

The Prevalence of Skin Sensitization to *Aspergillus* Antigens Among Asthmatic Patients in Singapore*

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Skin-prick tests have been used extensively both for the diagnosis and for the study of aetiological factors in atopic asthma.¹⁻³ Immediate type skin reaction to *Aspergillus* antigen is used as a major criterion for the diagnosis of allergic broncho-pulmonary aspergillosis which is a well defined complication of bronchial asthma.^{4,5}

In Britain, several authors have reported a high prevalence of both broncho-pulmonary aspergillosis (10-20%) and of skin sensitization to *Aspergillus fumigatus* antigen (16-23%).^{2,3,6,7}

In a previous study, positive skin reactions to *Aspergillus fumigatus* were found in only 6.5 per cent of our patients with asthma.⁸ In this study, we investigated the prevalence of skin sensitization to several species of *Aspergillus* in patients with asthma.

PATIENTS AND METHODS

Subjects

We studied 76 consecutive patients (46 men and 30 women) with bronchial asthma at the Singapore General Hospital. Their ages ranged from 12 to 71 years with a mean of 31.8 years. They all had a history of intermittent wheezing and

evidence of reversible airway obstruction. The onset of asthma occurred in 69 of the patients before the age of 40; seven of them, after 40. Ethnically, they were made up of 50 Chinese, 16 Indians, eight Malays and two Caucasians.

Aspergillus antigens

Freeze dried antigens from eight species of *Aspergillus* were reconstituted in isotonic saline at a weight/volume concentration of 1:10. This solution was used for the skin-prick tests. The various *Aspergillus* species used for testing are shown in Table 1.

Testing method

The patients were instructed to refrain from taking any antihistamines for at least 48 hours before the test.

A drop of each allergen was placed on the volar aspect of the

forearm, arranged in two rows. The skin was pricked through the fluid superficially to avoid drawing blood. The tests were read 15 minutes later. They were taken as positive if the wheal size was at least 2 mm larger than that of the control.⁸

RESULTS

Only nine out of the 76 patients tested (11.8%) gave positive skin reactions to one or more of the *Aspergillus* antigens. The average number of positive reactions per patient was 2.3 with a range of 1 to 7. Table 1 shows that five patients gave positive reactions to more than one species of *Aspergillus*. *Aspergillus fumigatus* was the most allergenic as it produced positive

SUMMARY Seventy-six consecutive patients with bronchial asthma were studied. Immediate skin reactions to eight different species of *Aspergillus* were tested. Nine out of the 76 patients (11.8%) gave positive skin reactions to one or more of the *Aspergillus* antigens. Only five patients (6.5%) reacted to *Aspergillus fumigatus*. We conclude that skin sensitization to *Aspergillus* antigens is less common among asthmatic patients in Singapore than in temperate countries.

ASIAN PACIFIC J ALLERG IMMUN 1983;1:123-124.

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Table 1 The patterns of positive skin-prick reactions to *Aspergillus* antigens in nine patients with asthma.

Patient No.	1	2	3	4	5	6	7	8	9	Total
<i>A. fumigatus</i>	+	+			+		+		+	5
<i>A. clavatus</i>	+		+			+		+		4
<i>A. terreus</i>	+	+								2
<i>A. flavus</i>	+									1
<i>A. niger</i>	+			+			+			3
<i>A. versicolor</i>	+			+	+		+			4
<i>A. fisheri</i>										0
<i>A. ridulans</i>	+	+								2

reactions in five patients while no patient had a positive skin-prick test to *A. fisheri*.

DISCUSSION

Positive immediate skin reactions to at least one out of eight *Aspergillus* species were demonstrable in only 11.8 per cent of our patients. Only five patients (6.5%) reacted to *Aspergillus fumigatus*. This was much lower than the reported incidence of positive skin reactions to *Aspergillus fumigatus* in countries in the temperate zone where the incidence ranged from 16 to 23 per cent.^{2,3}

The reason for the low incidence in Singapore is unclear. We do not think it was due to relatively unreactive antigens since the same incidence was found in a previous study using Bencard (Wellcome) reagents.⁸ It is also unlikely that our patients were anergic since the incidence of positive skin reactions to house-dust mite was comparable to that reported in countries in the temperate zone.⁸

Fungi of the genus *Aspergillus* are ubiquitous saprophytes in soil, compost and decaying vegetable

matter. They grow best at the relatively high temperatures of 15 to above 30 degrees Celsius under conditions of relative humidity of more than 95 per cent.⁹ Their reproductive spores are airborne and widely distributed. It would appear that the warm, humid, tropical climate of Singapore would be ideal for the germination and distribution of these fungi. *Aspergillus* fungi are indeed common contaminants isolated by our Bacteriology Department.¹⁰ Hence, it is surprising that we found a low incidence of skin reaction to *Aspergillus* species in our asthmatic patients. This is also reflected in the clinical impression that allergic bronchopulmonary aspergillosis, in which sensitization to the fungus plays a major pathogenic role, is uncommon among asthmatic patients in Singapore although no systematic study has been reported.

We conclude that skin sensitization to *Aspergillus* antigens is less common among asthmatic patients in Singapore than in countries in the temperate zone. Further studies are needed to determine the significance of this in bronchopulmonary aspergillosis in asthmatic patients

in Singapore.

ACKNOWLEDGEMENTS

We are grateful to Dr. J. Pepys (London) who kindly provided the *Aspergillus* antigens used in this study.

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