

The pattern of food hypersensitivity in patients with onset after 10 years of age

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Summary

One hundred and twelve patients with a history of immediate adverse reaction after food ingestion and positive skin test to food are presented with the result of food challenge. In all patients the symptoms started after 10 years of age; most presented with recurrent short-lasting urticarial rash, often accompanied by rhinitis. In the majority of the patients, skin tests were positive to multiple food allergens, but 67% of these responded to oral provocation by only one allergen. One-third of the patients had a history of allergic symptoms following exercise after meals, but in only one-third of these symptoms were reproducible in the laboratory. Fruit and vegetables were the main allergens responsible for food hypersensitivity. Food allergy can develop after the first 10 years of life. Fruit and vegetables are the main cause of food allergy in these patients, while milk and egg are the least common. These findings differ from those in early childhood where milk and eggs are the main allergens.

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Introduction

Evaluation of patients with a history suggesting food hypersensitivity includes skin testing with food extracts and oral challenge with the suspected food. Several paediatric studies have reported a correlation between diagnostic tests and the reproduction of symptoms [1–3]. While several adult studies claimed that skin tests to food are non-contributory in the diagnosis of food allergy [4], others reported a high correlation between positive skin tests and positive food challenge [5,6]. Atkins *et al.* [5,6] recently suggested that in patients with suspected food allergy, the most helpful information for prediction is the correlation of suggestive history with a positive prick-skin test for the food in question.

To further clarify the relationship between symptoms suggesting food allergy, skin-testing to food extracts and food challenge in an adult population, we report our findings in 112 patients referred to us with suspected food allergy, in whom onset of symptoms was after 10 years of age.

Subjects

Patients with recurrent allergic symptoms were referred for evaluation to the Allergy Unit at the Tel-Aviv Medical Center. One hundred and twelve patients with positive skin hypersensitivity to food, and onset of symptoms after the age of 10 years, were included in the study, during the years 1982–1992. All symptoms could be objectively diagnosed: urticaria, angioedema, rhinitis, bronchoconstriction, diarrhoea, vomiting, tachycardia and hypotension.

Methods

Skin-test

All the patients had skin-prick tests to inhaled allergens (dust, mite, mixed grasses, mixed weeds, mixed trees, mixed moulds, cat, dog, cockroach, histamine and saline as a control) and to food (total of 70 foods). Allergen extracts were purchased from Hollister-Stier (1:20 w/v in 50% glycerine). The weal size was measured 15–20 min after skin-prick test and the mean diameters calculated by adding the largest and smallest and dividing by 2 [7]. Positive reactions were considered those with a mean diameter of 3 mm or more than that of the negative control site [8].

Table 1. Patients' characteristics

	Number	Age range (year)	Mean age (year)	History of atopy (%)	Duration of symptoms (year)
Total	112	10-48	18.3	76	7.1
Male	62	10-44	18.1	79	8.2
Female	50	12-48	18.6	73	5.3

Food challenge

In most cases the food was given fresh and disguised by mixing it with food that the patients had consumed without causing allergy, and to which skin-testing had been negative. Food was purchased from the same source as the food which had previously evoked an allergic reaction. The initial dose of food was administered taking into consideration the amount previously reported to elicit a response and the severity of the reaction. If the first dose was tolerated, the subsequent one was increased two- to 10-fold, depending on the severity of the reaction. A nurse from the unit, unaware of the history and the content of the food given, was the blind observer.

Fourteen of the patients were diagnosed by open food challenge only. All patients were examined and their vital signs recorded both before and at intervals after food challenge for a total of 4 h. Most patients required large amounts of food to induce symptoms. Resuscitation equipment was available in the challenge room at all times.

Results

One hundred and twelve patients were included in the study; four with anaphylactic reaction to food were not challenged. These patients were clinically sensitive to I-mango, II-peach, III-peanuts and IV-sunflower seeds, with a positive skin reaction to these foods. They also had positive skin reactions to other foods but which they tolerated without adverse effects. Since they claimed severe response upon eating the suspected foods, they were not challenged with them. Among the remaining 108 patients, 37 (33%) claimed to develop urticarial rash, runny nose and shortness of breath following strenuous exercise; 17 recalled having eaten shortly before the exercise (≤ 1 h), which was usually intense and prolonged (approximately 20 min). On skin-testing to food extracts, they were sensitive to peaches (80%), sunflower (78%), soya (70%), peanuts (68%), almonds (55%), cucumber (54%), orange (41%), amongst others. Forty per cent of the patients claimed to have itchy palate while eating peach. Meals composed of the skin positive foods,

Table 2. Results of allergy evaluation in 71 patients with food allergy

Food	Skin responders (%)	Challenge responders	
		<i>n</i>	(%)
Peach	91	49	(75)
Sunflower	84	25	(35)
Soya	73	0	0
Peanuts	65	22	(31)
Almond	45	28	(39)
Cucumber	45	0	0
Orange	30	6	(9)
Chocolate	24	0	0
Tomato	25	2	(3)
Wheat	14	2	(3)
Apple	12	2	(3)
Carrot	13	4	(6)

induced symptoms (mild urticaria, runny nose) in 12 patients when taken before exercise (running on treadmill for 20 min). Ten of the patients had a blind challenge. Seventy-one patients did not consider exercise to be a factor in the induction of allergic symptoms. In these patients, 65 (91%) were skin sensitive to peach, 60 (84%) to soya, 52 (73%) to sunflower, 46 (65%) to peanuts, 32 (45%) to almonds, 32 (45%) to cucumber, 21 (30%) to orange, 17 (24%) to chocolate, 17 (24%) to tomato, 10 (14%) to wheat, amongst others. Upon food challenge, soya, cucumber and chocolate were tolerated without allergic symptoms (Tables 1, 2).

Peach (in very small quantities— < 10 mg) induced allergic symptoms in 43 (66%) of the skin positive patients; in six patients (9%), none of whom were blinded, symptoms were induced only after eating a whole peach. The challenge was negative in 16 (25%) of the patients. Sunflower induced symptoms in 25 (35%) of the skin sensitive subjects, peanuts in 22 (31%), almonds in 28 (39%) and orange in six (9%). Other food items which induced symptoms were: apricot (two patients), apples

(three patients), grape (two patients), tomato (two patients), wheat (two patients), cantaloupe (one patient), carrot (four patients). One patient who was skin sensitive to wheat, tolerated wheat orally without symptoms, but had asthmatic attacks following inhalation of wheat powder. Four patients were skin sensitive to egg and two to milk, but neither provoked symptoms upon oral challenge. None of the patients with a history of itchy palate following peach developed objective symptoms following its consumption in the laboratory.

In 62 patients (87%), symptoms appeared within 1 h following the food ingestion, and in all of the responders within 3½ h. In patients who had clinical hypersensitivity to food, 66 (59%) reported gastrointestinal symptoms, 99 (89%) dermatological, and 36 (32%) respiratory symptoms (most of them nasal). None had cardiovascular symptoms, but a mild drop in blood pressure (mean of 10 mmHg) was seen in the majority of the patients; 75 of the responders (67%) had hypersensitivity to only one food, 20 (18%) to two food items, eight (7%) to three food items, five (4%) to four food items and the rest to five items or more.

Fourteen patients had symptoms following open challenge: two following exercise, six following peach, two to sunflower, two to peanuts, one to almonds and one to carrot.

Most patients presenting with an immediate adverse reaction to food had a history of seasonal rhinitis or asthma; 29 (24%) had only symptomatic food hypersensitivity; 107 (96%) also had positive skin test to inhalants.

Discussion

In patients presenting with history of immediate adverse reaction after food intake, clinical investigation is directed towards the identification of the specific food involved. In addition to patient history and general laboratory tests, skin testing with the food extracts and oral challenge with the suspected food are usually performed [1–3].

It is well-established in the paediatric population that a strong correlation exists between skin-prick tests and positive oral challenge. So far, there have only been a limited number of studies evaluating adult patients with a history of type I hypersensitivity to food. While some [4] disregard skin test in the evaluation of food allergy, others [5, 6] support the use of skin testing with food extracts in patients with a history of immediate adverse reaction to foods. In these studies, objective assessments of the symptoms were done by food challenges.

A large number of young adults suspected of having a food allergy, either by the patients themselves or their

physician, were referred to our Allergy Centre. Most presented with a recurrent short-lasting urticarial rash, often together with rhinitis, or shortness-of-breath. Occasionally, the urticaria was accompanied by gastrointestinal symptoms (vomiting, abdominal cramps or diarrhoea).

The majority of these patients were found atopic (by skin test) to environmental allergen. We are of the opinion that this marker could be used to further evaluate patients with adverse food reactions. When skin tests to food were done, all of the patients exhibited multiple sensitivity. In contrast to the paediatric population, in whom the rate of sensitivity to egg and milk is high, only a few patients were skin sensitive to this allergen. Most were sensitive to fruits and vegetables. When challenged with the food items to which they were skin sensitive, the patients sensitive to peach usually became symptomatic, while those skin sensitive to vegetables (soy, cucumber) were rarely symptomatic to the challenged food. In the skin sensitive patients, we could not find any correlation between the size of the weal and the probability of developing symptoms to the food.

In our patients suspected of food allergy, exercise was usually a factor. However, we were able to confirm food-related exercise-induced allergic reactions in only 12 patients. It is possible that the rate of exercise-induced allergic reactions is high after 10 years of age, because of the common participation in strenuous physical activity. We could not exclude the possibility that some of the patients had urticarial rash following exercise unrelated to food allergy. It has so far been claimed that type I hypersensitivity to food is common in the paediatric age group [1–3]. In the few studies reported in the adult population, the age of onset of the food allergy was not mentioned. In our patients, food allergy presented frequently at 10 years of age. This, as well as the fact that our patients were not allergic to milk or egg (also typical for the paediatric age group), emphasizes the fact that given certain circumstances (such as ingestion of particular foods at a specific age) synthesis of IgE to the food can be evoked. These patients can then become symptomatic when engaged in strenuous physical activity. In conclusion, type I hypersensitivity to food can occur later in life, when milk and egg are not the cause.

References

- 1 Bock SA, Atkins FM. Patterns of food hypersensitivity during sixteen years of double blind placebo-controlled food challenges. *J Pediatr* 1990; 117:561–7.
- 2 May CD. Objective clinical and laboratory studies of immediate hypersensitivity reactions to foods in asthmatic children. *J Allergy Clin Immunol* 1976; 58:500–15.

- 3 Sampson HA, Scanlon SM. Natural history of food hypersensitivity in children with atopic dermatitis. *J Pediatr* 1989; 115:23-7.
- 4 Bernstein M, Day ZH, Welsh A. Double-blind food challenge in the diagnosis of food hypersensitivity in the adult. *J Allergy Clin Immunol* 1982; 70:205-10.
- 5 Atkins FM, Steinberg SS, Metcalf DD. Evaluation of immediate adverse reaction to food in adult patients. I. Correlation of demographic laboratory and skin prick test data, with response to controlled oral food challenge. *J Allergy Clin Immunol* 1985; 75:348-55.
- 6 Atkins FM, Steinberg SS, Metcalf DD. Evaluation of immediate adverse reaction to food in adult patients. II. A detailed analysis of reaction patterns during oral food challenge. *J Allergy Clin Immunol* 1987; 75:356-63.
- 7 Norman PS. In vivo methods of study of allergy. In: Middleton E Jr, Reed CL, Ellis EF, eds. *Allergy: Principles and practice*, pp. 297-303. St. Louis, CV Mosby Co, 1983.
- 8 Bock SA, Buckley J, Holst A, May CD. Proper use of skin tests with food extracts in diagnosis of hypersensitivity to food in children. *Clin Allergy* 1977; 7:375-83.

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