

Unsuspected sources of soybean exposure

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Background: Hidden allergens in processed foods can provoke severe allergic reactions in sensitive individuals. The presence of soy proteins in typical Spanish sausage products (chorizo, salchichón, mortadella, and boiled ham), doughnut and soup stock cubes has not been reported previously.

Methods: The present article reports two examples of severe allergic reactions due to the ingestion of foods that unexpectedly contained soybean proteins. Allergologic study included skin prick tests with the implicated foods and their components, serum specific IgE and bronchial and oral provocation tests.

Results: Skin tests, serum-specific IgE, and bronchial and oral challenge tests (the latter, in one patient) were positive against soy and the above mentioned processed foods in which the presence of soybean flour was confirmed.

Conclusions: This report demonstrates the importance of hidden allergens in allergic reactions to foods and the need to scrutinize closely every food component.

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INTRODUCTION

When the diagnosis of food hypersensitivity has been established, the only proven therapy is elimination of the offending allergen.¹ Severe reactions, even deaths, have been documented in patients who ingested foods to which they were allergic.^{2–4} Since there are many ways for allergens to be hidden in foods, patients must be taught to examine food labels to detect potential sources of the forbidden allergen. This is not always easy as Steinman reviewed in a recent article.⁵

The present article deals with two examples of severe allergic reactions due to the ingestion of foods that unexpectedly contained soybean proteins.

CASE REPORTS

Case 1

A 24-year old man gave an account of a 15-year history of more than 20 episodes of generalized urticaria, palpebral and labial edema, dyspnea, wheezing, and cough. Typically he had developed these symptoms one to two

hours after the ingestion of some foods such as doughnut, different types of commercial sausage products (boiled ham, Spanish salami-salchichón-, mortadella, and Spanish chorizo) and soup. The patient had required emergency hospital care on six occasions. He had been treated with both parenteral epinephrine and antihistamines with recovery in 40 minutes. The other episodes were treated with oral antihistamines with improvement after two hours. Similar symptoms (dyspnea and wheezing), which required inhaled albuterol, once appeared during the unloading of soybeans into a silo in La Coruña, Spain. The patient also complained of oral pruritus after eating lentils, peas, peanuts, and chickpeas.

Clinical examination was normal. Total IgE was 1152 IU/mL (normal 10 to 130).

Skin prick tests, performed with a battery of 26 commercial inhalant allergens including grass and tree pollen, animal danders, molds, house-dust mites, and latex (ALK-Abelló Lab, Spain) were negative (no one developed a wheal reaction 3 mm greater than saline solution). Histamine control (10 mg/mL) was positive (5 x 6 mm). The patient has immediate responses to commercial food extracts (Leti Lab., Spain) of lentil (wheal size,

8 x 4 mm), pea (12 x 9 mm), peanut (18 x 5 mm), chickpea (14 x 8 mm), soybean (16 x 7 mm), corn flour (7 x 4 mm), and barley flour (6 x 5 mm). Skin prick tests with commercial food extracts of hazelnut, sunflower seed, chestnut, nut, egg white, ovalbumin, ovomucoid, yolk, pork, beta-lactoglobulin, alpha-lactalbumin, and wheat flour were negative.

Prick by prick tests with sausage foods were done. For that purpose, the food product was pricked with a lancet and then the patient's forearm. Tests were positive for commercial pork-made Spanish chorizo (9 x 8 mm), salami (6 x 5 mm), mortadella (7 x 6 mm), boiled ham (20 x 10 mm), and boiled sausage (21 x 8 mm). Prick tests with doughnut and soup stock cubes (oxo, and so on) diluted in saline were positive also (10 x 8 mm and 15 x 10 mm, respectively). Five control atopic subjects were negative. When testing home-made chorizo and sausage, the patient showed no reaction.

Specific IgE antibody levels were determined by commercial CAP immunoassay (Pharmacia Lab., Sweden). A CAP score greater than 0.35 IU/mL was considered positive. Results were positive against hazelnut (22.4 IU/mL), chestnut (3.88 IU/mL), barley (10.3 IU/mL), corn (16.9 IU/mL), lentil (0.45 IU/mL), pea (1.13 IU/mL), peanut (26.8 IU/mL), chickpea (3.09 IU/mL), and soy (10.3 IU/mL).

Nonspecific bronchial provocation test with methacholine (Provacholine, Roche Labs, Nutley, NJ) was carried out following the method described by Cockcroft et al. Test results showed mild bronchial hyperreactivity (PC₂₀ of 0.78 mg/mL).

Twenty minutes after inhalation of 0.35 mg/mL of a soybean extract solution, FEV₁ decreased by 20% (Fig 1). Finally, oral provocations with Spanish chorizo and soybean proteins (100 mg) were followed by a late response

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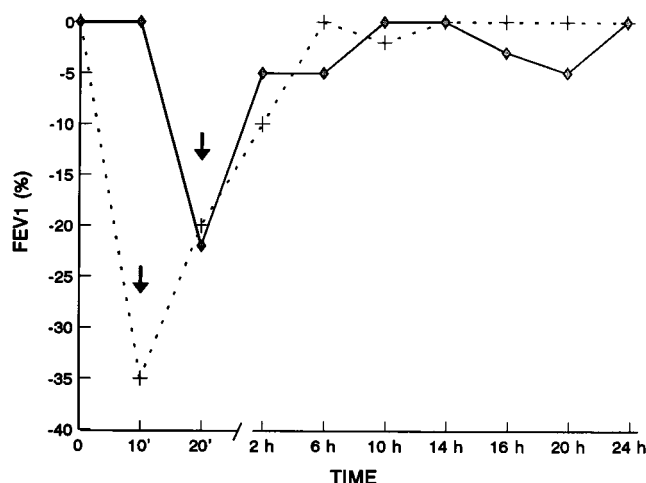


Figure 1. Representation of FEV₁ fall after bronchial challenge tests with both 0.35 mg/mL of a soybean extract in case 1 and 0.1 mg/mL of the same extract in case 2 (dotted line). Arrows indicate time of albuterol administration.

of dyspnea and wheezing in the first case and an immediate response (30 minutes) of oral pruritus, hives, and conjunctival edema in the latter. Open oral challenge tests with lentils and peas were followed by oral pruritus but no systemic reaction occurred.

Case 2

A 38-year-old woman complained of oral pruritus, erythema, generalized urticaria, facial angioedema shortly followed by dyspnea, wheezing, laryngeal stridor, and diarrhea two to three hours after eating lentils, peas, and commercial soup and sausages on several occasions. The patient required emergency hospital care on two occasions due to loss of consciousness.

Clinical examination was normal. Total IgE value was 593 IU/mL.

Skin prick tests performed with common inhalants and latex were negative. The patient had immediate responses to commercial food extracts of lentil (wheal size, 14 x 6 mm), pea (7 x 4 mm), chickpea (12 x 8 mm), peanut (7 x 5 mm), and soybean (25 x 10 mm). Skin prick tests with commercial food extracts of hazelnut, sunflower seed, chestnut, nut, egg white, ovalbumin, ovomucoid, yolk, beta-lactoglobulin, alpha-lactalbumin, pork, and wheat flour were negative. Prick by prick tests were positive with commer-

cial Spanish chorizo (20 x 11 mm), salami (7 x 5 mm), mortadella (12 x 7 mm), boiled ham (12 x 6 mm), and boiled sausage (9 x 5 mm). Similarly, prick tests with doughnut and soup stock cubes diluted in saline were positive (9 x 5 mm and 25 x 9 mm, respectively).

Specific IgE antibody levels were positive against soybean (57.9 IU/mL), lentil (44.4 IU/mL), pea (42.4 IU/mL), white bean (47.3 IU/mL), peanut (14.5 IU/mL), and chickpea (34.9 IU/mL).

Nonspecific bronchial provocation test with methacholine was positive (PC₂₀ of 0.19 mg/mL). Ten minutes after inhalation of 0.1 mg/mL of a soybean extract solution, FEV₁ decreased by 35% (Fig 1). Finally, oral provocations were not done due to the severity of the reactions reported by the patient.

On asking the implicated food industries about detailed composition of Spanish sausage products as well as doughnut and cooking stock ingredients, the presence of soybean flour was confirmed in all of them. These data together with perfect tolerance of both homemade soybean-free sausage products and consommés suggest the importance of an unsuspected soybean exposure in our patients. Both patients have been symptom-free since avoiding all of these processed foods.

DISCUSSION

Allergenicity of soybean proteins is well-documented.^{6,7} The main symptoms of soy hypersensitivity include both digestive and respiratory manifestations. The first ones frequently appear in children as an expression of food allergy, including diarrhea, urticaria, and worsening of atopic dermatitis.^{6,8,9} Respiratory symptoms, generally due to the inhalation of soybean dust, varies from rhinitis to bronchial asthma, causing real outbreaks.¹⁰⁻¹³

Due to the almost unlimited uses of soy, it is a particularly harmful allergen, usually hidden. Soy and other vegetables of the Leguminae family can be used in the manufacture of food such as "texturizer," emulsifier, and protein filler⁵ but this information is not commonly detailed on the labels. In fact, soy protein was not listed as an ingredient in the labeling of any of the commercial food products that caused the anaphylactic reaction in our patients. Patients reported here had specific IgE against both soy and other legumes but symptoms were proven only against soy proteins in case 1. As it has been previously stated,^{15,16} while in vitro cross-reactivity can be seen among individual members of the Leguminae family, little cross-reactivity has been documented when these individual food antigens are ingested in food challenges. Since severe systemic reactions appeared after the ingestion of lentils, peas and soy products in case 2, the elimination of the entire Leguminae family should be required in this particular patient.

According to our research, the presence of soy proteins in typical Spanish sausage products such as chorizo, salchichón, mortadella, and boiled ham has not been reported previously. The same can be said with regards to doughnut, and soup stock cubes commonly used as an additive. Even though the use of these products is widespread, no similar cases have been reported previously. In patients with severe anaphylactic reactions like those reported here, recommendations should probably include the avoidance

of ingesting processed foods and training to scrutinize food labels.

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OCCUPATIONAL ASTHMA DUE TO ANISEED

A butcher who worked with spices and other additives noticed dyspnea, coughing, and wheezing provoked by exposure at work. Peak expiratory flow rate fell more than 50% on days he worked with aniseed and RAST and skin prick testing with aniseed extract were both strongly positive. Bronchial provocation with nebulized aniseed extract provoked bronchoconstriction.

Dust from aniseed caused occupational asthma in this patient.

—RMS

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