
Case report

Pectin anaphylaxis and possible association with cashew allergy

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Background: Inhalation of pectin has been identified as a cause of occupational asthma. However, allergic reactions to orally ingested pectin have not been reported.

Objectives: To describe a child with pectin-induced food anaphylaxis and to discuss its possible relationship to cashew allergy.

Methods: A 3½-year-old boy developed anaphylaxis once after eating cashews and later after eating a pectin-containing fruit “smoothie.” He also has a history of generalized pruritus after eating grapefruit. Skin tests or radioallergosorbent tests (RASTs) were performed to pectin and other suspected food allergens.

Results: The child had a positive skin prick test reaction to pectin and a high RAST reaction to cashew and pistachio. He had a low-level positive RAST reaction to grapefruit. Results of allergy tests for the other potential food allergens were negative. The pectin in the smoothie was confirmed to be of citrus origin. Review of previous case reports of pectin-induced occupational asthma revealed several patients with allergies to and cross-reactivity with cashew.

Conclusions: Ingestion, not only inhalation, of pectin can cause hypersensitivity reactions. Cashew, and possibly pistachio, allergy may be associated with pectin allergy, and the possibility of pectin allergy should be considered in cashew- or pistachio-allergic patients who have unexplained allergic reactions.

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INTRODUCTION

Pectin allergy is a rare cause of occupational asthma.^{1–4} We describe a child with anaphylaxis to ingested pectin and discuss its possible relationship to cashew allergy.

CASE REPORT

A 3½-year-old boy developed respiratory distress, pruritus, and angioedema immediately after drinking a strawberry fruit “smoothie.” The ingredients of the drink included milk, corn, apple, and pectin, as well as natural and artificial flavors and vitamins. At 2 years old the patient developed respiratory distress, abdominal pain, diarrhea, urticaria, and angioedema after eating cashews. He also has a history of pruritus that intermittently occurred after eating grapefruit.

Skin testing was performed using a commercially available pectin product (Ball Fruit Jelly; Jarden Home Brands, Muncie, IN) using 0.25 g of powder in 30 mL of water. Per the manufacturer, it contained a mixture of citrus pectins in a proportion that varied between lots. The patient developed an immediate wheal (with pseudopods) and flare, with a maximum wheal diameter of 16 mm compared with 10 mm for histamine and 3 mm for diluent (Fig 1). Results of concomitant pectin skin tests on 4 controls (the patient’s



Figure 1. Skin prick test reactions in a 3½-year-old boy to pectin (P), saline (S), and histamine (H). Maximum wheal diameters: P, 16 mm; S, 3 mm; and H, 10 mm.

mother and sister and 2 clinic staff) were negative. Results of radioallergosorbent testing (RAST) to cashews and pistachios were greater than 100 KU/L each and negative to other tree nuts and peanuts. The RAST reaction to grapefruit was low positive (2.22 KU/L). Results of skin prick testing and RAST to milk, corn, and apples were negative.

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DISCUSSION

Inhalation of pectin can cause occupational asthma and rhinitis,¹⁻⁴ and there is 1 report of anaphylaxis to the pectin excipient in a barium enema.⁵ Allergic reactions to ingested pectin have not been reported, to our knowledge.

Pectin is primarily an emulsifier for jellies, candies, and other thickened foods. Although present in many fruits and vegetables, commercially it is usually derived from citrus fruit and apple peels. The manufacturer of this "smoothie" confirmed that its product's pectin is derived from a blend of citrus fruits in varying proportions. The patient's positive skin prick test reaction and immediate symptoms suggest an IgE-mediated reaction. His vague history of intermittent grapefruit-induced pruritus and a low positive RAST reaction to grapefruit may further support the possibility of citrus pectin allergy.

There have been reports of concomitant pectin and cashew allergy. Rasanen et al⁴ reported pectin-induced occupational asthma in a yogurt dairy worker with preexisting cashew and pistachio allergies. This worker also had allergic reactions and a positive skin test result to oranges. Kraut et al² described a candy maker with pectin-induced occupational asthma and rhinitis and a preexisting cashew allergy. Hernandez-Garcia et al⁵ described an adult with anaphylaxis to the pectin component of a barium enema who also had positive skin test result and RAST reactions to cashew, pistachio, and orange peel. These authors reported positive pectin skin test results,^{2,4,5} pectin-specific IgE,⁴ and RAST inhibition between pectin and cashew.^{4,5} We did not perform a food challenge to pectin owing to the severity of his reaction. However, because the source of pectin varies from lot to lot, it may be difficult to draw a valid conclusion from a pectin challenge.

Allergies to ingested pectin are rare but perhaps are underestimated because a fruit-derived carbohydrate may be over-

looked as a cause of allergies. Cashews and pistachios belong to the family Anacardiaceae and are known to share common antigenic determinants.⁶ The possibility of pectin allergy should be considered in patients with unexplained allergic reactions, especially in cashew- or pistachio-allergic individuals.

REFERENCES

1. Westphal W, Muller E, Schubeler K, Becker WM, Fasske E, Schlaak M. Exogenous allergic asthma following pectin exposure: a new occupational allergen [in German]. *Pneumologie*. 1990;44:S337-S338.
2. Kraut A, Peng Z, Becker AB, Warren CPW. Christmas candy makers asthma: IgG4-mediated pectin allergy. *Chest*. 1992;102:1605-1607.
3. Jaakkola MS, Tammivaara R, Tuppurainen M, Lahdenne L, Tupasela O, Keskinen H. Asthma caused by occupational exposure to pectin. *J Allergy Clin Immunol*. 1997;100:575-576.
4. Rasanen L, Makinen-Kiljunen S, Harvima RJ. Pectin and cashew nut allergy: cross-reacting allergens? *Allergy*. 1998;53:626-628.
5. Hernandez-Garcia E, de la Heras M, Bartolome B, et al. Anaphylaxis caused by the pectin component of barium sulphate suspension [abstract]. *J Allergy Clin Immunol*. 2004;112:S243.
6. Fernandez C, Fiandor A, Martinez-Garate A, Martinez Quesada J. Allergy to pistachio: crossreactivity between pistachio nut and other Anacardiaceae. *Clin Exp Allergy*. 1995;28:1254-1259.

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