

The pattern of sesame sensitivity among infants and children

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Recently, we found sesame to be a major cause of severe IgE-mediated food allergic reactions among infants and young children in Israel. The purpose of this study was to describe the different patterns of sesame sensitivity. We have identified three subgroups among our patients ($n = 32$). Group I ($n = 23$, M/F; 14/9) consisted of cases with IgE-mediated sesame allergy. The mean age of the first allergic reaction was 11.7 months. Although the main clinical manifestation was urticaria/angioedema ($n = 14$, 60%), anaphylaxis was the presenting symptom in seven (30%) patients; all of them were younger than 1 year. Sixteen (70%) were found to be allergic to other foods, and other atopic diseases were identified in 18 (78%) patients. Three patients 'outgrew' their allergy within 1–2 years. Group II ($n = 2$) included cases in whom sesame allergy was ruled out based on a negative skin prick test (SPT) together with a negative open oral challenge. Group III ($n = 7$) consisted of patients that were found to be SPT positive for sesame as part of a screening for other food allergies. Although sesame products have become fashionable in westernized countries, early exposure may cause sesame to share eventually the same 'notoriety and fate' as peanut – a major cause of severe food allergic reactions.

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The ingestion of foods containing sesame (*Sesamum indicum*) seeds or oil has spread to developed countries in recent decades. Common foods containing sesame are Middle Eastern dishes, bakery products, dips, salad dressing, and vegetarian foods. In addition, sesame oil has been used extensively in the pharmaceutical and cosmetic industries due to its presumably low antigenicity (1). This increasing consumption of sesame might be the reason for the growing frequency of reported cases of sesame-induced allergic reactions. Various types of reactions have been reported including IgE-mediated (2), anaphylaxis (3), occupational (4), and non-IgE-mediated (5) mechanisms.

Recently, we found sesame to be a major cause of severe IgE-mediated food allergic reactions among infants and young children in Israel (6).

In the present study, we report our experience with infants and children who present with either clinical manifestations suggestive of IgE-mediated

reactions or positive skin prick tests (SPT) to sesame.

Patients and methods

Thirty-two subjects were included in this study; twenty of them were described in part previously (6). All patients were investigated for suspected sesame allergy in the Pediatric Allergy/Immunology unit in the E. Wolfson Medical Center during the past 4 years (1998–2002). All of them had their initial evaluation at our clinic except for five patients (patients 7, 11, 14, 19, 20) that were diagnosed earlier by other physicians and sent to our clinic for re-evaluation due to recurrence of symptoms after consumption of sesame-containing products. Possible clinical manifestations included cutaneous symptoms [urticaria, angioedema, exacerbation of atopic dermatitis (AD)], gastrointestinal symptoms (vomiting, diarrhea), respiratory symptoms (cough, wheezing, rhinitis)

and anaphylaxis. Only patients who had symptoms within 2 h after exposure to sesame and positive SPT were diagnosed as having an IgE-mediated sesame allergy. We defined anaphylaxis as a severe, life-threatening systemic reaction, involving more than one organ system (7).

Diagnostic procedures

SPT. For sesame testing both commercial (Bencard, Mississauga, Ontario) sesame extract and brown sesame seed freshly crushed and diluted in physiologic saline (1 : 10 w/v) were utilized. For other foods, commercial extracts (Center Laboratories, Port Washington, NY, USA) were used as required. Positive (histamine 1 mg/ml) and negative (50% glycerosaline) controls were applied by the same technique. A wheal diameter of at least 3 mm larger than the negative control was considered positive.

Specific IgE antibodies. Antibodies to sesame were measured using the Phaebas CAP System (Pharmacia, Uppsala, Sweden). Concentrations of ≥ 0.35 kU_A/l were considered positive.

Oral challenge. Oral challenge was used only in cases where the required combination of the strict clinical criteria together with positive SPT was not diagnostic. In two cases, an open oral challenge with incremental doses of Halva (a sesame-based confection) was performed at 20-min intervals, up to a total dose of 20 g. This was done in a hospital set-up unit, which is fully equipped for cases of anaphylaxis. The patients were observed closely during the challenge and 2 h afterwards.

Results

Altogether we identified 32 cases with suspected sesame allergy. These patients can be divided into three subgroups based on clinical and SPT results (Table 1). Group I (n = 23) consisted of cases with proven IgE-mediated sesame allergic reactions. Group II consisted of patients (n = 2) who presented with a suggestive history of sesame allergy but SPT were negative. In both cases, sesame allergy was ruled out based on a negative oral challenge, and subsequent consumption of sesame-containing products without any reactions. Group III consisted of patients (n = 7) that were found to be SPT positive for sesame as part of screening for other food allergies (mainly cow's milk and egg). However, these results were considered clinically irrelevant based on multiple consumption of sesame-based foods without any problems. Of note, 4 out of 7 had AD. Group I consisted of 14 males and 9 females and the mean

age when they first experienced an allergic reaction to sesame was 11.7 months (range 4 months to 4 years). The clinical manifestations included 14 (60%) cases of urticaria with or without angioedema. Seven of them reported an acute exacerbation of AD as well. Anaphylaxis was the presenting symptom in 7 (30%) patients. All of them were under the age of 1 year. Only two patients had intestinal symptoms at presentation. Sixteen patients (70%) were found to be allergic to other foods including: cow's milk – 10, egg – 9, nuts – 5, peanut – 4, and soy, avocado, banana, and garlic – 1 each. Eighteen (78%) patients were found to have other atopic diseases such as AD – 8, allergic rhinitis (AR) – 9, bronchial asthma (BA) – 8, and a history of atopy in first-degree family members was reported in 14 (61%) patients. SPT with raw sesame extract was positive in 21/21 cases while the commercial extract was positive in only 12/15 patients. This observation has been reported previously (1). Sesame-specific IgE antibodies were detected in the sera of 12 out of 14 patients tested.

Discussion

We report on the largest detailed series of sesame-allergic patients. Presentation of sesame allergy was diverse including patients with anaphylaxis, highlighting the growing importance of this allergen worldwide.

Our data are cause for concern because a large portion of our patients (7/23, 30%) presented initially with anaphylaxis, and all of them were under the age of 1 year. In fact, in a recent study on food allergy among infants and young children in Israel, we found sesame to be second only to cow's milk as a cause of anaphylaxis (6). A dominant contribution to these findings could be the early exposure in life and the heavy consumption of sesame-containing foods in Israel (6). Kanny et al. also drew attention to the growing risk of sensitization to this allergen, occasionally as a 'masked' allergen (1).

A major concern, yet unresolved issue, is the natural history of sesame allergy. Whether it will follow the 'destiny' of cow's milk, egg, soy and wheat allergies that usually disappear by the age of 3 years, or in contrast will remain for life as with most cases of peanut, nuts, and fish allergies, is still unknown. In our study we were able to show that some infants can 'lose' their allergy within a few years. However, the size of our group is too small for any definitive conclusions, and only long-term prospective studies with

Table 1. Clinical and laboratory findings in patients with suspected sesame allergy

Patient no./sex	Age		Clinical presentation	Prick test (mm)		Specific IgE (kU _A /l)	Other food allergies	Atopy	Family history	Comments
	Symptom onset	Diagnosis		Raw	Con.					
1/F	10 mo	11 mo	Anaphylaxis (urticaria, angioedema, rhinitis, bronchospasm)	7/12	6/10	<0.35	Milk, egg		AR, BA	
2/F	6 mo	10 mo	Urticaria, AD exacerbation	4/10	5/12	<0.35		AD	AR, BA,	
3/M	8 mo	10 mo	Urticaria, AD exacerbation	5/15	ND	ND		AD Soy 4/6, peanut 5/5, egg 10/15, chicken 3/5		Resolved within 2 yr
4/M	8 mo	1 2/12	Vomiting, diarrhea	5/12	ND	5.71	Milk, egg			Resolved within 1–2 yr
5/F	7 mo	4 yr	Urticaria, angioedema, AD exacerbation	7/13	ND	24.7	Pine seeds, garlic, almonds	AR, BA, AD, cashew 5/12	AR	
6/F	9 mo	10 mo	Anaphylaxis (urticaria, angioedema, vomiting, apathy)	10/20	10/20	7.6	Milk, egg			
7/M	4 yr	12 yr	Urticaria, AD exacerbation	3/6	ND	1.3	Pecan, peanut, almonds	AD		
8/M	11 mo	12 mo	Anaphylaxis (urticaria, angioedema, vomiting, syncope)	7/17	ND	ND				
9/F	8 mo	1 10/12	Anaphylaxis (angioedema rhinitis, tearing, bronchospasm)	5/25	5/25	ND		AR	AR	
10/M*	5 mo	6 mo	Anaphylaxis (angioedema, dyspnea, bronchospasm, apathy)	5/17	ND	1.01	Banana, avocado	AD	AR, Food allergy	
11/M*	2 yr	29 yr	Near syncope, abdominal pain, vomiting	10/30	ND	11.7	Milk	AR		
12/F	10 mo	11 mo	Urticaria	4/8	8/15	ND			Food allergy	Resolved within 2 yr
13/M	10 mo	1 2/12	Urticaria, angioedema	4/10	Neg	11.83	Egg	BA	BA	
14/F	6 mo	8 6/12	Urticaria, Angioedema	ND	5/9	0.373	Almonds	BA, AR	BA	
15/M†	8 mo	8 mo	Urticaria	4/8	10/20	ND	Milk, egg	AD, wheat 7/15	AD, BA	

16/M†	1 2/12	6 yr	Urticaria, AD exacerbation	3/5	3/7	2.66	Egg	AD, AR	
17/M	8 mo	1 6/12	Urticaria, angiedema, AD exacerbation	7/12	15/25	0.38	Milk, soy egg, peanut, Milk	AD, AR, BA Almonds 7/15	BA, AR
18/M	1 yr	1 yr	Urticaria	3/10	Neg	2.31	Milk	AR, BA	AR
19/F	2 yr	14 yr	Urticaria, angiedema, AD exacerbation	10/20	10/20	ND		AD	
20/M	8 mo	15 yr	Urticaria, angiedema	7/25	10/20	3.86	Milk, peanut	AR, pecan 10/20, tomato 3/5	AR
21/M	4 mo	1 3/12	Anaphylaxis (urticaria, angiedema, apathy, syncope)	8/20	Neg	ND		BA	Food allergy, AR
22/F	9 mo	14 mo	Urticaria	5/10	5/15	ND	Milk, egg	AR, BA	AR
23/M	12 mo	24 mo	Anaphylaxis (urticaria, rhinitis, stridor, bronchospasm, syncope)		10/20	ND	Milk, egg, peanut	BA	
24/F	1 yr	2 7/12	Perioral rash	Neg	ND	ND			Negative oral challenge
25/F	8 mo	10 mo	Vomiting	Neg	Neg	ND	Egg		Negative oral challenge
26/F		11 mo	No symptoms		3/5		Egg	Milk 3/5, soy 2/3	Frequent intake without reaction
27/F		1 yr	No symptoms		7/10		Egg	AD, milk 4/5	Frequent intake without reaction
28/F		9 mo	No symptoms		10/20		Milk	AD, egg 4/6, wheat 5/10	Frequent intake without reaction
29/F		9 mo	No symptoms		10/15		Milk	AD, egg 4/7, peanut 15/30, wheat 6/10	Frequent intake without reaction
30/M		11 mo	No symptoms		3/4		Egg	Pecan 3/5, fish 3/5	Frequent intake without reaction
31/M		1 10/12	No symptoms		8/13		Egg, peanut	BA, AD	BA
32/M		11 mo	No symptoms		3/5		Egg, milk		AD, BA

*Patients 10 and 11 are a father and his son.

†Patients 15 and 16 are brothers.

No: number; mo: month; yr: year; com: commercial; AD: atopic dermatitis; AR: allergic rhinitis; BA: bronchial asthma; ND: not done; neg: negative.

subsequent oral challenge can shed light on this important aspect of food allergy.

The present literature on sesame allergy consists mostly of case reports (3–5). The largest, detailed report, which includes only 12 patients, was published by Kolop-Sarda et al. (2). Recently, Levy and Danon reported on 10 AD infants with sesame allergy in Israel (8). Sporik and Hill, in a reported letter, reported on 531 children (60% <2 years of age) with sensitization to sesame (9). However, skin sensitization to food allergens does not always correlate with clinical manifestations.

The use of sesame seeds/oil-containing products has spread through North America and Europe, probably due to the introduction of new trends such as vegetarianism, 'health food', and exposure to exotic foods. This may cause a significant increase of recognized sesame allergies including many anaphylactic reactions. Although sesame products have become fashionable in westernized countries nowadays, early exposure may eventually cause sesame to share the same 'notoriety and fate' as the peanut – a major cause of severe food allergic reactions.

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