Poppy seed allergy: A case report and review of the literature

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ABSTRACT

Seeds of the poppy plant are traditionally used in bakeries, e.g., *for garnishing bread or making cakes. Reports of allergic type I sensitivity to poppy seed are rare. According to the literature, severe reactions may occur, affecting mainly patients with allergy to pollens or nuts. We report on a 16-year-old boy who has developed erythema and angioedema, conjunctivitis, and dyspnea due to inhalation of poppy seed. Skin-prick tests were positive for poppy seed, hazelnut, and chickpea. The concentration of specific IgE for poppy seed, hazelnut, and peanut were 3.36 kU/L (class 2), 1.5 kU/L (class 2), and 6.17 kU/L (class 3), respectively. Allergic reactions associated with inhalation of food allergens have been reported for some foods but not for poppy seed. This is the first report on inhalative allergy to the poppy seed. Although poppy seeds are not commonly used, we underline the possible importance of such rare and often hidden sources of allergens, especially in patients with nut allergy.*

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The most common members of the botanic family Papaveraceae are corn poppy, poppy seed, prickly poppy and greater celandine. Seeds of the poppy plant are traditionally used in bakeries, *e.g.*, for garnishing bread or making cakes. Ingestion of poppy seed has been reported rarely as the cause of immediate-type hypersensitivity.[1–8] Furthermore, asthmatic response due to exposure to poppy seeds through inhalation has not been reported before. Here, we report a systemic reaction, including respiratory symptoms, caused by inhalation of poppy seed allergens in a boy with asthma.

CASE REPORT

We report on a 16-year-old boy who has developed angioedema, urticaria, pruritus, rhinorrhea, sneezing, cough, wheezing, and dyspnea within 5 minutes after he ate a piece of poppy cake for the first time in his life, when he was 7 years old. Then, the poppy seed was eliminated from his diet. Nevertheless, although he has not ingested poppy seed himself he has felt erythema and angioedema, conjunctivitis, and dyspnea whenever someone next to him has eaten poppy seed. Moreover, he had dyspnea whenever he studies on a table where poppy seed has been eaten previously. Last, he had pruritus in his eyes, nose, and palate; wheezing; and dyspnea due to ingestion of two pieces of crisps with poppy. He also has had urticaria and dyspnea due to ingestion of hazelnuts and peanuts since he was 13 years old. Although he has had urticaria, angioedema, and dyspnea after ingestion of chickpea and lentil when he was 7 years old, he can eat these foods without any reaction now. He has been treated for his asthma since he was 5 years old.

Skin-prick tests were positive for poppy seed (wheal reaction diameter, 6 × 8 mm), hazelnut (6 × 6 mm), and chickpea (4 × 4 mm; ALK, Allergologisk Laboratorium A/S, Horsholm, Denmark). The surveillance for other inhalant allergens including grass, trees, weed pollens, *Dermatophagoides pteronyssinus*, *D. farinae*, animals, molds, and other food allergens has revealed negative results. The concentrations of specific IgE for poppy seed, hazelnut, and peanuts were 3.36 kU/L (class 2), 1.5 kU/L (class 2), and 6.17 kU/L (class 3), respectively (Dr. Fooke, Laboratarien GmbH, Neuss, Germany). Oral food challenge with poppy seed has not been performed because the history was concordant with anaphylaxis and the challenge was contraindicated.

DISCUSSION

Reports of allergic type I sensitivity to poppy seed are rare. The poppy flower, a member of the Papaveraceae family, grows as a weed in cereal fields and along country roads. Clinical symptoms in allergic patients may affect the skin, mucosa, and bronchial and gastrointestinal tract, as with other food allergens. According to the literature, severe reactions often occur, affecting mainly patients with allergy to pollens or nuts.[7,8] The allergen is highly thermostable, and it is difficult to destroy it by cooking.

Anaphylactic reactions after consumption of poppy cake were first reported by Wagner and Ring.[1] The clinical symptoms ranged from itching around the mouth and lips, nausea, and dyspnea to anaphylactic

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Table 1 **Review of the literature and the demographic characteristics of our case**

Author	Case (*n*)	RAST (Poppy; kU/L; Class)	Symptoms					Pollen	Exposure	Other Food	Age (yr)
			Local	Skin	Abdominal	Respiratory	Anaphylaxis				
Jensen-Jarolim *et al.*[8]	11	+	8/11	9/11	4/11	7/11	1/11	9/11	11/11 Ingestion	9 Nuts, 1 sesame seed, 1 soya, 1 kiwi, 1 orange, 1 lemon	5–40 (range)
Vocks *et al.*[7]	5	+		3/5	1/5	2/5	2/5	2/5	5/5 Ingestion	5 Hazelnuts, 1 sesame seed, 5 rye grain, 1 apple	11–33 (range)
Wagner and Ring[1]		+		+	+	+	+		Ingestion	Nuts	
Kalyoncu and Stalenheim [2]	1	+ (5)				+		None	Ingestion or inhalation	Rice, tomato	27
Gamboa *et al.*[3]	1			+					Contact		
Crivellaro *et al.*[6]	1	+		Severe systemic reaction					Ingestion		
Frantzen *et al.*[4]	1	1.69 (2)		+	+	+		None	Ingestion	Nuts	52
Kütting *et al.*[5]	1	13.4 (3)		+			+	None	Ingestion + exercise	—	46
Our case, Keskin and Sekerel	1	3.36 (2)		+		+	+	None	Ingestion or inhalation	Nuts	16

reaction. The diagnosis was supported by prick test and radioallergosorbent test. In 1993, Kalyoncu and Stalenheim reported on a woman with atopic dermatitis who had dyspnea and swelling of her throat when eating ice cream with poppy seed topping.[2] In 1997, Gamboa *et al.* reported on an atopic patient who presented with a history of contact urticaria and angioedema after contact with poppy flowers.[3] In 2000, Frantzen *et al.* presented a 52-year-old woman who developed epigastric pain, angioedema, and respiratory distress a few minutes after eating a piece of poppy cake.[4] In another study, a 46-year-old man who had generalized urticaria after poppy seed cake ingestion only in combination with physical exercise was reported.[5] It has been shown that, the degree of cross-reactivity among kiwi, sesame seeds, poppy seeds, hazelnuts, and rye grain was very high.[7] In another study, the 40- and 45-kDa allergens that were glycoproteins, containing IgE binding moieties, and cross-reacting homologues of pollen allergens including Bet v 1 and profilin were detected in poppy seed extract.[8] Summary of the literature in poppy seed allergy is given in Table 1.

It is well known that the mechanism of death in fatal anaphylaxis induced by foods usually is profound bronchospasm and this reaction could be more severe in patients with asthma. Allergic reactions associated with inhalation of food allergens have been reported for fish, milk, peanuts, chicory, mushroom Boletus edulis, chickpea, buckwheat, and egg white protein[9–12] but not for poppy seed.

In conclusion, this is the first case of poppy seed allergy associated with inhalation. Although poppy seeds are not commonly used, we highlight the possible importance of such rare and often hidden sources of allergens, especially in patients with nut allergy. Therefore, a detailed clinical history is extremely important to identify the responsible allergen. Discovering the poppy seed as an inhalative allergen causing bronchospasm in a patient with asthma and nut allergy may be lifesaving.

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