

## Skin-test reactions in chronic allergic rhinitis in Benin

F. O. Ogisi

ENT Unit, Department of Surgery, University of Benin Teaching Hospital, Benin City, Nigeria.

Reprint requests to: Dr. F. O. Ogisi, Department of Surgery, U. B. T. H., P. M. B. 1111, Benin City, Nigeria.

### ABSTRACT

**Background:** Skin testing is an established mode of investigation of atopic allergic conditions, to determine the allergen or allergens responsible for clinical symptoms as well as the degree of reactivity in individual cases. However over the years little has been reported on the pattern of reactions in the common condition of allergic rhinitis in this part of the world.

**Method:** Seventy-five (75) patients with symptomatic chronic allergic rhinitis attending the Ear, Nose, and Throat Clinic of the University of Benin Teaching Hospital and forty-two (42) control subjects had skin prick tests performed on them for 11 different allergens.

**Results:** There were a significantly higher proportion of positive reactions in the rhinitis group (81%) than in the controls (36%). The commonest allergen detected was the House Dust mite (*Dermatophagoides pteronyssinus*) to which more than half of the rhinitis patients reacted as compared to less than a fifth of the control group. A positive reaction to multiple allergens was also common.

**Conclusion:** The skin test reaction is a valuable diagnostic index of the presence as well as the degree of allergic diathesis in allergic rhinitis in our environment. Although multiple reactions have been demonstrated, the house dust mite is the most common allergen incriminated in our patients.

**Key Words:** Skin test, rhinitis, allergy, sensitivity

### Introduction

Skin - testing has for long been employed in investigation of allergic rhinitis as well as in other atopic allergic conditions such as asthma and eczema. The purpose is to assess if the patient is producing reaginic antibodies and if so, against which allergens, and to what extent.<sup>1</sup> A positive skin test proves skin sensitivity but not necessarily clinical sensitivity, unless taken in conjunction with history and clinical examination. Other methods of investigating allergy such as intranasal provocation tests and estimation of specific

reaginic antibodies, IgE in the serum by radio - immunoassay (RAST) are used also, but the results are usually evaluated in conjunction with those of skin tests.<sup>1, 2</sup> Haddock and Onwuka<sup>3</sup> evaluated skin reactions in asthmatic patients in Benin, and Warrell et al<sup>4</sup> in a similar detailed study in Zaria, Northern Nigeria found 87% of asthmatics positive to skin prick tests. Mukherjee and Mukherjee<sup>5</sup> reported the results of skin tests in 50 patients including 15 cases of perennial allergic rhinitis and found the greatest number of reactions to sheep wool and house - dust followed by House-dust mite (HDM). Apart from this

latter work, there has been little written on the pattern of skin reactions in Nigerian patients with chronic allergic rhinitis. In this study we analysed the skin test reactions of 75 allergic rhinitis patients in comparison with 42 control subjects.

## Materials and Methods

The patients used in this study were those with chronic rhinitis manifesting the symptom complex of watery rhinorrhoea, nasal obstruction and bouts of sneezing and itching of nose and conjunctiva indicative of allergy; this may be either seasonal (hay fever) or perennial. Seventy-five (75) patients (35 males and 40 females) ranging in age from 7 to 45 years were tested by the skin prick method with a selection of allergenic reagents from the standard Bencard skin test kit. 42 control subjects aged 10 to 40 years (20 males, 22 females) were similarly tested; these were drawn mainly from nursing and medical staff and students who had no significant history of allergic diseases such as rhinitis, asthma or eczema.

Subjects were requested to stop all antihistamine treatment 48 hours before tests. The standard prick technique recommended by Bencard was used - the cleaned skin of the forearm was pricked with the sharp lancet provided in the kit through a drop of the test solution and the reaction is read 15 minutes later after wiping off excess reagent. Each subject was tested with 12 solutions - one control solution and extracts of 11 common allergenic substances including house dust, house dust mite extract and different pollens (see table 1); the control consisted of only the diluent used for the other solutions with no allergenic content. The strength of reaction was assessed by the size of weal at the test site with or without erythema, only those reactions significantly greater than the control, if any, being taken as positive. The weal

diameter measured with a plastic calibrator is graded as follows: -

- 0 (-) No weal, little or no erythema.
- 1 (+) Weal slight, 1 mm. (Erythema less than 3mm).
- 2 (++) Weal not more than 3 mm.
- 3 (+++) Weal between 3 and 5 mm.
- 4 (++++) Any larger reaction.

## Results

Of the 75 rhinitis patients 61 (81%) had positive reactions to one or more of the test materials whilst only 15 (36%) of the control subjects had positive reactions. The difference between the two groups is statistically significant (Chi-squared = 24.6055;  $p < 0.05$ ). There was no significant reaction to the control solution in any of the subjects. Table 1 shows the proportion of rhinitis patients and controls having reaction to each allergen.

House dust mite (*Dermatophagoides pteronyssinus*) had the highest proportion of reactions, followed by house dust in the rhinitis group; the two extracts together with feathers also predominated among the controls, though there were significantly fewer reactants to each of the allergens in the control group. There were relatively fewer reactants to food extracts and to the fungus *Aspergillus fumigatus*.

The grades of reactions are analysed in Tables 2 and 3 for the rhinitis patients and the controls respectively. In both groups weak reactions (grades 1 and 2) predominated over strong reactions (grades 3 and 4) except in respect of reactions to House dust mite which has an excess of strong reactions. Most of the rhinitis patients (87%) had positive skin reactions to more than one reagent, the largest proportion having 2 or 3 reactions as shown in figure 1.

Table 1: Positive skin reactions to various allergens

Allergens	Rhinitis patients (n = 75)		Controls (n = 42)	
	Positive reactions	%	Positive reactions	%
1. House dust mite	41	54.6	7	16.6%
2. House dust	32	42.6	8	19
3. Feathers	22	29	7	16.6
4. Dog hair	19	25	4	9.5
5. Human hair/ dandruff	12	16	2	4.7
6. Cotton flock	18	24	2	4.7
7. Pollen -grasses	20	26.6	1	2.4
8. Pollen - trees	12	16	2	4.7
9. Flowers / shrubs	18	24	3	7
10. foods	8	10.6	1	2.4
11. Aspergillus	6	8	1	2.4
Overall positive reactions	61 (81%)		15 (36%)	

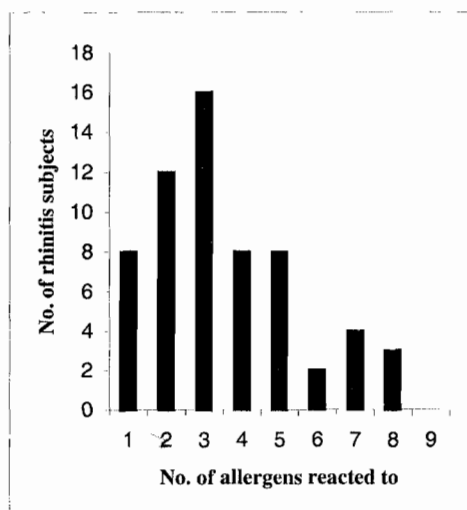
Table 2: Analysis of grades of reactions to different allergens: rhinitis patients

Allergens	Reaction grades (%)				Total
	1+	2+	3+	4+	
House dust mite	9	10	13	9	41
House dust	15	9	8	-	32
Feathers	10	8	4	-	22
Dog hair	11	5	3	-	19
Human hair/ dandruff	7	4	3	-	14
Cotton flock.	7	9	1	-	17
B2 grasses	7	9	2	2	20
Trees	4	7	1	-	12
Flowers	5	11	-	2	18
Foods	4	3	1	-	8
Aspergillus	2	2	2	-	6
Total	81 (39)	77 (37)	38 (18)	13 (6)	209(100)
	158 (76)		51 (24)		

Table 3: Analysis of grades of reactions to different allergens: control subjects.

Allergens	Reaction grades (%)				
	1+	2+	3+	4+	Total
House dust mite	1	1	3	2	7
House dust	5	2	1	-	8
Feathers	6	-	1	-	8
Dog hair	4	-	-	-	4
Human hair/ dandruff	2	-	-	-	2
Cotton flock	1	1	-	-	2
B2 grasses	1	-	-	-	1
Trees	2	-	-	-	2
Flowers	1	2	-	-	3
Foods	1	-	-	-	1
Aspergillus	1	-	-	-	1
<b>Total</b>	<b>25(66%)</b>	<b>6 (16 %)</b>	<b>5 (13 %)</b>	<b>2(5%)</b>	<b>38(100%)</b>
	<b>31 (82 %)</b>		<b>7 (18%)</b>		

Figure 1: Extent of multiple skin test reactions in chronic allergic rhinitis patients



## Discussion

The reliability of skin tests in assessment of nasal

allergy has often been questioned. The allergic response of the skin may not in fact be a true guide to the allergic state of a tissue so different anatomically and physiologically as the nasal mucosa.<sup>6</sup> A positive skin reaction only shows the ability to form IgE in response to an allergen; many atopic patients will have positive tests without evidence of clinical sensitivity. Nevertheless skin tests often confirm an allergic aetiology suspected from a patient's history.<sup>3</sup> Our data indicate a much higher proportion of positive reactions amongst the rhinitis patients as compared to the controls, both overall and for each of the allergens tested; the difference was found to be statistically significant. The results also show that house dust mite (*Dermatophagoides pteronyssinus*) is the commonest allergen eliciting skin reactions in the rhinitis group; this is a common finding for most groups of atopic patients tested.<sup>1, 4, 7.</sup>

In both rhinitis and control groups there is a high proportion of "strong" reactions (grade 3 and 4) to house dust mite (Tables 2 and 3) but it is obvious that if the reactions to house dust mite (HDM) are excluded, there is a much higher

incidence of strong reactions to other allergens in the rhinitis patients than the controls.

In this study we considered a reaction size greater than 3 mm (grade 3 and 4) as a strong reaction and one less than 3 mm as "weak" (grade 1 and 2). This is somewhat at variance with some other workers. Lee<sup>8</sup> only regarded a 4 mm reaction as significant, and Haddock and Onwuka<sup>3</sup> found significant differences between asthmatics and controls only with reactions greater than 5 mm. in diameter.

The identification of causative allergen or allergens by skin testing and other methods is of great value if treatment of individual patients by elimination or desensitisation is considered indicated. The use of specific desensitising vaccines has only been applied in a few cases in our unit and there is therefore insufficient data for a report on its value. There have, however, been several reports in the literature on its benefit in allergic rhinitis and other allergic conditions.<sup>1,9,10</sup>

We believe that desensitisation would prove of value to some of our many cases of allergic rhinitis, based on positive skin test and a suggestive history, particularly in cases that prove resistant to conventional drug treatment.

### Acknowledgement

I am grateful to Sister J. Ogiamien for her invaluable assistance in carrying out the skin tests and to Miss Fidelia Mordi for secretarial assistance.

### References

1. Wentges RTR. In: Clinical otolaryngology. Maran A G D, Stell P M (eds). Blackwell, London, 1979; 226 - 234.
2. Mogi G, Shoichi M, Yoshida T, Watanabe N. IgE studies on respiratory tract allergies. Arch Otol 1977; 103: 251 - 257.
3. Haddock DRW, Onwuka E I. Skin tests in Nigerian asthmatics from equatorial forest zone in Benin, Nigeria. Trans R Soc Trop Med Hyg 1977; 71: 32 - 34.
4. Warrell DA, Fawcett IW, Harrison BD. Bronchial asthma in the Nigerian savannah region. Quart J Med 1975; 44: 325 - 347.
5. Mukherjee K, Mukherjee DK. Immunity and allergy - A report in skin testing (for allergic diathesis) in Nigeria. Nigerian. Med J1975; 6: 193 - 197.
6. Kumar R. Evaluation of skin tests and desensitisation in allergic rhinitis. J Laryng Otol 1977; 91: 795 - 803.
7. Commey JOO, Haddock DRW. Skin sensitivity to house dust mite extract in Ghanaian asthmatics in Accra. Trans Roy Soc Trop Med Hyg1973; 67: 109 - 111.
8. Lees LJ. A trial of house dust mite adsorbed on tyrosine in general practice. Br J Clin Pract 1974; 28: 343 - 346.
9. Warner JO, Perice JF, Soothill JF, Mey EN. Controlled trial of desensitisation to dermatophagoides pteronyssinus in children with asthma. Lancet 1978; iv: 912.
10. Lindsay Miller ACM. Aqueous extracts in treatment of perennial allergic rhinitis. Practitioner 1978; 201: 779 - 781.