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HYPERIMMUNOGLOBULINAEMIA E IN ATOPIC ECZEMA (ATOPIC DERMATITIS) IS ASSOCIATED WITH "FOOD ALLERGY"

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Abstract. Thirty-two adult patients with atopic eczema were compared with a similar group of atopics with asthma and/or rhinitis. Twelve patients with eczema had a history of food allergy, either to fish or eggs: only one of the asthma/rhinitis group gave such a history. When "prick" testing to foods was performed, all but one of these patients with a history of food allergy had a positive skin test to foods. In addition, 6 further patients with eczema and one further patient from the asthma/rhinitis group gave positive skin tests to foods. Total serum IgE concentrations were estimated in each patient, and it was found that those patients with the highest IgE concentrations were those with positive skin tests to foods. As severe atopic eczema in adults is a difficult management problem, it is suggested that in those with positive skin tests to foods, exclusion diets are worth a trial.

Key words: Immunoglobulin E; Atopic eczema; Food allergy

Patients with atopic eczema tend to have very high IgE concentrations (1–3), and this is particularly true if the eczema is associated with asthma and rhinitis (4). A majority of authors (3, 5–6), have also asserted that there is a positive relationship between the severity of the eczema and the total serum IgE concentrations though it is generally accepted there is considerable variation between the serum IgE concentrations in different patients, and that the concentrations in individuals are relatively constant when sequential studies are performed.

The present study was designed to ascertain the reason for the variation in serum IgE concentrations between different patients with atopic eczema.

PATIENTS AND METHODS

Thirty-two patients with atopic eczema were studied. Eighteen were male and 14 female, and their ages ranged from 18 to 54 years; 10 of them also had a history of asthma and rhinitis, 8 had asthma, and 3 hayfever. They were compared with 28 patients with asthma and/or allergic rhinitis who were matched for age and sex (9 had a history of asthma and rhinitis, 6 had asthma, and 9 had rhinitis), and 28 matched healthy controls.

The patients from each group, and the healthy controls had venous blood withdrawn for total serum IgE concentrations to be estimated: this estimation was performed using the solid-phase radio-immune-adsorbent technique (Pharmacia, Uppsala, Sweden). Each patient and control was also skin-tested by "prick-testing" to 8 inhalants and 8 food allergens: the allergens were supplied by Bencard, Brentford, Middlesex, and the following were used: (*a*) inhalants: pollens from mixed grasses, pollens from mixed flowers and shrubs, dog hair, cat fur, horse hair, house dust, house dust mite and Aspergillus fumigatus; (*b*) foods: mixed cereals, vegetables, meats, fruits, fish, shellfish, cow's milk and whole egg. The results of skin tests were recorded after 15 minutes and were deemed to be positive when the weal reaction had a diameter (on average) greater than 5 mm; lesser weals were disregarded. Statistical significance for differences in serum IgE concentrations between groups was calculated in each case using the Mann Whitney U test.

RESULTS

History of food allergy

Patients with eczema. Of the 32 patients with eczema, 11 gave a history of allergy to foods with swelling of the mouth and throat, and in some, vomiting. Of these, 6 gave a history of allergy to fish, 4 to eggs, and 2 to both allergens. (One other patient noted that her eczema deteriorated after ingestion of fish but had no symptoms of angio-oedema). Only one patient had a history of allergy to milk, and he had since "outgrown" it.

Patients with asthma and allergic rhinitis. Of the 28 patients, only one gave a history of food allergy, having experienced angio-oedema on ingestion of fish.

Control group. Not one of the 28 healthy controls had a history of food allergy.

Skin testing

Patients with eczema. Of the 32 patients, 29 had one or more positive prick tests to inhalants, and 17 had one or more positive prick tests to foods (Fig. 1). In all but one of the patients with a history of

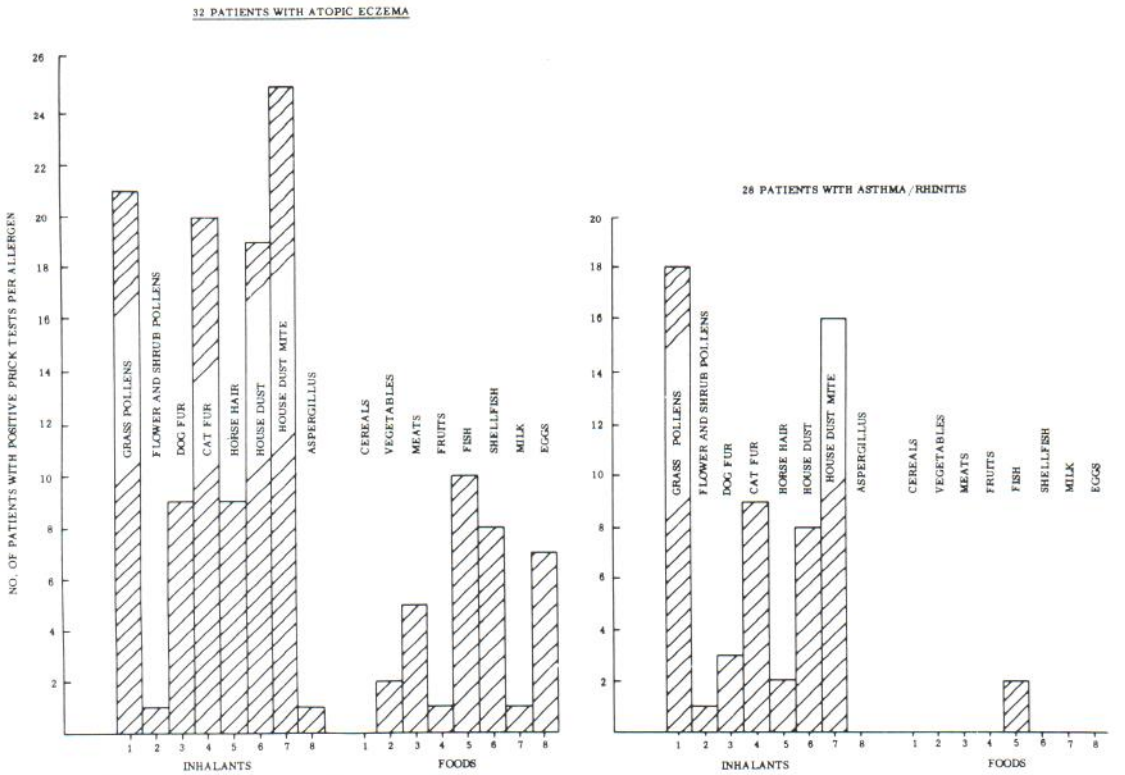

Fig. 1. Number of patients with positive prick tests per allergen (inhalants and foods): 32 patients with atopic eczema and 28 patients with asthma and/or rhinitis.

allergy to foods, this was confirmed by a positive prick test with weal >5 mm diameter (in the one patient with a history of food allergy whose prick test did not achieve a weal of 5 mm diameter, the weal had a diameter of 4 mm). In addition, these patients and 6 further patients produced unexpected positive skin tests to foods, both to fish and eggs, and also to shellfish, and meats (on subsequent testing, mainly to pork). Only one had a positive prick test to milk, and there was no history of allergy to milk in this patient.

Patients with asthma and/or rhinitis. Twenty-four of the 28 patients had positive prick tests to inhalants. Only two had a positive prick test to foods (fish), one being the patient who gave a history of allergy to fish (Fig. 1).

Control group. Two of the 28 controls had unexpected positive skin tests to grass pollens.

Total serum IgE concentrations

The total serum IgE concentrations of patients with atopic eczema (median 4 000 U/ml) were significantly higher ($p < 0.01$) than those of patients with asthma and/or rhinitis (median 300 U/ml) and the control group (median 45 U/ml). However, there was noted to be a marked variation in IgE concentrations in the eczema group (range 10–40 000 U/ml).

When the serum IgE concentrations in all groups of patients with atopy were correlated with the results of skin tests to food allergens, it was found that those patients with positive prick tests to foods (median 9 500 U/ml) had significantly higher IgE concentrations ($p < 0.01$) than those without. It was also observed that the eczema patients without positive skin tests to foods, had similar IgE concentrations (median 450 U/ml) to those of the asthma/rhinitis group (median 280 U/ml); and the IgE concentrations were again significantly lower ($p < 0.01$) than those of the skin test positive (to foods) group (Fig. 2).

DISCUSSION

These studies show that the IgE concentrations are highest in those atopics with evidence of "food allergy", and suggest that antibodies to food are

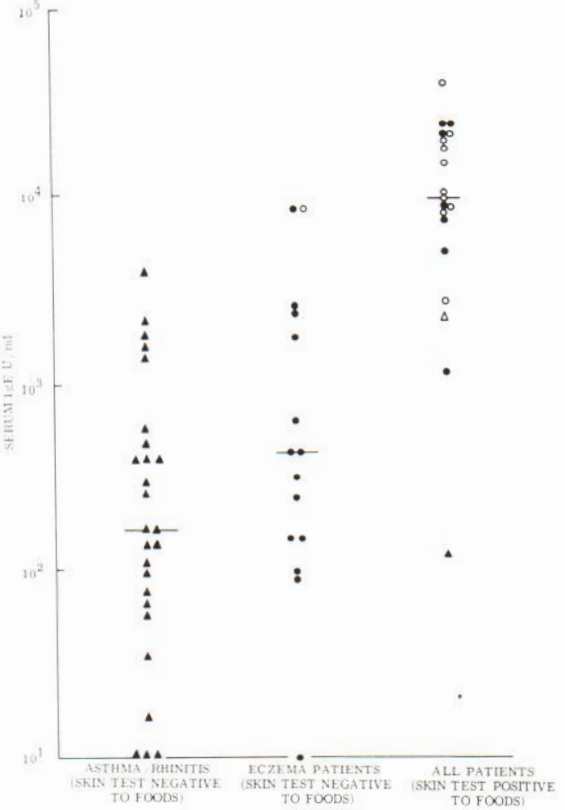

Fig. 2. Serum IgE concentrations in patients with positive skin tests to foods compared to those with negative skin tests to foods. Open circles (○) or triangles (△) indicate those with history of angio-oedema following ingestion of foods.

largely responsible for the very high IgE concentrations seen in atopic eczema patients.

Patients with severe atopic eczema who tend to have high IgE concentrations, are a difficult management problem. Patients with mild atopic eczema are usually effectively controlled by the application of steroid ointments, the use of antibacterials where necessary, and the avoidance (as far as possible) of precipitating factors such as stress, excessive sweating and contact with irritants such as wool: however, on the whole, these measures are not adequate to control those with severe eczema. If food allergy (latent or overt) plays even a minor part in the pathogenesis of the eczema component, then avoidance of potential allergens could be helpful.

REFERENCES

1. Juhlin, L., Johansson, S. G. O., Bennich, H., Högman, C. & Thyresson, N.: Immunoglobulin E levels in atopic dermatitis, urticaria and various dermatoses. Arch Dermatol *100: 12*, 1969.
2. Johansson, S. G. O. & Juhlin, L.: Immunoglobulin E in "healed" atopic dermatitis, and after treatment with corticosteroids and azathioprine. *Br J Dermatol 82:* 10, 1970.
3. Clendenning, W. E., Clack, W. E., Ogawa, M. & Ishizaka, K.: Serum IgE studies in atopic dermatitis. Arch Dermatol *61:* 233, 1973.
4. Öhman, S. & Johansson, S. G. O.: Immunoglobulins in atopic dermatitis. Acta Dermatovener (Stockholm) *54:* 193, 1974.
5. Ogawa, M., Berger, P. A., McIntyre, R., Clendenning, W. E. & Ishizaka, K.: IgE in atopic dermatitis. Arch Dermatol. *103:* 575, 1971.
6. Gurevitch, A. W., Heiner, D. C. & Reisner, R. M.: IgE in atopic dermatitis and other common dermatoses. Arch Dermatol *107:* 712, 1973.

DISCUSSION

Aoki (Osaka). Q: Is there any difference between patients who are simply allergic to food and others who are also sensitive to moulds in the effect of food restrictions?

A: I have not studied that. My main message is that the higher the IgE, the more foods they are allergic to.

Aas (Oslo). Q: I would like to comment on heredity. Links between genetic markers and allergens have only been demonstrated with rare and less active allergens.