

Systemic Anaphylaxis After Ingestion of a Psyllium-Containing Breakfast Cereal

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Allergic reactions have been described as an occupational hazard among nurses and pharmaceutical workers who handle psyllium-containing laxatives. This study reports the case of a 38-year-old female nurse who ingested a bowl of psyllium-containing Heartwise Cereal (Kellogg's, Battle Creek, MI) and 25 minutes later developed severe systemic anaphylaxis manifested by hypotension, a feeling of constriction in the throat, hoarseness, dyspnea, wheezing, generalized pruritus, urticaria, and vomiting. She was treated with epinephrine, normal saline, diphenhydramine, and methylprednisolone, and recovered completely. Subsequent IgE immunoblot assay was strongly reactive to psyllium. Ingestion of psyllium-containing breakfast foods by sensitized individuals can be associated with life-threatening systemic anaphylaxis. (Am J Emerg Med 1991;9:449-451. Copyright © 1991 by W.B. Saunders Company)

The current widespread interest in healthier living has resulted in the American public looking favorably upon food products with increased dietary fiber. Manufacturers have responded by marketing products with natural sources of high fiber content and some with additional fiber added. The dried outer layer of psyllium seeds are found in hydrophilic bulk laxatives, but are now being added to certain high fiber breakfast foods. We report a severe case of systemic anaphylaxis in an adult woman following ingestion of a psyllium-containing breakfast cereal.

CASE REPORT

A 38-year-old female nurse reported that approximately 25 minutes after eating a bowl of Heartwise Cereal (Kellogg's, Battle Creek, MI) with bananas and milk she developed a dry mouth, a sensation of throat tightness, and vomited one time. She subsequently suffered hoarseness, wheezing, and dyspnea, together with profound weakness, severe whole body pruritus, and an urticarial rash. She felt dizzy, was badly frightened, and telephoned for an ambulance. Ten minutes later the paramedics found her appearing pale and anxious, with marked difficulty breathing and a respiratory rate of 32 per minute. She spoke in a hoarse whisper and had wheezing in all lung fields. The skin showed generalized urticaria, but no cyanosis. The first blood pressure was palpated at 110 mm Hg systolic with a sinus tachycardia of 160 beats per minute; shortly thereafter her blood pressure diminished to 88 mm Hg and she felt even more lightheaded. She was placed in the Trendelenburg position and

treated with oxygen at 10 l/min by mask, 0.3 mg of 1:1,000 epinephrine subcutaneously, 500 mL of normal saline, and 25 mg of diphenhydramine intravenously. During transport to the hospital she showed improvement in her voice, throat tightness, dyspnea, and itching.

On arrival in the Emergency Department approximately 50 minutes after eating the cereal, her blood pressure was 158/90 mm Hg, her pulse was 86 beats per minute, and her respiratory rate had decreased to 18 per minute. She was pale and apprehensive with moderate periorbital edema. Her voice was raspy and she continued to complain of chest tightness and difficulty breathing. On chest examination, no wheezes, rales, or rhonchi were heard. A moderately severe urticarial rash was present on her chest, abdomen, arms, and inner thighs, and she described persistent itching. She was given an additional 1,500 mL of normal saline, 25 mg of diphenhydramine, and 125 mg of methylprednisolone sodium succinate intravenously. No laboratory tests were performed.

She was observed in the Emergency Department until she showed complete resolution of the pruritus, hoarseness, and respiratory difficulty. Mild urticaria persisted. Her blood pressure remained normal. She denied any prior ingestion of Heartwise or any other psyllium-containing cereal. She described a previous reaction to codeine manifested by a rash, and also suffered from mild seasonal allergic rhinitis. She denied medication ingestion, recent allergic reactions, food sensitivities, history of atopic dermatitis or urticaria, or chronic medical illness. She was discharged to her home with oral hydroxyzine and the advice to avoid psyllium-containing products. A Western immunoblot assay (Figure 1) done on her blood was strongly positive with bands present representing IgE and IgG antibodies specific for psyllium fractions in Heartwise, psyllium powder, and Metamucil (Proctor & Gamble, Cincinnati, OH). Total serum IgE was 3,197 µg/mL (12-240 reference intervals).

In a later interview the patient recalled an episode of mild wheezing and dyspnea that occurred 3 weeks before her Emergency Department visit when a bulk laxative had been spilled at the desk of the nursing station where she worked. She had dispensed psyllium-containing laxatives to patients in the past without developing symptoms, but denied ever ingesting these herself. Subsequent ingestions of milk and bananas have not resulted in any symptoms.

DISCUSSION

Psyllium or plantago seeds come from various species of plantain (*Plantago ovato*). The husk or outer layer of these seeds are ground into a fine powder and used in certain bulk laxatives such as Metamucil, Fiberall (Ciba Consumer, Edison, NJ), Perdiem Plain (Rorer, Fort Washington, PA), and others. Material from the outer seed layer is known as ispaghula powder and serves as the hydrophilic agent in these products.¹⁻⁸ The English plantain (*P lanceolata*) is a member of the same genus as psyllium and is a well-known allergen associated with rhinitis, conjunctivitis, and bronchospasm.^{2,8}

Type I hypersensitivity reactions are mediated by IgE.⁹⁻¹¹ Cell-bound IgE, when fixed with an antigen, causes mast cells, basophils, and other cells to release histamine, slow-

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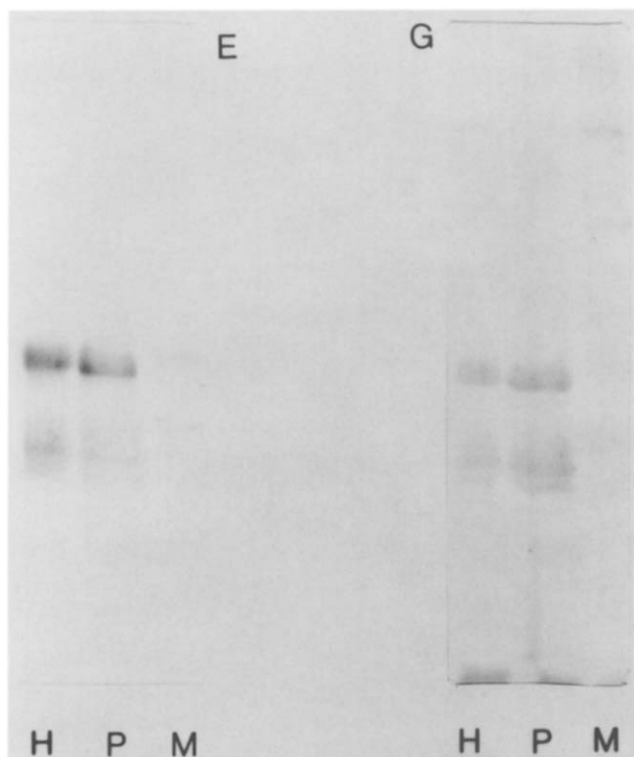


FIGURE 1. Western immunoblot assay showing IgE antibodies (E) and IgG antibodies (G). Dark bands represent antibodies specific for psyllium fractions in Heartwise (H), psyllium powder (P), and Metamucil (M).

reacting substance of anaphylaxis (SRS-A), serotonin, leukotrienes, prostaglandins, and other substances that produce the characteristic severe generalized allergic reactions termed anaphylaxis. Urticaria, rhinitis, laryngeal edema, bronchospasm, hypotension, and gastrointestinal symptoms can occur as isolated findings or in various combinations. The extent and severity of these reactions is believed to depend on the degree of vasodilatation, capillary permeability, and smooth muscle contraction associated with the affected individual's quantity and quality of released mediators.

In 1941 Ascher recognized the allergenic potential of psyllium when he reported rhinitis and gastrointestinal symptoms in a pharmaceutical worker exposed to ground psyllium seed.⁸ Allergic reactions have also occurred in nurses and pharmaceutical workers handling psyllium-containing products. Nurses who have developed allergic rhinitis while dispensing psyllium-containing laxatives^{3,5,12-15} have typically experienced their symptoms after several months to years of exposure. Pharmaceutical workers have also described rhinitis and bronchospasm while processing psyllium.^{2,4,8,16,17} Their symptoms also appeared after a prolonged period of exposure and were confirmed by allergy testing. Bernton reported a case of a man who developed rhinitis during daily preparation of a psyllium-containing laxative for his wife.¹⁸ In all reports, these symptoms resolved when the exposure was eliminated; however, one nurse had recurrence of her bronchospasm when her dog was given a laxative that contained psyllium.³

Systemic anaphylaxis has been reported in five nurses following the ingestion of psyllium-containing laxatives.^{1,16,19,20} In all cases the subjects had a history of dispensing laxatives containing psyllium during the course of their work. One had also ingested such a laxative herself for constipation. All developed generalized urticaria and respiratory distress. Three of the five had hypotension. The presence of IgE to psyllium seed was confirmed by the radio-allergosorbent test, skin testing, and other methods in these cases.

Kaplan²¹ and Lantner et al²² have recently reported anaphylaxis after ingestion of Heartwise cereal. Similar to our report, these two cases both occurred in nurses who also had previous exposures to psyllium-containing laxatives.

Psyllium is approved by the Food and Drug Administration (FDA) as a main ingredient in nonprescription bulk-producing laxatives. The only approved use of psyllium in food is as an optional ingredient in frozen desserts. Benefit (General Mills, Minneapolis, MN), Heartwise, and Bran Buds (Kellogg) are newly marketed breakfast cereals containing husks of psyllium as a source of dietary fiber. The FDA had issued a memorandum on October 4, 1989 describing letters sent to these manufacturers voicing concern about the use of psyllium in their cereals. Among their considerations was "possible allergic reactions in those who may be sensitive to inhaled or ingested psyllium powder."²³ The FDA also requested that the companies provide scientific evidence demonstrating that psyllium can safely be consumed in the quantities present in these cereals.

Our patient suffered a severe systemic anaphylactic reaction associated with the ingestion of a psyllium-containing breakfast cereal. Her previous sensitization to psyllium likely occurred during occupational exposure. While we believe that our case is unusual, other sensitized individuals may experience life-threatening anaphylactic reactions to psyllium-containing foods.

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