

The nature of asthma in Brisbane

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Summary

Clinical details and skin prick test reactions are described for 183 asthmatic patients who attended an asthma clinic at the Royal Brisbane Hospital in 1976. These features were compared with similar studies reported from London, Sydney, Tristan da Cunha and New Guinea. Asthma in Brisbane was shown to be similar in many ways to asthma in those centres; however, a higher frequency of positive immediate skin test reactions to antigens of *A. fumigatus*, a larger percentage of skin test-negative patients developing symptoms before the age of 10 years, and a lack of association between the age of onset of symptoms and number of positive skin tests was noted. A difference in mean weal diameter (in mm) on skin testing with house dust mite antigens was not found between patients giving a history of sensitivity to these antigens and those that did not. A seasonal increase in symptoms was only described by 27% of patients.

Introduction

Previous studies on asthma in Brisbane have placed emphasis on the relationship of exacerbations of asthma with changes in climate (Derrick, 1972). The age of onset (Derrick, 1971) and the role of allergens (Wright & Derrick, 1975) have received some attention.

The purpose of this report is to present a year's experience obtained from an asthma clinic conducted at the Royal Brisbane Hospital. Cases were studied in a way that would enable a comparison to be made with studies from other geographical regions.

Materials and methods

Patients

An asthma clinic was started at the hospital in January 1976 conducted by the Staff

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Table 1. Number and percentage of positive immediate skin test reactions in 141 skin test-positive patients

Fungi	Number	Per- centage	Pollens	Number	Per- centage	Foods	Number	Per- centage	House dust	Number	Per- centage	Animal danders	Number	Per- centage
<i>Botrytis</i> *	13	9.2	Eucalyptus*	9	6.4	Milk	18	12.8	House dust	115	81.6	Horse	95	67.4
<i>Penicillium</i> *	5	3.5	Wattle*	11	7.8	Egg	10	7.1	<i>D. farinae</i>	50	83.7	Dog	59	41.8
<i>M. Lachrymans</i>	3	2.1	Jacaranda*	14	9.9	Wheat	12	8.5	<i>D. pteronyssinus</i>	68		Cat	86	60.9
<i>A. fumigatus</i>	40	28.4	Paspalum*	40	28.4	Mixed nuts	13	9.2				Mixed feathers	89	63.1
<i>A. terreus</i>	15	10.6	Couch*	18	12.8									
<i>C. albicans</i>	10	7.1	Clover*	13	9.2									
Mixed yeasts	37	26.2												
<i>A. tenuis</i>	28	19.8												
<i>C. herbarum</i>	21	14.9												

* From Commonwealth Serum Laboratories, Parkville, Victoria. The remainder are Bencard. *D. farinae* was used for the first 6 months, *D. pteronyssinus* the remainder.

Thoracic Physician (C.W.C.) and a Registrar in Advanced Training (P.M.A.) until the end of December 1976. Patients presenting to the casualty department with a history suggestive of asthma were referred to the clinic for management. These patients used the casualty department for their medical needs rather than attending a general practitioner, which the majority did not have.

The diagnosis of asthma was made according to the definition of the American Thoracic Society (Meneely *et al.*, 1962). A history relevant to their asthma was taken on the first visit and recorded on an asthma history form. The patient was given a full examination at this time.

Respiratory function was assessed using a Vitalograph (Vitalograph Ltd, Buckinghamshire, U.K.) before and after inhaled bronchodilator.

Skin testing

Skin prick testing to a range of common allergens was performed according to the method of Hendrick *et al.* (1975). If the patient was on antihistamines they were suspended for 3 full days prior to testing. The range of allergens used is listed in the results section.

Statistical analyses

The significance of a positive family history of different symptoms was analysed by the χ^2 test (Colton, 1974a). A rank correlation was used to determine relationship of age of onset of symptoms with the number of positive skin tests (Colton, 1974b).

Results

193 new patients were seen in the 12 month period, and 183 were able to be analysed for this report. There were ninety males and ninety-three females, with a skin test positivity rate of 82% and 74% respectively. The allergens used for testing and the frequency of positive immediate reactions to them is summarized in Table 1. The important sensitizing agents were house dust and house dust mite antigens, animal danders, Paspalum, *A. fumigatus* and mixed yeasts.

Clinical features

Family history of asthma and rhinitis. This is summarized in Table 2. There was

Table 2. Family history of asthma and rhinitis in the two groups of asthmatic patients

Family	Skin test-positive (n = 141)		Skin test-negative (n = 40)	
	Asthma	Rhinitis	Asthma	Rhinitis
Parents	48 (34%)	53 (38%)	5 (12.5%)	5 (12.5%)
Siblings	50 (35%)	41 (29%)	5 (13.0%)	9 (23.0%)
Children*	24 (41%)*	9 (16%)*	7 (21%)†	7 (21.0%)†

* Eighty-three did not have children.

† Seven did not have children.

Table 3. Age of onset of asthma is summarized according to the age grouping in which symptoms first occurred

Age group (years)	Skin test-positive (n=141)	Skin test-negative (n=40)
0-10	89 (63%)	12 (30%)
11-20	25 (18%)	5 (12.5%)
21-30	14 (10%)	9 (22.5%)
31-40	9 (6%)	0 (0%)
41-50	3 (2%)	6 (15%)
> 50	1 (1%)	8 (20%)

no significant difference between skin test-positive and skin test-negative patients for a family history of asthma, but there was for a family history of rhinitis ($P < 0.05$).

Age of onset of asthma. The age of onset of asthma is detailed in Table 3. 81% of skin test-positive patients developed symptoms before the age of 20 years, compared with 42.5% of skin test-negative patients. The number of positive skin tests is related to the age of onset in Table 4. There was no correlation between age of onset and number of positive skin tests.

Features of asthma

133 patients (73%) complained of wheezing on exercise, fifty (27%) felt that symptoms were confined to a particular time of the year, 139 (79%) stated that their asthma was worse at night while in ten (6%) said that it was worse during the day. Eighteen out of 159 patients (11%) said that alcohol in various forms was a significant precipitating factor in causing wheezing.

The significance of house dust as a cause of wheezing or rhinitis following exposure to it was particularly looked for. 104 (57%) gave a positive history on exposure to it. Of these, eighty-seven (84%) had a positive skin test to house dust mite antigens with a mean weal diameter of 5.0 mm. A further thirty-one patients had a positive skin

Table 4. Mean number of positive skin tests related to age grouping in which symptoms first occurred

Age of onset (years)	Mean number of positive skin tests	Range
0-10	6.67	1-21
11-20	9.2	1-18
21-30	7.35	1-21
31-40	5.0	1-11
41-50	5.3	4-6
	1.0*	—

* Only one patient with nine positive tests.

Table 5. Frequency of immediate skin reactions to antigen in the different centres

Study	<i>A. fumigatus</i>	House dust	<i>D. farinae</i>	<i>D. pteronyssinus</i>
London*	86 (16%)	386 (70%)	380 (70%)	—
Sydney†	77 (21%)	344 (93%)	—	255 (69%)
Tristan da Cunha‡	3 (5%)	49 (56%)	—	40 (43%)
New Guinea†	4 (6.25%)	64 (100%)	—	—
Brisbane*	40 (28.4%)	115 (81.6%)	118 (83.7%);	—

* Bencard antigen.

† C.S.L. antigen except for *A. fumigatus* in Sydney study which was Hollister-Stier.

‡ Antigen not given in reference.

§ *D. farinae* used for first 6 months. *D. pteronyssinus* second 6 months.

test to these antigens, with a mean weal diameter of 4.5 mm, but gave a negative history on normal exposure.

Discussion

This study lists features of asthma occurring in patients referred to a clinic at the Royal Brisbane Hospital in 1976. It enables a comparison to be made with studies of aspects of asthma reported from London (Hendrick *et al.*, 1975), Sydney (Bryant & Burns, 1976), Tristan da Cunha (Mantle & Pepys, 1974) and New Guinea (Anderson, 1974).

The frequency of skin test positivity in the patients is similar in Brisbane (78%), London (84%), Sydney (75%) and Tristan da Cunha (89%). 100% of patients studied in New Guinea were skin test-positive. It is difficult to compare skin test reactions to many different antigens in the studies because of variation in test substances. A comparison was made for *A. fumigatus*, house dust and house dust mite antigens. The positivity rate and antigenic source are summarized in Table 5. It can be seen that sensitization to antigens of *A. fumigatus* is very frequent in the Brisbane patients, and suggests that disease due to hypersensitivity reactions to this fungus could be a problem in this community. A study to determine the extent of this disease is now in progress. Sensitivity to house dust mite and house dust antigens is common in all areas except Tristan da Cunha.

A positive family history of asthma was found in 34% of parents of skin test-positive patients and 12.5% of parents of skin test-negative patients in Brisbane, compared with 38% and 40% respectively in the London study. In Tristan da Cunha, it was 89% and 11%, but this may be distorted because of the inbred nature of the community. Information was not available from Sydney or New Guinea.

Age of onset was difficult to compare as different time periods were used in the different centres. In Brisbane, 63% of skin test-positive patients developed asthma before the age of 10 years, compared to 52% in London and 57% in Sydney. In Brisbane, 91% of these patients had developed symptoms before the age of 30 years, 79% in London and 86% in Sydney. For skin test-negative patients only, 30% had developed symptoms before the age of 10 years in Brisbane, 18% in London and 5% in Sydney. Onset of symptoms after the age of 30 years occurred in 35% of patients in Brisbane, 56% in London and 81% in Sydney. The difference between Brisbane and the other centres in the skin test-negative group may be due to the fact that a number

of patients presenting with asthma before the age of 10 years may be atopic; the appropriate sensitizing antigen not yet having been identified to put them into that category. Antigen is being prepared from local trees to look at this aspect. 51% of all asthmatic patients on Tristan da Cunha had developed symptoms by the age of 19 years.

Skin test reactions were not analysed according to allergen groups as in the Sydney study, and our study did not show that there was a relationship between the age of onset and the number of positive skin test reactions, if the mean number of positive skin tests was considered in each age grouping. The Sydney study did show a relationship. This is a third area that requires further investigation. It suggests that although a person may be born with an atopic tendency, conditions related to this, such as asthma, may not be manifested until they meet a potent allergen. This may be present in the Brisbane environment.

Another interesting finding was that there was little difference between the mean weal diameter to house dust mite antigens in patients with a positive history of house dust mite sensitivity (5.0 mm) and those without this history (4.5 mm). Another Sydney study has shown that a positive inhalation test occurred in all cases where the weal was greater than 4.0 mm using house dust mite antigen (Bryant, Burns & Lazarus, 1973).

The present study shows that there are similarities between the asthma in Brisbane and that occurring in other parts of the world. Differences were also demonstrated and these areas require further study. Much has been made of the relationship of asthma with the climate in Brisbane, but in this study only 27% felt asthma was worse at a particular time of the year. This aspect also requires clarification.

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