



Letter

Sesame allergy in adults

Investigation and outcomes of oral food challenges

Sesame (*Sesamum indicum*) allergy is the most common seed allergy and has been increasingly reported worldwide.¹ The variation in prevalence between populations is likely due to different food habits and awareness. Similar to peanut, immunoglobulin E (IgE)-mediated sesame allergy begins early in life (usually before 2 years of age) and persists in 80% of patients.² Clinical manifestations range from mucocutaneous, respiratory, and gastrointestinal manifestations to life-threatening systemic anaphylaxis. Therefore, accurate diagnosis of sesame allergy is crucial but the value of skin prick tests (SPTs) and sesame-specific IgE (sIgE) has been questioned. Previous studies, largely performed in children, have suggested that neither test sufficiently predicts true allergy as determined by oral food challenges (OFCs).^{3–5} This is of particular concern because anaphylaxis has been reported in adult patients with negative SPT reactions and sIgE levels.³ We performed a retrospective evaluation of the utility of SPT, sIgE, and other clinical parameters in predicting sesame allergy confirmed by OFC reactions in adults.

We reviewed the clinical data of all patients who had undergone sesame OFCs at Guy's and St. Thomas' and Royal Brompton and Harefield NHS Foundation Trusts (London, United Kingdom) from 2010 to 2016. SPTs were performed with different sesame-containing products including a commercially available solution (Allergopharma, Darmstadt, Germany) or prick-to-prick testing with sesame seeds, Sesame Snaps (Anglo-Dal Ltd, Edgeware, United Kingdom), sesame oil, halva, and/or tahini. When multiple reagents for SPT were used, the result with the largest wheal diameter was used for analyses. The sIgE to sesame seed antibody was performed with the ImmunoCAP system (Phadia, Uppsala, Sweden). All patients underwent OFC with sesame seeds, Sesame Snaps, sesame oil, or tahini. The starting dose, subsequent increments, interval times, and a decision to obtain intravenous access were individualized for each patient after a clinical assessment. Severity of reactions was retrospectively graded from the clinical records according to the classification of Ring and Messmer.⁶ Association analysis with the Fisher exact test and independent-samples *t* test was used to compare categorical and continuous variables between patients with and those without sesame allergy.

Over the 6-year study period, records were available for 33 patients who underwent supervised sesame OFCs. Overall, the median age was 32 years (range 16–81 years) and the male-to-female ratio was 1:2. Sixteen (48%), 12 (36%), and 10 (30%) patients had a history of allergic rhinitis, asthma, and atopic dermatitis, respectively. Twenty-one patients (64%) had a suggestive history of reactions after exposure to sesame-containing

foods, whereas the remainder did not have a clear or previous exposure to sesame. Eleven patients (33%) had positive SPT reactions, defined as a wheal diameter of at least 3 mm; 13 patients (39%) had a positive sIgE reaction, defined as a level of at least 0.35 kUA/L; and 9 patients (27%) had positive SPT and sIgE reactions. There were 10 (30%) positive OFC reactions and further information is presented in Table 1. Half the patients (5 of 10) with positive OFC reactions had reactions of at least grade 3 in severity during their index reaction or OFC. Two serious reactions (patients 1 and 4) required 2 doses of intramuscular epinephrine for refractory hypotension.

Association analyses showed no significant differences in age ($P = .41$), sex ($P = .24$), history of reaction to sesame ($P = .26$), atopy (allergic rhinitis [$P = .06$], asthma [$P = .06$], atopic dermatitis [$P = .12$]), other food allergies ($P = .06$), or mean SPT diameters ($P = .06$) and sIgE values ($P = .25$) in patients with positive vs negative OFC reactions. Moreover, absolute mean SPT wheal diameters and sIgE values were smaller in those with positive (0.3 ± 1.0 mm, 0.16 ± 0.29 kUA/L) than in those with negative (1.4 ± 1.6 mm, 2.00 ± 4.85 kUA/L) OFC reactions. In this selected cohort, SPT had a sensitivity of 10.0% and specificity of 56.5% (diameter ≥ 3 mm as cutoff); and sIgE had a sensitivity of 10.0% and specificity of 42.9% (≥ 0.35 kUA/L as cutoff).

To the best of our knowledge, we present the largest cohort of sesame challenges performed in adults. There were no significant differences in SPT reactions, sIgE results, or studied clinical parameters between patients with and those without allergy. Of 10 with positive OFC reactions, 9 (90%) had undetectable sIgE changes and negative SPT reactions despite using different sesame sources, highlighting the poor discriminative value of these tests and the importance of OFCs. We recommend sesame OFCs in cases with a suggestive clinical history but negative SPT and IgE results and only after evaluation of risks and benefits for each patient. We also advise cautious graded protocols and consideration of prophylactic cannulation.

The poor sensitivity of sesame tests might be due to a lack of clinically relevant allergens in testing agents. Leduc et al⁴ identified hydrophobic oleosins (Ses i 4 and Ses i 5) as major sesame allergens and sensitization to oleosins seems to be associated with more severe systemic reactions. The poor performance of SPTs with commercial extracts might be attributed to the paucity of oleosins. Analogous to peanuts, the roasting process could increase the allergenicity of sesame proteins and therefore tahini (a toasted oil-based sesame seed paste) might represent an alternative agent for SPT.⁷ However, we did not find tahini to confer any additional value compared with other sesame sources, with all 7 patients tested with tahini in the positive OFC group having negative SPT results. Various sesame preparations are available for OFC and no evidence

Dr Skypala and Dr Till contributed equally to this work.

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Table 1
Clinical Summaries of 10 Patients With Positive Oral Food Challenge Results

Patient number	Sex/age (y)	Grade	Index reaction	Atopy; other food allergies	SPT wheal diameter (mm); source ^a	slgE (kU/L)	Cumulative dose	OFC reaction	Treatment
1	F/30	1	Rash over hands and face, loss of consciousness	Nil; nil	0; solution	<0.35	6.5 g (seed)	Perioral tingling, palpitations, flushing, hypotension (SBP 70 mm Hg)	2 doses of IM epinephrine, IV antihistamines and corticosteroids
2	F/39	2	Tongue swelling with throat constriction, generalized urticaria	Nil; nil	0; solution, seed, tahini	<0.35	1.75 g (Sesame Snaps)	Urticaria	IV antihistamines and corticosteroids
3	M/43	2	Neck rash, abdominal pain, generalized swelling, throat tightness, dyspnea	Nil; nil	0; solution, oil, sesame snaps, halva	<0.35	6.6 g (Sesame Snaps)	Urticaria, flushing	Oral antihistamines and corticosteroids
4	M/16	3	Sesame naïve, history of contact rash in infancy	Allergic rhinitis, asthma, atopic dermatitis; peanut and egg	3; solution	0.91	6.5 g (Sesame Snaps)	Urticaria, facial angioedema, hypotension (SBP 60 mm Hg)	2 doses of IM epinephrine, IV antihistamines and corticosteroids
5	F/16	3	Urticaria, facial swelling	Nil; nil	0; solution, oil, seed, tahini	<0.35	1 mL (sesame oil)	Palmar erythema, pruritus, coughing with wheeze on auscultation (PEFR 480 → 360 L/min)	Salbutamol nebulizer, oral antihistamines and corticosteroids
6	F/27	3	Flushing, pruritus, diarrhea (after nonspecific foods)	Nil; soy	0; seed, tahini	<0.35	¼ tablespoon (tahini)	Urticaria, abdominal pain	—
7	F/35	3	Facial swelling, throat tightness, hypotension	Nil; nil	0; seed, oil, tahini	<0.35	5 mL (tahini)	Urticaria	—
8	M/50	2	Generalized pruritus, lip swelling, throat tightness	Nil; nil	0; tahini	<0.35	0.25 mL (tahini)	Urticaria	Oral antihistamines
9	M/54	3	Facial swelling, dyspnea, feeling faint	Allergic rhinitis; nil	0; seed, oil, tahini, oil skin test	<0.35	1 mL (tahini)	Urticaria, periorbital angioedema	Oral antihistamines and oral steroids
10	M/32	1	Flushing, facial swelling	Nil; nil	0; seed, tahini	<0.35	5 mL (tahini)	Urticaria, flushing	Oral antihistamines

Abbreviations: F, female; IM, intramuscular; IV, intravenous; M, male; OFC, oral food challenge; PEFR, peak expiratory flow rate; SBP, systolic blood pressure; slgE, specific immunoglobulin E; SPT, skin prick test.

^aSPT values (except patient 4) for all tested allergens were 0 mm.

for superiority of any one form. From our experience, we recommend Sesame Snaps as a palatable and convenient preparation that has reliably led to positive challenge results. The utility of additional investigations such as basophil activation tests, “contact tests” with sesame oil, and component-resolved diagnosis with Ses i 1 warrant further investigation.^{8–10}

Our study is limited by its retrospective nature and non-standardized use of various sesame sources for SPT and OFC. Using the largest value for SPT (when multiple results are available) for analysis could lead to underestimation of specificity.

In conclusion, our study adds to previous reports and confirms that SPT and slgE results are not predictive of sesame allergy in adults. No studied clinical parameters were different between patients with and those without allergy. OFC remains essential for diagnosis but should be conducted cautiously under experienced supervision because of the inherent severity and unpredictability of sesame reactions. Further work to improve the diagnostic accuracy of skin and serum testing is needed.

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