

Association of Rhinitis in Adult Asthmatics

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Asthma and rhinitis are common diseases which frequently coexist. The close relationship between these two conditions which affect the lower and the upper respiratory tract respectively has been well recognized.¹ A 'triad' of asthma, nasal polyps and aspirin sensitivity has been well described.

Nasal symptoms in patients presenting with asthma have been reported in up to 78% of patients.² The symptoms occur more often in early onset asthma and in those who have an allergic basis for their asthma. On the other hand, the prevalence of asthma in patients with rhinitis is lower, occurring in less than 20% of patients.³⁻⁵

The purpose of this study was to determine the frequency of associated rhinitis in our asthmatic subjects, to study the relationship of rhinitis symptoms to the occurrence of acute asthmatic attacks and to identify the factors that are more likely to occur in this group of patients.

MATERIALS AND METHODS

The study group consisted of a total of 124 adult asthmatic patients aged between 10 and 67 years seen

SUMMARY In a study of 124 adult patients with bronchial asthma, 65% of them had associated rhinitis. In the asthmatics who had associated rhinitis, both diseases usually started within two years of one another but either disease might develop first. In 21% of the patients, asthmatic attacks were preceded or precipitated by rhinitis symptoms. In the patients who had asthma alone or those associated with rhinitis, no significant difference were found in terms of age and sex distribution, age of onset, and a positive family history of asthma, rhinitis or allergic diseases. Response to skin prick test using six different types of allergens also showed no difference in the two groups of patients. Sensitivity to house dust was common among both groups of patients as well as in the normal controls suggesting a common occurrence of house dust mite in our community and making the skin prick test using this allergen unsuitable as a test for atopy in our population.

in the chest clinic at Universiti Sains Malaysia between January 1990 and August 1990. The patients were divided into those with asthma alone and those who had asthma associated with rhinitis. The diagnosis of asthma was made if the patient had recurrent episodes of wheezing, shortness of breath, cough and demonstrable evidence of reversible airflow obstruction on spirometry. Reversibility of obstruction was defined as a 15% or more improvement in the forced expiratory volume in one second (FEV₁) following inhalation of a beta agonist (200 µg of salbutamol). Patients with chronic bronchitis and emphysema and chronic smokers (more than 10 pack years) were excluded from the study.

A diagnosis of rhinitis was established by a current history of the symptom complex of sneezing, watery rhinorrhea, nasal congestion and stuffiness or obstruction for more than one day in a week for one year or more. The relationship between the nasal symptoms and the asthma history was recorded. The nasal symptoms were recorded as preceding asthma if the symptoms started more than one year prior to the first asthmatic attack and vice versa.

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The sex and age of the patients were noted. The patients were also asked about the age of onset of asthma and its relationship with the onset of rhinitis. The presence or absence of a family history of asthma, rhinitis or other allergic conditions were recorded. A family history was considered positive if parents, grandparents, aunts, uncles or siblings suffered from the conditions.

Allergic skin tests using the pin-prick puncture technique were performed on all patients using six aeroallergens (house dust, house dust mite, cat fur, feathers, grass pollen, and *Candida albicans*). All extracts of the allergens were supplied by Bencard Ltd (Brentford, England). The allergens were selected because they were thought to be common in the local situation. Positive (histamine) and negative (glycero-saline) control tests were also performed on each patient.

The skin tests were performed on the volar aspect of the forearm and read after 15 minutes. The size of the wheal and erythema were measured with Bencard skin test reaction gauge. The strength of each reaction was graded as varying from zero to four plus according to Bencard skin test reaction chart as follows :

- No wheal. Erythema absent or less than 1 mm.
- + Wheal absent or very slight. Erythema present, not more than 3 mm diameter.
- ++ Wheal not more than 3 mm diameter, with associated erythema.
- +++ Wheal between 3 mm and 5 mm diameter, with erythema.
- ++++ Any larger reaction, or one with pseudopodia.

A reaction of 2+ or more was regarded as positive skin test.

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 requested to refrain from taking any antihistamine for at least 48 hours before undergoing the test.

Ninety-three normal subjects (23 males and 70 females) consisting of medical students and staff of the hospital who had no history of rhinitis, eczema or asthma were also similarly tested. Skin tests were also done using similar methods on 95 patients (59 males, 36 females) seen at the Ear, Nose and Throat clinic with the diagnosis of rhinitis.

Reactions for the four groups of subjects were analysed and compared. For statistical analysis, Chi-square test of significance were carried out.

RESULTS

Patient data

Forty-three patients (15 males and 28 females) were classified as

suffering from asthma alone and 81 patients (39 males and 42 females) had asthma and rhinitis. The age and sex distribution of the patients are shown in Table 1. There was no significant difference in the age of the patients or sex incidence between those asthmatic with associated rhinitis and those without rhinitis ($p = 0.2186$).

Relationship of onset of rhinitis to onset of asthma

Of the 81 patients who had both rhinitis and asthma, the majority of patients developed both diseases within two years of one another. The onset of nasal symptoms preceded the onset of asthma by varying interval in 38 patients (46.9%) while in 26 patients (32.1%), both nasal symptoms and asthma started at about the same time. The remaining 17 patients (21.0%) had asthma first.

Table 1. Age and sex distribution of the patients with asthma and asthma/rhinitis.

	Asthma alone (n=43)	Asthma/rhinitis (n=81)	Total (n=124)
Sex			
Male (%)	15 (35)	39 (48)	54 (44)
Female (%)	28 (65)	42 (52)	70 (56)
Mean age (Years) (Standard deviation)	33.1 (12.1)	31.7 (14.7)	32.6 (13.8)

Table 2. Age of onset of asthma in relation to rhinitis association.

Age of onset (Years)	Number of patients		Total (%) (n=124)
	Asthma/rhinitis (n=81)	Asthma alone (n=34)	
0-10	13	10	23 (18.5)
11-20	17	9	26 (21.0)
21-30	16	8	24 (19.4)
31-40	18	9	27 (21.7)
Over 40	17	7	24 (19.4)

Table 3. Frequency of skin test positivity to specific allergens.

Allergens	Number of positive skin tests (%)			
	Asthma (n=43)	Asthma/rhinitis (n=81)	Rhinitis (n=95)	Normal (n=93)
One or more allergens	30 (69)	64 (79)	89 (94)	59 (63)
House dust	30 (69)	62 (75)	76 (80)	54 (58)
House dust mite	29 (67)	59 (73)	66 (69)	53 (57)
Cat fur	22 (51)	57 (70)	77 (81)	46 (49)
Feathers	27 (63)	50 (62)	77 (81)	39 (42)
Grass pollen	12 (28)	24 (30)	17 (18)	11 (12)
Candida albicans	11 (26)	17 (21)	7 (7)	8 (9)

Age of onset of asthma in relation to associated rhinitis

The distribution of the age of onset of asthma in patients with and without associated rhinitis is shown in Table 2. The onset of asthma occurred at all ages but the majority (60.5%) of the 124 adult asthma patients had late onset asthma (age of onset more than 20 years). The mean age of onset was 17.1 ± 13.0 . There was no significant correlation between the incidence of rhinitis and the age of onset of asthma ($p = 0.6125$).

Relationship to family history of asthma

Sixty-four per cent of patients had family history of asthma. Family history of rhinitis and allergy were less common and were present in 21% and 8% of patients respectively. There was no significant correlation between positive family history of asthma, rhinitis or allergy and presence of associated rhinitis in asthma.

Relationship of rhinitis symptoms to acute asthmatic episodes

Among the patients who had asthma with rhinitis, in 17 patients (21.0%), asthmatic attacks were preceded or precipitated by nasal symptoms while in 18 patients (22.8%) the asthma attacks occurred simul-

taneously with the nasal symptoms. In the other half of patients, no definite correlation could be established. A few patients who had no rhinitis also had asthma attacks which were often precipitated by nasal symptoms.

Skin test reactions

The frequencies of skin test sensitivity to different types of allergens for the different groups of patients are shown in Table 3. 76% of all asthma patients (69% with asthma alone, 79% with asthma and rhinitis), 94% of patients with rhinitis alone and 63% of normal subjects) had positive skin tests to at least one of the allergens. There were significant differences ($p < 0.05$) in the positivity of skin tests between the three groups of patients as compared with the normal control group. However, there was no significant difference in the positivity of skin tests between the two groups of asthmatic patients; skin tests were positive in 79.0% of asthmatic with associated rhinitis compared to 69.8% in those without rhinitis ($X^2 = 0.853$, $p = 0.3556$).

DISCUSSION

Asthma and rhinitis are common conditions which occur throughout the world. In the United Kingdom,

the prevalence rate for adult asthma ranges from 3.1-6.5%,⁶⁻⁸ while the prevalence is lower in Finland⁹⁻¹¹ and rates of up to 12.5% have been reported from New Zealand.¹² In Malaysia, asthma represents between 3 to 10% of medical admissions^{13,14} but no population study has been reported.

Rhinitis occurs more frequently than asthma.^{15,16} The prevalence of seasonal allergic rhinitis has been reported as 15% among students in Denmark,¹⁵ whilst higher figures have been reported from the United States.¹⁷ In one study, Elango *et al.* found that allergic rhinitis constituted about 10% of all patients attending the ear, nose and throat clinic.¹⁸

Asthma and rhinitis frequently coexist; 65.3% of our 124 asthmatics had associated rhinitis. This finding is accordance with the prevalence of between 44 to 81% reported in other series.^{19,20} The common occurrence of rhinitis and asthma together suggests that they probably have similar underlying etiology and pathogenesis. The mechanisms by which nasal and sinus diseases produce reactive airway disease have been attributed to various factors including bacterial seeding of the lung from the nose/sinuses with mucopurulent material, possible enhancement of

pre-existing beta-adrenergic blockade and reflex bronchospasm from receptors in the nose and sinuses.²⁰ It was well known that nasal changes can reflect a disease of the entire respiratory tract membrane.¹

The association of rhinitis in asthma is more usually found with early onset (childhood/adolescent) asthma.² However, the majority of the adult asthma patients in our study had late onset asthma (onset over 20 years) and there was no significant difference between the age of onset of asthma and the prevalence of rhinitis.

In accordance with one other study,⁵ we found that in patients who suffered from both the conditions, the diseases usually started within two years of one another. The diseases started at roughly the same time in 32% of patients while 47% of patients developed asthma first and the other 21% rhinitis first.

Although in the majority of cases there was no definite correlation between nasal symptoms and acute asthma attacks, in a number of our patients (21%), rhinitis symptoms might trigger off or precipitate acute asthmatic episodes. This finding emphasizes the importance of directly questioning asthmatics about nasal symptoms so that earlier or concomitant control of rhinitis may reduce the frequency and severity of asthmatic attacks.

Notwithstanding that a history of rhinitis is in itself not sufficient to distinguish atopic from non-atopic asthmatic patients, the incidence of rhinitis is more common in the atopic asthma patients than in the non-atopic asthmatics. Kalliel reported that 64% of atopic asthmatics had rhinitis compared to only 17% of the non-atopic asthmatics.¹⁹ Also, subjects who had both rhinitis and asthma are twice as likely to develop positive skin prick testing response than subjects who had rhinitis alone.²¹ However, we found no significant dif-

ference in the prevalence of rhinitis between skin test positive asthmatics and the skin test negative patients. Neither did the results of skin testing show significant differences between the asthmatic, the asthma/rhinitis and the rhinitis-only patients. We also found that positive family history of asthma, allergy or rhinitis did not predispose patients to rhinitis.

Almost all positive skin reactors (in normals as well as asthmatics) responded to house dust or house dust mite. This is similarly found in other skin prick test studies in Malaysian^{13,18} and Singaporean²² patients. This establishes the ubiquity of *Dermatophagoides* in our environment and the importance of house dust mite allergy in our population. The other authors also suggested that skin test using house dust alone would be useful to identify the atopic status of our population. However, the high number of positive results to this allergen among the normal subjects would imply that skin tests using house dust mite alone would not be useful in predicting whether those atopic individuals would be associated with or without allergic diseases.

ACKNOWLEDGEMENT

We wish to thank staff nurse Law Siew Mui for assisting in doing the skin tests, Dr. Win Kyi for her advice in the preparation of the paper, the director of the hospital for permission to publish this paper and especially to the patients and staff of the hospital and medical students who cooperated in the study.

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