

Systemic Anaphylaxis to a Hidden Cross Reactive Food in a Surgical Resident With Latex Hypersensitivity

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ABSTRACT

Background: Health-care professionals are at an increased risk for severe latex hypersensitive reactions. Hidden cross-reactive foods can trigger systemic anaphylaxis. It is well recognized that latex-allergic individuals may also be allergic to certain foods due to cross-reactive antigens. **Objective:** We describe a case of a 30-year-old surgical resident who developed a systemic anaphylactic reaction after ingesting snack crackers kept in close proximity to a bowl of guacamole. **Results:** The patient, who was highly sensitive to latex, was cautioned to avoid cross-reactive foods and to carry epipen and diphenhydramine with him at all times. Progressive anaphylaxis developed in spite of self-administration of epinephrine and prior counseling to avoid latex products, bananas, walnuts, avocados, and chestnuts. **Conclusion:** This case illustrates the severity of cross-reactive immunoglobulin E mediated food hypersensitivity in health-care workers who are strongly allergic to latex protein. (Pediatr Asthma Allergy Immunol 1997;11[2]:141-146.)

INTRODUCTION

LATEX HYPERSENSITIVITY HAS BEEN KNOWN to cause systemic reactions, contact urticaria, and contact dermatitis with an eczematous keratotic dermatitis. Severe reactions can occur in health-care workers who experience recurrent exposure to latex protein during surgery.⁽¹⁾

CASE REPORT

A 30-year-old Indian male who is currently enrolled in a surgical residency, initially presented to our department with a history of three episodes of anaphylaxis to latex gloves. Each episode would start with redness and itching of his hands, then progress to generalized urticaria and respiratory distress. On all three occasions, the patient required medical treatment with epinephrine, diphenhydramine, and solumedrol. In

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addition to the anaphylactic episodes, the patient also had a history of developing hives on his hands after using latex gloves on numerous occasions.

The patient had a past history of bronchial asthma for which he was being treated with intermittent beclomethasone and albuterol inhalers. He also had a history of allergic rhinitis for which he was intermittently given terfenadine. The patient's history was also significant for eczematous dermatitis and an anaphylactic reaction after eating avocado.

At the initial visit, a physical examination revealed a well-nourished male, who was comfortable at rest. His vital signs were normal. On nasal examination, there was evidence of pale bluish mucosa and viscous mucus consistent with allergic rhinitis. Examination of the respiratory, cardiovascular, and neurologic systems showed that these systems were normal. Examination of the skin was significant for eczematous dermatitis of both legs (Fig. 1). Laboratory evaluation was significant for in vitro specific immunoglobulin E (IgE) to latex with a Latex Ratest = 11, 120 cpm, or a score of 4 interpreted as high sensitivity.

Allergy skin prick testing was 4⁺ for timothy and rye grass, 4⁺ for *Dermatophagoides farinae*, 3⁺ for dog epithelium, and 2⁺ for *D. pteronyssius*.

The initial differential diagnosis of distinct entities included:

- Allergic rhinitis
- Asthma
- Eczematous dermatitis



FIG. 1. Eczematous dermatitis present on the lower right leg.

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- Contact urticaria
- Systemic anaphylaxis
- Food hypersensitivity.

Various etiologic factors included:

- Inhalant-induced rhinitis secondary to grass, *D. farinae*, *D. pteronyssius*, or dog epithelium
- A cross-reactive food hypersensitivity reaction
- Inhalant or irritant-induced asthma
- Latex-induced rhinitis, asthma, and contact urticaria, with progression to systemic anaphylaxis.

CLINICAL COURSE

The patient was counseled concerning the necessity to avoid all latex-containing products, and also of the importance of avoiding bananas, walnuts, avocados, and chestnuts. The patient has previously anaphylaxed after eating avocados. Although no skin testing or radioallergosorbent test (RAST) to the other foods had been performed, we counseled our patient to avoid these foods because he was highly latex sensitive and cross reactions are known to exist between these foods and latex. He was advised to carry self-injectable epinephrine and diphenhydramine at all times.

He avoided latex products carefully although this was very difficult because of his surgical profession. After counseling, the patient had one more episode of anaphylaxis. He was at a party and was eating snacks kept alongside a bowl of guacamole, which contains avocado as one of its ingredients, when he suddenly developed nasal stuffiness, itching, and then respiratory distress, despite the use of his epipen and diphenhydramine. The patient required an emergency room visit for more epinephrine, diphenhydramine, and sol-medrol.

DISCUSSION

Latex allergy is a hypersensitivity response to allergens present in natural rubber.

More than 99% of natural rubber is obtained from the milky sap or latex of the commercial rubber tree, *Hevea brasiliensis*. There are many other species of plants that produce rubber, but only *H. brasiliensis*, and the guayule bush *Parthenium argentatum* produce rubber in commercially significant quantities.⁽²⁾

Latex allergy can present in a variety of ways. Clinically the patient can present with contact dermatitis, urticaria, rhinoconjunctivitis, bronchospasm, or even anaphylaxis.⁽³⁾ Table 1 illustrates IgE-mediated risk groups.⁽²⁾ There are many different routes by which a person can be exposed to latex products. This includes cutaneous, percutaneous, mucosal, and parenteral transfer of antigen. In a study in our center, we initially evaluated 15 latex-hypersensitive subjects, ages 8–60 years, by history, questionnaire, physical examination, and sensitive radioimmunoassay for latex hypersensitivity.⁽⁴⁾ Most subjects were health-care workers followed by those with allergic rhinitis, urticaria, asthma, and spina bifida. Counseling to avoid latex products and cross-reactive foods was performed.⁽⁴⁾ Contact dermatitis, or type IV reactions, have very commonly been seen in health-care workers because of their wearing rubber gloves at work. Contact dermatitis to condoms has been reported in both males and females. Other conditions that may fall into the

TABLE 1. IgE-MEDIATED LATEX ALLERGY RISK GROUPS

-
- | |
|----------------------------------|
| • Spine bifida patients 10%–50% |
| • Health-care workers 5%–10% |
| • Rubber industry workers 5%–10% |
| • Others |
-

Source: Slater JE Current Views. Sept. 1994

classification of eczematous dermatitis include seborrheic dermatitis and chronic hand eczema caused by allergic or irritant-contact dermatitis or psoriasis.

Delayed hypersensitivity to manufactured latex is mediated by skin Langerhans cells that present antigen to helper T cells, which release cytokines.⁽⁵⁾ In a preliminary study in our division, latex-stimulated cellular proliferation and T-cell-related circulating cytokine levels were measured in latex subjects.⁽⁶⁾ The cell proliferation assay was a modified quantitative XTT proliferative assay utilizing mitochondrial dehydrogenase as an in vitro correlate of type IV delayed hypersensitivity. This assay was able to detect cellular proliferation in 3 patients with type I or type IV reactions after 4 hours.⁽⁶⁾ The patient described in this case had an eczematous keratotic dermatitis, which could represent a type IV contact dermatitis. Binding of latex antigen to specific receptors on T and B cells can result in the elaboration of latex-specific antibodies. B-cell antibodies are dependent on T-cell help via interleukins such as interleukin (IL)-4.⁽⁶⁾ Another group of subjects in whom contact dermatitis has been frequently reported is rubber factory workers. It is believed that these type IV reactions are most probably caused by chemicals, such as mercaptobenzothiazole and tetramethylthiuram, that are added during rubber processing.

Mucosal exposure commonly occurs in patients with spina bifida and urogenital abnormalities because of the need for repeated bladder catheterization. This class of patients most commonly presents with type I reactions in anaphylaxis. The New England Myelodysplasia Association surveyed 187 families in five myelodysplasia clinics and found that 10%–18% of patients had experienced acute allergic reactions to rubber products.⁽⁷⁾ In a study of 16 health-care workers and of 3 subjects with spina bifida and latex allergy, we detected elevated serum IL-4 levels.⁽⁸⁾ IL-4 is a T-cell cytokine that regulates IgE production and immune response to allergens in atopic subjects.⁽⁹⁾ We have detected IL-4 in atopic subjects with atopic dermatitis.⁽⁹⁾ In our own institution, we found certain foods have now been shown to cross react with latex. These foods include bananas, avocados, chestnuts, walnuts, and kiwis.

Subjects may experience itching of the throat or mouth, swelling of the lips, or tightness in the throat. Table 2 illustrates the various foods that have been known to cross react with latex. Ahlroth et al. reported on cross reacting allergens in natural rubber latex and avocado. The large number of inhibitable proteins in immunoblot experiments and clinical observations from skin-prick tests have suggested considerable immunologic cross reactivity between natural rubber latex and avocado.^(10,11)

A history of allergy to certain other foods in the latex-allergic individual has also been reported for papaya, melon, apple, pear, peach, plums, tomatoes, potatoes, cherries, figs, celery, and hazelnut.⁽¹²⁾ Anaphylaxis to carrageenan commonly ingested in milk and pharmaceutical products, such as barium enema solution, has been reported as a pseudolatex allergy.⁽¹³⁾

TABLE 2. IgE-MEDIATED LATEX ALLERGY CROSS REACTIVITY

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- Bananas
 - Avocados
 - Chestnuts
 - Kiwis
 - Walnuts
 - Papayas
 - Melons
 - Apples
 - Pears
 - Peaches
 - Plums
 - Tomatoes
 - Potatoes
 - Cherries
 - Figs
 - Celery
 - Hazelnuts
-

Modified from Slater JE Current Views, Sept., 1994 Ref. 12.

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An interesting possibility is that the presence of significant eczematous dermatitis on the lower extremities predisposed this patient to further latex protein absorption at a distant site in the operating room. This increased absorption caused by skin-barrier breakdown in addition to airborne-latex exposure via the respiratory tract and direct contact with latex may have contributed to a more severe reaction on ingesting a small amount of cross reactive protein such as avocado.

DIAGNOSIS

Diagnosing latex allergy is a growing and significant problem. Many health-care workers are not aware of the problem and many staff are not familiar with how to handle such patients.

Taking a detailed history is the first and most important step in the diagnosis. Testing can be done based on the modes available. In the United States there is no Food and Drug Administration approved material for skin testing. Therefore, in vitro RAST or enzyme-linked immunoabsorbent assay can be performed. These tests have a greater safety profile but are less sensitive and have a long turnover time compared to skin testing.

In certain centers, skin testing is being performed on a research basis using extracts from latex gloves. This type of testing has been associated with anaphylactic reactions, and must be performed with extreme caution.

MANAGEMENT

The management of latex-allergic patients including counseling to provide information about latex products, alternative products, and the existence of cross reacting foods.

Anaphylactic episodes need to be treated with appropriate medications such as epinephrine, antihistamines, and steroids.

CONCLUSION

Our case presentation serves to highlight the severity of cross-reactive, IgE-mediated food hypersensitivity in individuals who are strongly positive to latex protein. Despite our patient's best efforts to avoid cross reacting foods, the avocado that was "hidden" in the guacomole was enough to precipitate an anaphylactic reaction.

Education of health-care workers as well as of patients is key in diagnosing, managing, and, most important of all, preventing this life-threatening reaction.

Note: The American College of Allergy, Asthma and Immunology has a Special Bulletin on Latex Allergy with questions and answers, which can be ordered through the College (85 West Algonguin Road, Suite 550, Arlington Heights, IL 60005).

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