

Oral allergy syndrome induced by chestnut (*Castanea sativa*)

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Background: Oral allergy syndrome is a distinctive type of allergy to food resulting from direct contact between food and the oral mucosa. Normally, it affects patients who are allergic to pollens. It can be challenged by testing for hypersensitivity to fresh fruit or vegetables in well-known associations. Oral allergy syndrome rarely occurs in patients with other types of allergies, or to food not associated with pollens. Only occasionally does chestnut cause hypersensitivity. There are only a few reported cases, depending on cross-reactivity in previously latex-hypersensitive patients. Oral allergy syndrome to chestnut in a patient with respiratory allergy to *Dermatophagoides* is therefore unusual and worth reporting.

Objectives: To describe the clinical features and their differences from previously reported cases and to analyze the techniques and methodologic problems related to in vivo and in vitro diagnosis.

Methods: Case report. Skin tests with commercial and freshly made extracts and by the prick-by-prick method. Challenge test. Specific IgE antibody assay. Prausnitz-Küstner reaction.

Results: The challenge with fresh food confirmed an oral allergy syndrome to chestnut. Clear symptoms of rhinoconjunctivitis and asthma set in as well. Skin tests with several commercial extracts and the prick-by-prick test were negative and so was specific IgE assay in serum by RAST and other immunoenzymatic methods. Skin prick test with a freshly prepared extract of fresh chestnut and the passive transfer reaction were positive.

Conclusions: The case of oral allergy syndrome to chestnut reported here appears to be a manifestation of immediate IgE-dependent hypersensitivity.

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INTRODUCTION

The term “oral allergy syndrome,” first introduced by Amlot and coworkers,¹ describes a distinctive kind of IgE-mediated allergy to food, resulting from direct oral contact with some food. The syndrome consists of a number of allergic manifestations localized in the oral cavity and sometimes followed by more or less severe systemic symptoms. It mainly occurs in patients hypersensitive to pollens and can be elicited by fruit and fresh vegetables.^{2–5}

Monosensitization and cross-reactivity have been reported.^{6–9} Oral allergy syndrome, however, rarely occurs in patients with allergies not elicited by pollens and does not occur

from foods not associated with pollen allergy.

Chestnut only induces allergic manifestations rarely and the few reported cases of allergic responses involve patients previously sensitized to latex. The allergic reaction results from partial cross-reactivity to this allergen.

In the present study we report a case of oral allergy syndrome to chestnut in a woman with respiratory allergy to *Dermatophagoides*.

CASE REPORT

The patient, a 22-year-old white woman, who worked as weaver, came to our department because of perennial rhinoconjunctivitis. She reported no atopy in her family history, but the symptoms suggested allergy. Skin prick testing elicited positive reactions to *Dermatophagoides* and storage

mites, confirmed by high levels of specific IgE antibodies in her serum (FAST class 2-Bio Whittaker Inc, Walkersville, MD).

The patient did not report any symptoms of hay fever or asthma, or any other clinical manifestations of allergy. Nevertheless she had had an unusual allergy to chestnut. She reported that when chewing chestnut she had felt a burning sensation and itching of the oropharyngeal mucosa followed by lacrimation, nasal pruritus, violent sneezing salvos, and “moderate” difficulty in breathing. The symptoms, however, were not so severe as to require emergency medical treatment.

Symptoms initially had been relatively minor and limited to oral symptoms but subsequent episodes became progressively worse.

For about 2 or 3 years, she carefully avoided eating chestnuts even in sweets. She reported no other oral allergy symptoms to food, including banana or other nuts and seeds.

Skin prick testing with commercial extracts of chestnut and a standard set of animal and vegetable foods used daily in our department (24 groupings, Laboratorio Farmaceutico Lofarma srl, Milano, Italy) as well as the FAST control, were negative. Except for mites, all skin prick tests and FAST for the other inhalant allergens and for the pollens of allergenic relevance—including but not limited to grass, birch, ragweed, pellitory, mugwort, and chestnut tree pollens—were negative. So were the skin tests and specific IgE assay for latex and banana (FAST, CAP RAST FEIA Pharmacia, Uppsala Sweden, RAST Sferikit IgE spec, Laboratorio Farmaceutico Lofarma srl, Milano, Italy).

The prick-by-prick test with fresh chestnut according to the method of

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Dreborg and Foucard¹³ was also negative. This technique is performed by pricking the fresh food first and soon afterward the skin with the same lancet. It is commonly used in Europe to diagnose allergy to fruit and fresh vegetables, because it is simple, reliable, and more sensitive compared with commercial extracts.¹⁴

Specific IgE antibody assays for chestnut pollen and fruit carried out in several laboratories using different methods (FAST, RAST, CAP RAST FEIA) were negative, too. Neither were any specific IgG4 antibodies to chestnut found.

After informed consent the patient chewed a piece of fresh chestnut (about 5 g) for a few minutes, until it was ready for swallowing, and then spit it out, avoiding ingestion.

Within a few minutes she experienced an inflammatory reaction of the oral mucosa, with burning and itching. Shortly thereafter, moderate conjunctival redness and mild bilateral edema of the eyelids followed. A few minutes later severe rhinitic symptoms began with sneezing and watery rhinorrhea together with difficulty in breathing and wheezing. In view of the progression of the symptoms we administered

epinephrine, 1 mg/mL, 0.3 mL by subcutaneous injection, intravenous corticosteroids (betamethasone 1.5 mg), and antihistamines (dexchlorpheniramine 5 mg).

No blind oral food challenge was done because of the possibility of a potentially dangerous reaction. The effectiveness of blind challenges in reproducing oral allergy symptoms has been questioned.^{5,14,15}

After a suitable lapse of time, the skin tests were repeated with a fresh chestnut extract prepared by finely mashing about 7 g of fresh chestnut with a pestle. Then the pulped nut was put into a cold infusion with 0.9% NaCl (about 15 mL) until a dense milky liquid was obtained. This "milk" was quickly centrifuged (1 min/12,000 rpm) to remove corpuscular parts and its supernatant was used as a testing material. The extract was obtained with aseptic procedures and was used immediately after preparation without any further processing or sterilization.

The skin prick test elicited a positive immediate reaction a little larger than the positive control (histamine 10 mg/mL) (Fig 1). In a control group of ten volunteers (seven men and three women aged 19 to 51 years, mean $\pm$

SD 30.10 ± 9.95 years) with allergy to *Dermatophagoides* (FAST class 3 or 4), skin prick tests with the same fresh chestnut extract were completely negative.

The role of specific immunologic mechanisms was also demonstrated by passive transfer testing in a healthy male volunteer, who had given his written informed consent. After tests to exclude any transmissible diseases, the patient's serum was injected intradermally into three different skin sites on the arm of a recipient. Twenty-four hours later, the same sites were challenged with chestnut milk, diluted ten times, and a commercial *Dermatophagoides* extract. There was an immediate, positive reaction to both the chestnut and the *Dermatophagoides* antigens. Comparative skin tests in corresponding unprepared sites elicited no significant skin reactions (Fig 2).

DISCUSSION

The clinical manifestations of oral allergy syndrome occur usually in pollen-hypersensitive patients and are associated with the onset of hay fever. The symptoms can be elicited by groups of vegetables often belonging to the same botanical family,

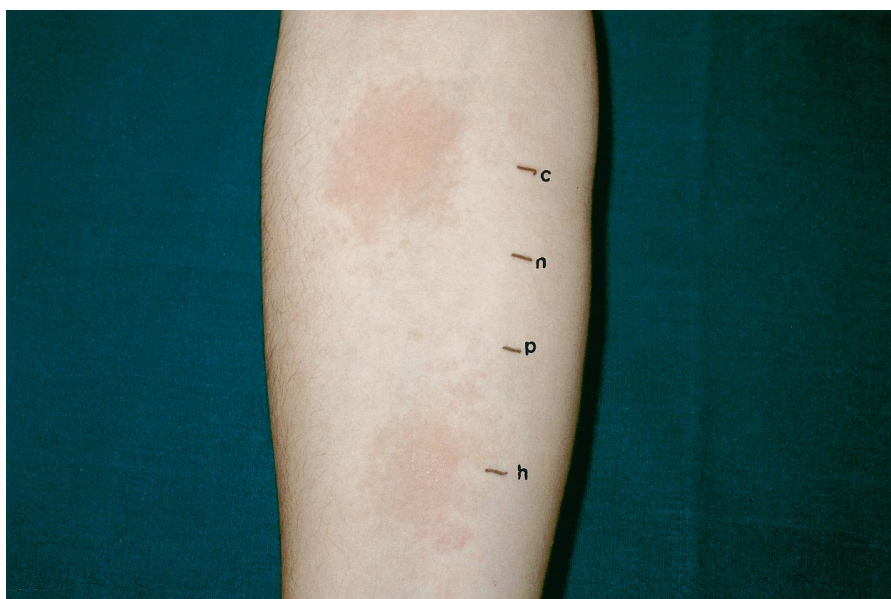


Figure 1. The skin prick test with a fresh chestnut extract (c) eliciting a skin reaction of the immediate type, larger than the positive control (h, histamine hydrochloride 10 mg/mL). In the middle: negative control (n) with glycerosaline solution and chestnut-pollen prick test (p).



Figure 2. Result of passive transfer test. On the left: positive reaction to chestnut (c) and to a commercial extract of *Dermatophagoides pteronyssinus* (d). Negative control (n) with diluent, (glycerosaline solution). On the right; corresponding control tests on unprepared skin.

whose usual associations are well known.^{2-5,13,15-17} The case presented here involved a clinical history of perennial rhinitis and allergic sensitization to *Dermatophagoides* and concurrent-sensitization to mites or to inhalants other than pollens (especially animal dander) is reported only as an exception in cases of oral allergy syndrome.^{6,8,19} It is not certain whether these associations are significant or whether there is any specific cross-reactivity between these allergens and certain foods.

The case reported here is most likely the first of oral allergy syndrome in which chestnut is the only offending food. We found virtually no previous reports of allergic reactions to chestnut in a computerized reference database, even with polysensitization to other nuts and seeds, except for rare cases of cross-reactivity to latex (and banana)¹⁰⁻¹² and a single case in a patient with chestnut pollinosis.²⁰ Allergy to chestnut must therefore be quite unusual, considering the frequent consumption of this food.

Very serious anaphylactic reactions, sometimes fatal, have been reported after accidental ingestion of peanuts and tree nuts by allergic patients.^{21,23} The course of this type of food allergy has tended to be one of increasingly severe clinical manifestations.^{21,25} The patient described here has had similar features. The patient had noticed that each subsequent exposure to chestnut induced increasingly serious clinical manifestations. Further, during the challenge test, in spite of the very small dose administered and the precautions taken, the symptoms were so severe that they required intensive therapy, including epinephrine.

Skin tests with different commercial extracts of chestnut, pollens, and fruit, including very fresh extracts, were repeatedly negative. Even tests with commercial extracts prepared to order just before use (Neo Abellò SpA, Madrid, Spain) were negative. In the diagnosis of food allergy weak sensitivity and poor specificity of skin tests with commercial extracts is common.^{5,14,26}

The prick-by-prick test with some foods, such as nuts and seeds, presents obvious difficulties and weak sensitivity so it is not in fact very helpful in diagnostic work.^{14,15} This is probably because the foods are rather dry. We tried to overcome the problem by preparing our own extract by cold infusion of the mashed fruit. This chestnut "milk" did establish the allergy state in our patient and was very specific as well, considering the complete negativity of the skin tests in the control group. The protein content of the extract (Protein Test Dasit SpA, Bareggio, Italy—Coomassie Brilliant Blue-SDS spectrophotometric method, analytical sensitivity 0.5 mg/mL) was about 50 times that of similar commercial products.

This preparation appears to reproduce the process of allergenic component solubilization that occurs during chewing. It might therefore be used and, if necessary, standardized for other nuts.

The possible negative results of specific IgE assays in serum has been reported often^{6,10,11,20} and occurred several times in our study, whatever the method.

In most reported cases of cross-reactivity between latex and chestnut (or banana) prick tests with commercial extracts and RAST were both positive and cross-reactive peptides were found by RAST-inhibition or immunoblotting.¹⁰⁻¹² In the case in question there was neither co-sensitization nor cross-reactivity to latex and banana, and both the RAST and skin prick tests with commercial extracts were negative. This leads us to presume different antigens are involved in different patients. Such antigens may be lost or denatured in the course of industrial processing. Their concentration in commonly used commercial extracts may be very low.^{5,14}

It was not possible to perform more sophisticated immunologic tests in our laboratory. Nevertheless, the positive skin test and oral challenge and the passive transfer test indicate that in this patient the oral allergy syndrome to chestnut was a clinical manifestation of immediate type allergy involving specific IgE antibodies.

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HYPNOTHERAPY FOR ATOPIC DERMATITIS

The authors evaluated responses to hypnotherapy in 20 children and 18 adults with severe atopic dermatitis refractory to dermatologic therapy. Therapy included progressive relaxation; stress management; suggestion of skin comfort and coolness and nonscratching behavior; ego strengthening to relieve anxiety, tension, lack of confidence, and dependence; and posthypnotic suggestion. The patients practiced self-hypnosis daily after 3 to 12 sessions over 1.5 to 7 months.

Significant improvement in itching, scratching, sleep disturbance, and tension, rated on analogue scales, occurred within 4 weeks and continued throughout the period of evaluation of up to two years. Topical steroid use decreased to 40% of the original amount at 4 weeks, 50% at 8 weeks, and 60% at 16 weeks among the adults.

Hypnotherapy merits further study with appropriate controls.

—RMS

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