Common allergens causing Naso bronchial allergy in patients attending a tertiary care centre in South India

Shameem N, Krishna Kumar MK and Bhaskar MK

DOI: https://doi.org/10.22271/27069567.2020.v2.i2d.73

Abstract

Introduction: Patients who seek medical care because of the symptoms of naso bronchial allergies are increasing. The distribution of allergens and its effect on the population differs in different parts of India. For the management and effective treatment of allergen induced respiratory illnesses, it is very important to find out the specific allergens responsible. To determine the common allergens causing naso-bronchial allergy in atopic patients.

Materials and Methods: Atopic patients who attended a tertiary care centre as outpatients for an year with symptoms of naso-bronchial allergy for more than a year who were not responding to regular medications were selected for the study after taking a detailed history. An intradermal allergy test was done in the volar aspect of the patients arm and forearm with antigens of the common allergens prevalent in south India.

Results: Out of 51 patients tested by 39 allergens, 47 persons turned positive for at least one antigen. Among pollen antigens, Acacia species showed highest number of positive reactions. Among dust, house dust and wheat dust showed higher positivity. Among antigens of animal origin, house fly was highest and among fungal origin, Aspergillus fumigatus showed high positivity.

Conclusion: The commonest antigen identified was that of house dust followed by house fly.

Keywords: Naso-bronchial allergy, allergens, intradermal antigen test, respiratory system

Introduction

The population of India is estimated to be at 1.3 billion during the mid-year of 2020 according to UN data and it accounts for 17.7% of world population. More than 300 million of the world’s population suffer from allergic diseases [1]. Chronic respiratory diseases were responsible for 10-9% (95% UI 10-0-12-0) of the total deaths and 6-4% (5-8-7-0) of the total DALYs in India in 2016 [2]. Respiratory symptoms were the most common cause of presentation to a physician in 51% of all patients included in the study and in 65% of paediatric age group, and obstructive airways disease was as one of the most common diagnosis reported [3]. Allergens play an important role in triggering of naso-bronchial allergy and subsequent flaring up of chronic respiratory diseases. The incidence of atopy is estimated to be 28.96% in a randomised survey of the Indian population [4]. Respiratory allergy sometimes causes difficulty in completing doing day to day chores and thereby reducing the quality of life. According to previous studies conducted in different parts of India; house dust, pollen grains, fungal spores, insect allergens, animal dander etc were found to be the most important allergens which trigger naso-bronchial allergy. For the management and its effective treatment, it is very important to find out the specific allergens responsible for the allergy.

Materials and Methods

Study design and settings

The study was designed as a prospective study. Atopic patients those who attended the Respiratory Medicine department as our patients for 6 months (February 2019 to the last day of July 2019) suffering from symptoms of naso-bronchial allergy for more than a year who were not responding to regular medications were selected for the study after taking a detailed history.

Inclusion criteria

- Patients with serum IgE level more than 150
Exclusion criteria
- Age less than 10 years and above 60 years.

Procedure
After obtaining informed written consent, data was entered in a questionnaire and an intradermal test was done with common allergens. 39 common allergens which patients come across in day to day life were selected for the sensitivity study. It included allergenically important pollens in the southern part of the India, fungal, dust and few allergens of animal origin. Patients were directed to stop taking anti histamines and corticosteroids 72 hours prior the test.

Procedure of intradermal testing
The aqueous solution of allergen was taken in different 1 ml disposable tuberculin syringes and 0.1ml of each antigen was injected intradermally with hypodermic needle in the volar aspect of the patient’s arm and forearm in a continuous manner in two rows, 2cm apart. The concentration of allergens was between the rages of 1:500 to 1:5000. Buffered saline was used as negative control. After waiting for 20 minutes, the measurement was taken with the help of a scale which came along with the antigen. Each injection site was observed and interpreted according to Sivpuri’s criteria [3]. A positive result was considered as a wheal which is more than twice that of the negative control.

Statistical analysis
Data was entered into the Microsoft Excel sheets. Mean, median and percentages were calculated. Statistical association between selected variables were calculated using Chi square test using Statistical Package for Social Sciences (SPSS 20.0) version software, p value less than 0.05 considered statistically significant at 95% confidence interval.

Results
The study subjects included 33 males and 18 females. The age of the study subjects ranged between 14 and 58 years. The mean age was observed as 37.86 with a standard deviation of 12.43. 47.0% of the study subjects were from urban area whereas 53.0% were from rural area. Among the study participants 20 were housewives. 8 persons were students, 21 persons were working in government offices, private firms or as labourers for daily wages. Out of 51 study subjects, 31 had family history of allergy (Table-1). Out of the 51 study subjects, 47 had at least one positive reaction from the total of 39 allergens tested. 35 persons were tested positive for one to five numbers of antigens, whereas 12 persons tested positive for more than 5 antigens (Table-2). The highest number of antigens which came positive was eight. The reaction pattern of the study subjects is summarised in Table 3. The highest number of positive reactions was for house dust which was 41%. House fly allergen became positive for 37% of study subjects. Wheat grain dust came third with a positivity rate of 23%. Among the pollen grains, Acacia species topped as the main allergen with 17% of study subjects turning positive. Carica papaya, Amaranthus spinosus and eucalyptus species was positive in 7% of study subjects. None became positive for cocos nucifera, ricinus communis and cassurinae quisetifolia. Grocery dust and mosquitos also turned out to be a main allergen with 17.0% of study subjects turning positive. 15.0% of study subjects turned positive for ration shop dust, rice dust, house dust mite and cockroaches. Chicken feather, cotton dust and hay dust was positive in 9.0% of study subjects. Among the fungal allergens, 7.0% of study subjects turned positive for aspergillus fumigatus.

Table 1: Distribution patients based on the socio-demographic status

| Socio-demographic status      | Number | Percentage (%) |
|-------------------------------|--------|----------------|
| Gender                       |        |                |
| Male                          | 21     | 41.2           |
| Female                        | 30     | 58.8           |
| Family history of allergy     |        |                |
| No                            | 31     | 60.8           |
| Yes                           | 20     | 39.2           |
| Occupation                    |        |                |
| Student                       | 8      | 15.7           |
| House wife                    | 20     | 39.2           |
| Private firm                  | 5      | 9.8            |
| Government service            | 7      | 13.7           |
| Others                        | 11     | 21.6           |

Table 2: Distribution table showing positivity of reactions in study subjects

| Number of positive reactions | Number | Percentage (%) |
|------------------------------|--------|----------------|
| 0                            | 4      | 7.8            |
| 1-5                          | 35     | 68.6           |
| More than 5                  | 12     | 23.5           |

Table 3: Frequency table showing positive reactions for each antigen

| Antigens tested   | Number of persons positive | Percentage (%) |
|-------------------|---------------------------|----------------|
| Pollen            |                           |                |
| Acasia            | 9                         | 17.6           |
| Amaranthus spinosus| 4                         | 7.8            |
| Areca catechu     | 1                         | 2              |
| Azadirachta indica| 1                         | 2              |
| Carica papaya     | 4                         | 7.8            |
| Cassia siamea     | 1                         | 2              |
| Cassia occidentalis| 1                        | 2              |
| Cassuarineaqueisetifolia| 0        | 0              |
| Cenchirus ciliaris | 1                         | 2              |
| Clerodendron      | 2                         | 3.9            |
| Cocos nucifera    | 0                         | 0              |
| Cynodonacitylon   | 1                         | 2              |
| Eucalyptussp      | 4                         | 7.8            |
| Heteropogonconcitans| 2                     | 3.9            |
Discussion

In our study, the number of females was more when compared to males who had more than five allergens turning positive. Two females turned positive for 8 allergens. Those with seven allergens positive comprised of one male and four females. In a study done in Mumbai by Shaikh WA et al., males outnumbered females i.e., 53.05% versus 46.95%; 89.17% of the patients were adults and 10.83% were children. More than 80.0% of the patients were young, below 40 years of age. The house dust mite D farina showed the highest incidence (77.13%) of positive reactions. In our study Amaranthus spinosus came second among pollen grains, first being Acacia species. In a study done in Lucknow by Prasad R et al., the most common allergen was found to be the pollen of Amaranthus spinosus (39.58%) [8]. In a study conducted at Kochi housefly was the most common allergen observed 53.26% followed by rice grain dust 47.5%. Amongst dust group of allergens, most predominant allergen was Grain dust wheat (20.83%) and House fly (41.2%]). Among pollen antigens, Parthenium showed maximum number of positive reaction (12.99%), while Aspergillus flavus and Aspergillus niger were the most common fungal antigens (both 4.44%) [10]. Another study done by Agarwal RL et al., in Allahabad reported house dust mite as the commonest allergen (78.0%) followed by dust and other insects [11]. There were no statistically significant association found with occupation or place or rural urban difference when compared with number of positive reactions

Conclusion
In our study the highest number of positive reactions was for house dust followed by house fly allergen and then by wheat grain dust. The pattern of positive reactions for allergens is different in various studies done in different parts of the country as well as in other countries.

Limitations
Number of study subjects was less. Patients with urticaria were not included in the study.

Sources of funding: Self

Conflict of interest: Nil

References
1. Singh AB, Mathur C. An aerobiological perspective in allergy and asthma. Asia Pac Allergy 2012;2(3):210-22.
2. The burden of chronic respiratory diseases and their heterogeneity across the states of India: the Global Burden of Disease Study 1990-2016. Lancet Glob Health 2018;6:e1363-74.
3. Salvi S, Apte K, Madas S et al. Symptoms and medical conditions in 204 912 patients visiting primary healthcare practitioners in India: a 1-day point prevalence study (the POSEIDON study). Lancet Glob Health 2015;3(12):e776-e784.
4. Shaikh WA, Shaikh SW. Allergies in India: an analysis of 3389 patients attending an allergy clinic in Mumbai, India. J Indian Med Assoc 2008;106(4):220-4.

5. Shivpuri DN. Clinically important pollens, fungal and insect allergens for nasobronchial allergy patients in India. Aspects Allergy Appl Immunol 1980;13:19-23.

6. Prasad R, Verma SK, Dua R, Kant S, Kushwaha RA, Agarwal SP. A study of skin sensitivity to various allergens by skin prick test in patients of nasobronchial allergy. Lung India Of Organ Indian Chest So 2009;26(3):70-3.

7. Akhilesh K, Harilakshmanan P, James PT, Rakesh PS. Allergen profile of patients from central Kerala, India. Int J Pharm Bio Sci 2017;8(1):588-592.

8. Anand P, Sushmita C. Prevalence of allergen sensitivity in naso bronchial allergy in Gujarat, India. National Journal of Medical Research 2012;2(4):431-4.

9. Chogtu B, Magaji N, Magazine R, Acharya PR. Pattern of allergen sensitivity among patients with bronchial asthma and/or allergic rhinosinusitis in a tertiary care centre of Southern India. J Clin Diagn Res 2017;11(8):1-4.

10. Raseela K, Jose RR, Dinesa PV, Parvathy S. Pattern of intradermal antigen sensitivity in patients with Nasobronchial allergy in a tertiary care centre in South Kerala. JMSCR 2017;105(12):31922-7.

11. Agrawal RL, Chandra A, Jain S, Agrawal G, Snehlata. Identification of common allergens by skin prick test associated with united airway disease in Allahabad, Uttar Pradesh, India. Indian J Allergy Asthma Immunol 2008;22(1):7-13.

12. Singh AB, Kumar P. Common environmental allergens causing respiratory allergy in India. Indian J Pediatr 2002;69(3):245-50.

13. Jerath VP, Sood M, Jerath P, Jerath A. Sensitization to pollen antigens in 1420 patients of Jalandhar and neighbouring area in Punjab. Indian J Allergy Asthma Immunol 2010;24(2):69-73.

14. Gaur SN, Kumar R, Lohia AK, Agarwal K. Sensitivity to common aeroallergens in allergic rhinitis as a predictor of bronchial hyperreactivity and development of asthma. Indian J Allergy Asthma Immunol 2011;25(2):61-6.

15. Singh AB, Singh A. Pollen allergy - A global scenario. In: Agashe SN. Recent trends in aerobiology, allergy, and immunology. New Delhi: Oxford & IBH Pub. Co 1994, P143-70.

16. Bousquet PJ, Chinn S, Janson C, Kogevinas M, Burney P, Jarvis D. Geographical variation in the prevalence of positive skin tests to environmental aeroallergens in the European Community Respiratory Health Survey I. Allergy 2007;62:301-09.

17. Singh N, Singh U, Singh D, Daya M, Singh V. Correlation of pollen counts and number of hospital visits of asthmatic and allergic rhinitis patients. Lung India 2017;34:127-31.

18. Mansouritorghabeh H, Jabbari-Azad F, Sankian M, Varasteh A, Farid-Hosseini R. The Most Common Allergenic Tree Pollen Grains in the Middle East: A Narrative Review. Iran J Med Sci 2019;44(2):87-98.

19. Demoly P, Matucci A, Rossi O et al. The disease burden in patients with respiratory allergies induced by house dust mites: a year-long observational survey in three European countries. Clin Transl Allergy 2020;10:27-9.