IU/ml (Madhuri et al., 1992).

RESULTS

Of the 257 patients 124 were females and 133 were male patients with a mean age group of 34.27 years. Out of 257 patients, 47.5% was asthmatics, 12.5% was rhinitis and 40% was asthma with rhinitis and 32% patients had family history of allergy. Among these 234 patients, 26.9% had breathlessness, 46.5% had sneezing, 44.87% had nose block and 42.7% had rhinophoea (Few patients had more than one symptom).

A group of different fungal, Pollen and dust allergens were taken for intradermal skin test. Among fungal group, prevalence of *Aspergillus flavus* is the highest followed by *Curvaria*, *Trichoderma*, *Nigrospora*, *Rhizopus* and *Alternaria* (Table 1). The other group allergens were pollen, predominant pollen allergen in asthma and rhinitis observed in the present study by intra dermal skin test was *Cynodon dactylon* followed by *Poa pretences*, *Rumex acetosa*, *Morus alba*, *Plantago lanceolata* (Table 2). Third group allergens used for IDST were dust allergens. Among different dust allergens studied in nasobronchial allergy patients, rice grain dust had more prevalence followed by Wheat grain dust, house dust and paper dust (Table 3). According to the information given by the patients, 3% of the patients suffer in summer, 5% suffer only in rains, and 7% only in winter, 12% in rains as well as, in winter and 73% suffer with symptoms throughout the year (Figure1). 37% of patients were positive to more than 5 fungal allergens, 28% were positive to more than 5 pollen allergens and 9% were positive to more than 5 dust allergens. As far as total serum IgE concern, 55% of the patients suffering with symptoms had ≥ 325 IU/ml and 45% of patients had ≤ 325 IU/ml of serum IgE values. It has been observed that patients allergic to more than 5 allergens had elevated levels of total serum IgE values.

DISCUSSION

There is a huge variation in predominance of allergens from region to region in allergic disorders with the fact that there are topographical variations in nature. In our present study, intradermal skin test showed *A. flavus* was the most predominant allergen among fungal group in asthma and rhinitis as 66.23% showed positivity to *A.*

flavus. The study conducted in 1982 on allergens in nasobronchial allergy from the same centre, *Candida albicans* was found as the most predominant fungal allergen (Raja et al., 1985). In 1980's from different parts of India reported *Curvularia*, *Aspergillus versicolor*, *Alternaria*, *Aspergillus niger*, *Phoma* (Anand,1984) and *Mucor* (Shah and Merchant, 1983) were the most allergic fungal species in nasobronchial allergy. The second predominant fungal allergen in asthma and rhinitis observed was *curvaria* (60.25%) followed by *Trichoderma* (57.26%), *Nigrospora* (38.46%), *Rhizopus* (36.75%) and *Alternaris* (28.20%). Comparison with others works with respect to fungal allergens in nasobronchial allergy, allergens such as *A. Flavus*, *Curvaria* and *Alternaria* were found to be common allergens (Agashe, 2003; Singh et al., 1980). In our present study, *Trichoderma* has gained momentum as allergen in asthma and rhinitis which was hardly observed in others study. In 2009, a study from Lucknow, UP observed that *Aspergillus fumigates* followed by *A. flavus*, *Alternaria teneis* and *Fusar allergodani* were most offending fungal allergens in nasobronchial allergies (Prasad et al., 2009).

Among pollen allergens studied, *C. dactylon* found as potent allergen causing asthma and rhinitis in Kupwara region and 30.70% of patients showed positivity. The next predominant pollen allergen was *P. Pretences* followed by *Rumex acetosa*, *Morus alba*, *Plantago lanceolata*. Other pollen allergens in nasobronchial allergies reported from different parts of India were *Amaranthus spinosus*, *Argemone mexicana*, *adhatoda vasica*, *Alanus nitida*, *Cocos*, *Carica*, *Cendrus*, *Parthmium*, *Holoptelea*, *Sorghum vulgare*, *Pennisetum*, *Artemisia* and *Ricinus communis* (Agnihotri, 1971; Singh, 2002; Shivpuri, 1980). The next allergen group was dusts; the common dust allergens observed in our study was Rice grain dust (28.20%), and Wheat grain dust (27.35%), and House dust (25.20%), Paper dust

(18.80%) and Cotton dust (13.67%). Acharya (1980) reported among dust allergens in nasobronchial allergy house dust followed by wheat dust, cotton dust and paper dust were common in Andhra Pradesh (Acharya, 1980). It was also found by various studies that House dust, wheat dust, paper dust, cotton dust acted as predominant allergens in respiratory disorders (Duc et al., 1986).

From these studies, one can clearly observe the variations in allergens causing nasobronchial allergies. The main basis for this may be due to the climatic variations, Industrialization, environmental pollution and change in life style.

High number of patients were suffering with symptoms of asthma and rhinitis throughout the year where as low number suffer in summer. However, the number of patients that suffered in winter and rains was on the average (Figure 1). An explanation offering this may be due to fungal species as omnipresent in nature. However, the concentration of fungal spores in air changes with temperature, humidity, rainfall, wind-velocity and the vegetation of the province. As far as pollen allergen is

Table 1. Intra dermal skin test response to fungal allergens.

S/N	Fungal allergens	No. of positive patients	Percentage
1	Aspergillus flavus	155	66.23
2	Curvularia	141	60.25
3	Trichoderma	134	57.26
4	Nigrospora	90	38.46
5	Rhizopus	86	36.75
6	Alternaria	66	28.20
7	Helminthosporium	63	26.92
8	Aspergillus fumigatus	55	23.50
9	Mucor mucedo	52	22.22
10	Fisarium solonll	48	20.5
11	Cladosporium	45	19.2
12	Candida albicans	29	12.39
13	Aspergillus niger	8	3.4

Table 2. Intra dermal skin test response to pollen allergens.

S/N	Pollen allergens	No. of positive patients	Percentage (%)
1.	<i>Cynodon dactylon</i>	78	30.35
2.	<i>Poa pretences</i>	65	25.29
3.	<i>Rumex acetosa</i>	49	19.06
4.	<i>Morus alba</i>	42	16.34
5.	<i>Plantago lanceolata</i>	38	14.78
6.	<i>Robinia acetosa</i>	35	13.61
7.	<i>Abies pindrow</i>	28	10.89
8.	<i>Platanus orientalis</i>	22	8.56
9.	<i>Pinus halepensis</i>	18	7.0
10.	<i>Pinus roxburghii</i>	15	5.83
11.	<i>Chenopodium album</i>	12	4.66
12.	<i>Cedrus deodara</i>	8	3.11

Table 3. Intra dermal skin test response to dust allergens.

S/N	Fungal allergens	No. of positive patients	Percentage (%)
1	Rice grain dust	66	28.20
2	Wheat grain dust	64	27.35
3	House dust	59	25.20
4	Paper dust	44	18.80
5	Cotton dust	32	13.67
6	Wheat thrashing dust	25	10.68
7	Straw dust	22	5.12

concerned, during rains they may get settled down in the atmosphere due to mugginess, it may be one of the reasons for less number of patients suffering in summer with symptoms. However, it strongly depends on the type of pollen and vegetation of the plant.

Low levels of IgE in other patients may not indicate the absence of allergy; it may not associate with atopic sensitization. However, in our present study high number of patients showed total serum IgE level ≥ 325 IU/ml suggesting atopic nature of the disease. However, for

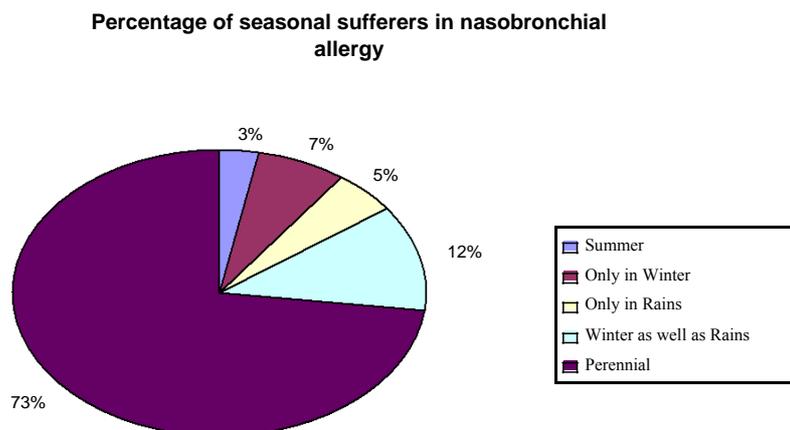


Figure1. Percentage of seasonal sufferers in nasobronchial allergy' and oblige.

better diagnosis and immunotherapy treatment, intradermal skin test with specific IgE levels may be fruitful. More and more studies from different places is to be conducted to specify the prevalent allergens in allergic diseases as there is a variation in allergens from region to region.

Conclusion

The common inhalant allergens in nasobronchial allergy in Kupwara region was assessed and compared with other studies. It was found that there is a variation in prevalence of allergens. The atopic nature of asthma and rhinitis in 55% of patients was observed by total serum IgE levels. The seasonal variations of allergy were found to be minimal. Due to the difference in prevalent allergens from place to place, it is strongly recommended to carry further studies from time to time for better outcome.

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