

Allergic skin tests in Malaysian asthmatics

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Summary

To assess the prevalence of skin test sensitivity among asthmatic patients in Malaysia, skin prick tests for allergy in 134 adult asthmatic patients and 120 control subjects were done. 90% of asthmatic patients had positive skin test to at least one allergens as compared to 78% of the controls. House dust mite was the most frequent allergen to which the subjects had positive reactions. Sixty-four percent of the asthmatic patients had associated rhinitis. There was no significant difference in the skin test sensitivity between asthmatic patients with associated rhinitis and those without.

Key words: Asthma, rhinitis, skin test, allergy, house dust mite.

Introduction

Screening for allergy is valuable in asthma because a division of asthma into allergic and non-allergic types may be valuable in therapeutic point of view. A patient's history and simple clinical data often given guidance to the question of the presence or absence of allergy.^{1,2} Determination of serum IgE has also been proposed³ but a broad overlap of IgE values between allergic and non-allergic patients makes this test a less valuable method of confirming allergy.^{4,5} The diagnostic and practical value of an in vitro procedure such as the radioallergosorbent test (RAST) is still under investigation.

Of the in-vivo procedures, direct skin testing is the most widely accepted because of its high reliability, easy accessibility, and relatively low risk as compared to nasal or bronchial provocative testing. Herbert et al.⁶ found that 90% of atopic asthmatics could be detected by skin prick test.

The purpose of this study was to determine the frequency of skin test sensitivity in Malaysian adult asthmatic subjects and to ascertain which allergens should be selected for use in allergy screening in our community.

Material and Methods

The patient population consisted of 134 asthmatic patients (76 females and 58 males) seen in the chest clinic at Universiti Sains Malaysia between January 1989 to December 1990. Their mean age was 33.5 ± 13.4 years (range 10 to 63 years). The diagnosis of asthma was made based on the criteria of recurrent episodes of wheezing, shortness of breath and cough, and demonstrable evidence of reversible airflow obstruction on spirometry. Reversibility of airway obstruction was defined as a fifteen percent or more improvement in the forced expiratory volume in one second (FEV₁) following an inhaled beta agonist (fenoterol). Patients with a history of chronic bronchitis or emphysema were excluded from this study. A diagnosis of rhinitis was based on a history of sneezing, watery rhinorrhoea, nasal congestion and stuffiness for more than one day in a week of more than one year duration.

Allergic skin tests using the prick puncture technique were performed on all patients with thirteen allergens extracts supplied by Bencard Ltd. Brentford, England. The allergens selected were thought

to be common in the local situation. A positive (histamine) and negative (glycero-saline) skin test control were also performed on each subject.

The patients were allowed to continue taking oral or inhaled bronchodilators or inhaled steroids but oral steroids were stopped for at least one week before skin testing. Patients were also refrained from taking any antihistamines for at least 48 hours before the tests.

The skin tests were performed on the volar aspect of the forearm and read after 15 minutes. The sizes of the weal was recorded in millimeters and the strength of each reaction was recorded as varying from zero to four plus as recommended by Patterson.⁷ The skin test reaction was considered positive if the weal was 3 mm or more (ie. reaction of 2+ or more).

One hundred and twenty control subjects consisting of staff of the hospital and medical students with no history of asthma, rhinitis or eczema were also tested in a similar manner.

Chi-square contingency table analysis with Yates correction was used for comparison between groups.

Results

Table 1 shows the frequency of positive skin test to different allergens in the asthmatic patients and normal subjects. 86.6% (116/134) of the asthmatic patients and 72.5% (87/120) of the normal subjects had positive skin test to at least one allergen. This difference is significant ($X^2 = 6.995$, $p = 0.0052$). Many patients and normal subjects had positive skin reactions to more than one allergens (Table II).

Table I
Number of patients with at least one positive skin test

Patient group	Skin Tests		
	Positive	Negative	Total
Asthma + Rhinitis	76	10	86
Asthma alone	40	8	48
Normal control	87	33	120

Positive skin test: Weal of 3 mm or more (2+ or more)

The most frequent allergen to which the subjects had positive reactions was house dust mite (Table III). 70% of the asthmatic and 55% of normal subjects had positive reaction to house dust mite. Cotton and kapok (a common material used in the making of pillows and blankets) were common causes of skin sensitivity. Reaction of food allergens were not common except for shellfish. Reaction to grass pollen, a common allergen in the West, is uncommon in both asthmatic and normal subjects locally.

Association with rhinitis: 64.2% (86/134) of patients had associated rhinitis. There was no significance difference in the skin allergy between those with and those without rhinitis. Seventy-six of the patients with rhinitis (88.3%) had positive skin tests compared to 40 (83.3%) of the 48 patients without rhinitis ($X^2 = 0.309$, $p = 0.5782$).

Table II
Frequency of positive skin test to 13 allergens in 134 asthmatics
and 120 normal controls subjects

No. of Allergens	Asthmatic Patients (n=134)		Normal Control (n=120)	
	Number Positive	Cumulative (%)	Number Positive	Cumulative (%)
0	18	134 (100.0)	33	120 (100.0)
1	11	116 (86.6)	12	87 (72.5)
2	8	105 (78.3)	16	75 (62.5)
3	10	97 (72.4)	10	59 (49.2)
4	16	87 (64.9)	12	49 (40.8)
5	8	71 (53.0)	10	37 (30.8)
6	19	63 (47.8)	15	27 (22.5)
7	15	44 (32.8)	6	12 (10.0)
8	11	29 (21.6)	1	6 (5.0)
9	10	18 (13.4)	3	5 (4.2)
10	6	8 (6.0)	0	2 (1.7)
11	1	2 (1.5)	2	2 (0.0)
12	1	1 (0.8)	0	0 (0.0)

No subjects had positive skin test to all 13 allergens

Discussion

In Malaysia, bronchial asthma accounted for three to ten percent of admissions to the medical units in hospitals.^{8,9} The classification of asthmatic patients into an atopic and non-atopic group is useful in the management of these patients. The purpose of this study was to determine the frequency of atopy by skin test sensitivity in adult asthmatic patients in Malaysia.

Ninety percent of asthmatic patients in this study had a positive skin test to at least one allergen. Similarly, Ross reported that 80% (41/50) of asthmatic patients studied in Penang had positive skin test.⁸ The incidence of positive skin tests in asthmatic patients in Malaysia is therefore high as compared to 58% reported by Kalliel et al. in the United Kingdom¹⁰ and 60% as reported by Tan et. al. in Singapore.¹¹ The reason for the high positivity in our asthmatics may be due to a high prevalence of these allergens in our environment. This is evidenced by the high positive rate among our control population. Seventy-eight percent of our normal control subjects had positive skin tests to at least one allergen compared to only 12% in Singapore.¹¹ Therefore the presence of a positive skin test reaction in Malaysian patients is not helpful in differentiating atopic individuals with allergic diseases from those without. In the United Kingdom, approximately 30% of the population studied exhibited positive responses to skin prick testing with commonly inhaled allergens, although not all of them had allergic diseases.¹² Kalliel et al¹⁹ found that only one of their eighteen control subjects had positive reaction.

Hendrick et al¹³ postulated that a large number of positive responses with skin prick testing is associated with an earlier onset of rhinitis or bronchial asthma, an increased likelihood of having more than one atopic disease and a family history of atopic disease. Subjects with both rhinitis and asthma

are more than twice as likely to have positive skin prick testing responses than subjects with rhinitis alone.⁵ Kalliel et al. found that skin test is positive in 64% asthmatic subjects with rhinitis compared to only 17% of those without rhinitis.⁹ 64% of our patients had associated rhinitis. However there was no significance difference in the skin test positivity between these two groups of patients.

An allergen panel used for screening purposes must obviously depend on the patients' environment and this must vary from one country to another. There is a need to obtain allergen extracts pertinent to the local environment for a more accurate account of the incidence of hypersensitivity to environmental allergens. As seen in Table III, house dust mites tops the list of positive tests. Thus if only one allergen was to be used for screening, we suggest the house dust mite which would detect 80% of allergic patients. Food allergens (such as egg, milk or wheat), candida albicans, grass pollens are not necessary since the reactions to these allergens were uncommon and not significantly different from the control population.

Table III
Frequency of skin test positivity to specific allergens in 134 asthmatics and 120 normal controls subjects

Allergens	Asthmatics (n=134)		Normals (n=120)		p value
	No.	Positive (%)	No.	Positive (%)	
House dust mite	94	(70.1)	66	(55.0)	0.018
Cotton	90	(67.2)	54	(45.0)	<0.01
Kapok	80	(59.7)	47	(39.2)	<0.01
Aspergillus	72	(53.7)	35	(29.2)	<0.01
Shellfish	61	(45.5)	22	(18.3)	<0.01
Grass pollen	57	(42.5)	48	(40.0)	NS
Candida albicans	43	(32.1)	32	(26.7)	NS
Human hair	40	(29.8)	14	(11.3)	<0.01
Cat Fur	31	(23.1)	11	(9.2)	<0.01
Feathers	27	(20.1)	7	(5.8)	<0.01
Whole egg	26	(19.4)	11	(9.2)	0.03
Wheat	12	(8.9)	6	(5.0)	NS
Milk	6	(4.5)	3	(2.5)	NS

NS = Not statistically significant (p = >0.05)

In conclusion, our study confirms the high prevalence of skin test sensitivity among asthmatic patients in Malaysia. House dust mite is the commonest allergen to which the patients are sensitive to. Food allergens need not be included in skin testing among Malaysians.

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References

1. Dirksen A. Clinical vs. paraclinical data in allergy. *Dan Med Bull* 1982; 29 (Suppl 2) : 5 – 72.
2. Eriksson NE. Allergy diagnosis and specific therapy in asthma – when, where and how? *Eur J Respir Dis* 1984; 136 : 139 – 59.
3. Zetterstrom O, Johansson SGO. IgE concentration measured by PRIST in serum of healthy adults and in patients with respiratory allergy. A diagnostic approach. *Allergy* 1981; 36 : 537 – 47.
4. Dockhom RJ. Using the RAST and PRIST with an overview of clinical significance. *Ann Allergy* 1982; 49 : 1 – 8.
5. Mygind N, Dirksen A, Johnsen NJ, Weeke B. Perennial rhinitis on analysis of skin testing, serum IgE and blood and smear eosinophilia in 201 patients. *Clin Otolaryngol* 1978; 3 : 189 – 96.
6. Herbert FA, Weimer N, Salkie ML. RAST and skin test screening in the investigation of asthma. *Ann Allergy* 1982; 49 : 311 – 4.
7. Patterson R. Allergic diseases: Diagnosis and management. Philadelphia 1972, JB Lippincott Co. P. 77.
8. Ross I. Bronchial asthma in Malaysia. *Br J Dis Chest* 1984; 78 : 369 – 75.
9. Jeyaindron S. Review of bronchial asthma in Malaysia. the 11th Asia-Pasific congress on Disease of the Chest. Bangkok, November 1989.
10. Kalliel JN, Goldstein BM, Braman SS, Settipane GA. High frequency of Atopic Asthma in a Pulmonary clinic Population. *Chest* 1989; 96 : 1336 – 40.
11. Tan WC, Teoh PC. An analysis of Skin Prick Test reactions in asthmatics in Singapore. *Ann of Allergy* 1979; 43 : 44 – 6.
12. D'Souza MF, Davies RJ. The distribution of allergic disorders and atopy in the community and their relationship to total levels of serum IgE antibody. *Am Rev Respir Dis* 1977: annual meeting supplement; 211.
13. Hendrick DJ, Davies RJ, D'Souza MF, Pepys J. An analysis of prick skin test reaction in 656 asthmatics patients *Thorax* 1975; 30 : 2 – 8.