

Food-dependent exercise-induced anaphylaxis to corn

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Sections

- [Case Report](#)
- [Discussion](#)
- [References](#)
- [Publishing and Reprint Information](#)
- [Articles with References to this Article](#)

Abbreviation used

FDEIA Food-dependent exercise-induced anaphylaxis

Since the initial report in 1979,¹ the clinical syndrome of food-dependent exercise-induced anaphylaxis (FDEIA) has been well described, and numerous foods (e.g., celery, eggs, grapes, peaches, shellfish and wheat) have been implicated in this clinical entity.² The diagnosis of FDEIA is made primarily on the basis of history and may be confirmed by exercise challenge. Strenuous exercise is a requirement for development of symptoms, and typical age of onset is adolescence or young adulthood. Most patients with FDEIA also have positive skin prick test responses to the implicated food. Those that do not have an IgE response to food are thought to have exercise-induced anaphylaxis independent of food. Patients with FDEIA may be distinguished from those with cholinergic urticaria because they exhibit the following: systemic manifestations (including collapse, upper airway tract obstruction, or abdominal pain), characteristic urticaria (10 to 15 mm diameter wheal as compared with punctate for cholinergic urticaria), and a lack of symptomatic response to warm baths or other increases in body temperature.

Case report

A 15-year-old girl with asthma and allergic rhinitis was referred for further evaluation of a recent episode of anaphylaxis while exercising. In October, immediately following a lunch consisting of iced tea, grapes, and El Molenito brand taco chips (containing stone ground corn, sea salt, and slaked lime), she went for a 9-minute run around a lake near her school. On completion of this run, while walking back to school, she experienced severe sneezing. She took one tablet of Actifed (triprolidine-pseudoephedrine) after which she developed scalp and facial pruritis. This progressed to facial swelling and diffuse urticaria followed by a sensation of throat thickening and dyspnea. The emergency medical service was called, and she was found to be hypotensive with tachycardia. Oxygen, epinephrine, diphenhydramine, and methylprednisolone were administered, and she was admitted for overnight observation.

Past medical history was significant for mild asthma with triggers, including grass, cats, exercise, and upper respiratory infections. She was noted also to have allergic rhinitis. In addition, there was a strong family history of anaphylaxis, with triggers unknown in her paternal grandmother's family. Physical examination findings were unremarkable.

Pulmonary function testing was normal. Skin prick testing showed positive reactions to codeine (wheal/erythema = 4/0), wheat (12/15 with pseudopodia), corn (4/10 with pseudopodia), crushed taco chips (5/10), timothy grass (25/40 with pseudopodia), sagebrush (10/20 with pseudopodia), and Russian thistle (3/10 with pseudopodia). She had negative reactions to all other foods and common aeroallergens tested.

Treadmill exercise challenge was undertaken twice. Initially, a fasting treadmill exercise challenge with the standard Bruce protocol was done.³ A week later, a treadmill exercise challenge was done 40 minutes after ingestion of 30 gm El Molenito brand taco chips. This was not done in a blinded manner because it was felt to be unnecessary given the objective findings by history. Heart rate, oxygen saturation, blood pressure, and electrocardiogram were measured. For the first challenge, the patient exercised for 12 minutes to a maximum heart rate of 195 beats per minute. The resting and postexercise electrocardiogram and spirometry were normal. During exercise, she exhibited a normal blood pressure response without oxygen desaturation, and the challenge was tolerated well with no development of symptoms. For the second challenge, the patient exercised for 14 minutes to a maximum heart rate of 202 beats per minute. At maximal exercise, she had diffuse pruritis, light-headedness, and a sense of fullness in her nasal passages. She then progressed to mild left facial and periorbital swelling. Intravenous diphenhydramine (50 mg), intravenous Solu-Cortef (100 mg), and subcutaneous epinephrine (0.4 mg) were administered immediately, with subsequent rapid resolution of symptoms. Resting and postexercise electrocardiogram and spirometry remained normal. Also, she had a normal blood pressure response without oxygen desaturation throughout the event.

The patient was instructed to avoid eating corn or products with corn for at least 6 hours before exercise and to always carry an epinephrine kit when exercising. Although exercise was not discouraged, she was told to discontinue exercise after development of any unusual symptoms similar to those experienced.

This patient did well with these instructions until 1 year later when she had an episode of anaphylaxis to corn without need of exercise. She apparently ate a large number of taco

chips late in the evening before going to bed. Shortly after, she developed a sense of thickening in the throat followed by gastrointestinal complaints, including nausea and cramps. This then progressed to include severe dyspnea. The emergency medical service arrived and administered epinephrine with complete and rapid resolution of symptoms. Of note, this patient had not exercised before having these symptoms. Since this episode, there have been no further anaphylactic episodes with strict avoidance of corn or products with corn.

Discussion

This is the first case documented by challenge results of FDEIA to corn. The patient in this case report has several features characteristic of FDEIA. Not only did she have symptoms with exercise almost immediately after ingestion of food, but she also had systemic collapse. In addition, she had a positive skin test response to corn, with a subsequent positive exercise challenge response. With avoidance of corn ingestion before exercise, she was able to exercise without difficulty for a period of 1 year. Interestingly, in spite of the highly positive wheat skin test response, she was able to consume wheat without any adverse effect. This is consistent with the well-known fact that a large proportion of positive allergy skin test responses to foods are clinically irrelevant. Finally, with this case, it has been demonstrated that FDEIA may occasionally progress to food-induced anaphylaxis independent of exercise.

References

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Publishing and Reprint Information

- From ^athe Division of Allergy, Asthma, and Immunology, Scripps Clinic, La Jolla; and ^bthe Department of Medicine, University of Calgary, Calgary.
- Reprints will not be available from the authors.
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Articles with References to this Article

This article is referenced by these articles:

Double-blind, placebo-controlled corn challenge resulting in anaphylaxis

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The maize major allergen, which is responsible for food-induced allergic reactions, is a lipid transfer protein

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