

Anaphylaxis to *Laminaria*

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Preparations of the kelp *Laminaria digitata* are used as tents in gynecologic procedures to dilate the cervix.^{1,2} The kelp consists principally of a glucan carbohydrate called laminarin, which differs slightly among *Laminaria* species. The carbohydrate consists of about 92.5% β -D-glucose with 1:3 linkages. Laminarin is thought to function as the active ingredient in dilatation by changing osmotic pressure or uterine prostaglandin metabolism.¹ The *Laminaria* tent is manufactured by taking a 6 cm length of dried kelp stalk, about 2.5 to 4 mm in diameter, and attaching a string through a hole drilled 6 mm from the larger end. The tent is sterilized by ethylene oxide and sealed in plastic. For use, the tent is inserted into the cervix several hours before the procedure. As the cervix desiccates and dilates, the tent develops an hourglass shape.

CASE REPORT

A 26-year-old woman, gravida 5, with a history of three therapeutic abortions, was prepared for a fourth procedure. Medical history included a previous allergic reaction to penicillin and pruritus of unknown origin after her third abortion procedure. The previous abortion procedures all involved the use of *Laminaria* tents. The patient was not taking any medicines or recreational drugs. There was no history consistent with food allergy, allergic rhinitis, or asthma.

The abortion procedure was performed without anesthetics or medications. During the insertion of the *Laminaria* tent into the cervix she experienced generalized flushing, hives, difficulty breathing, and hypotension. She was treated with epinephrine, diphenhydramine, and 6 α -methylprednisolone, and symptoms were promptly reversed. The *Laminaria* tent was removed, and the procedure was terminated. After 24 hours'

observation, the patient was discharged with a maintenance dose of diphenhydramine for 2 days. On the third day she came to the emergency department with generalized pruritus, swollen lips, and urticaria. These symptoms were treated with diphenhydramine and prednisone. Subsequently, the therapeutic abortion was performed uneventfully with the use of a synthetic osmotic dilator.

Laboratory tests were performed and showed a normal complete blood count and C4 and CH₅₀ values; anti-nuclear antibodies were negative, and the serum IgE level was 377 IU/ml. Skin test responses to latex were negative. RASTs were performed with latex, ethylene oxide, and a panel of 10 common inhalant allergens. All results were negative. Extracts of *Laminaria saccharina* and laminarin from *L. digitata* were purchased from Sigma Chemical Company (St. Louis, Mo.) and coupled to cyanogen bromide-activated paper disks.³ Patient serum demonstrated specific IgE binding of 7.8% to the whole kelp extract and 6.3% to the purified carbohydrate. IgE binding of sera from 10 atopic patients was comparable to that of normal horse serum at 0.6% $\pm$ 0.1% for carbohydrate and 0.7% $\pm$ 0.1% for whole kelp extract. The patient refused skin testing with *Laminaria* extracts.

DISCUSSION

This patient's history and RAST results are consistent with anaphylaxis caused by the intracervical application of the *Laminaria* tent. There was no evidence of reactivity to either latex or the ethylene oxide used to sterilize the tent and surgical instruments and supplies. A complete search of the literature with MEDLINE did not locate any other reports of anaphylaxis to *Laminaria*. Allergic reactions to *Laminaria* may not have been recognized previously, and gynecologists should be prepared to treat anaphylaxis, when necessary.

The history of urticaria after the patient's third therapeutic abortion suggests a probable allergic reaction to *Laminaria* at that time, and this should have served as a warning that a more serious reaction might occur. Another troubling aspect of this case was the recurrence of symptoms several days after the initial reaction. This suggests that some of the seaweed extract remained on the cervix and had not been washed out by the gynecologist.

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cologist when the procedure was prematurely terminated.

The extracts used for RASTs were primarily carbohydrate. Protein was measured with the Pierce protein assay reagent (Pierce Chemical Company, Rockford, Ill.) with a bovine serum albumin reference. The supernatant of the aqueous extract of *L. saccharina*, prepared from 20.3 mg/ml, contained 7 µg/ml of protein. The purified laminarin at 10.2 mg/ml contained about 0.5 µg/ml of protein or 0.005%. The tents did not contain sufficient material to analyze for protein. It appears that the allergen may be the carbohydrate, but it is not possible to rule out that the activity results from the trace amount of protein in the purified carbohydrate.

Although postcoital allergy to proteins in human seminal fluid is a well-recognized syndrome, there are few reports in the literature of anaphylaxis in response to pharmaceutical agents applied intracervically. Two cases of anaphylactic reactions to

bovine serum albumin during artificial insemination were recently reported.^{4,5} These reports show the potential risks of repeated exposure to allergenic substances by this route.

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Latex: A potential hidden "food" allergen in fast food restaurants

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In recent years, the role of latex in causing a variety of IgE-mediated allergic reactions has been recognized.¹ Symptoms can range from localized or generalized urticaria to systemic allergic reactions including anaphylaxis.² Health care workers, employees in latex production facilities, and persons undergoing frequent surgical procedures are at high risk for developing latex allergy, and atopic persons are more likely than nonatopic persons to have latex-specific IgE antibodies.³ Thus the role of clinically significant latex allergy is influenced by frequency of exposure but not limited to the workplace. According to several reports, latex-sensitive patients are likely to have food allergy, an

association that is perhaps related to shared antigens between latex and various foods.³ We have recently seen two patients who experienced severe reactions to latex contaminating the food eaten at fast food restaurants, and they are the subjects of this report.

CASE 1

T.I., a 25-year-old man with a long history of allergic respiratory disease and angioedema caused by poultry products, was seen in consultation after an acute attack of urticaria, angioedema, and dyspnea, which occurred at the coffee shop of a local voluntary hospital. He had eaten a ham sandwich prepared by a food handler who wore latex gloves. The patient recovered fully after immediate treatment in the hospital emergency room with epinephrine, glucocorticosteroids, and Benadryl. At the time of consultation, results of the physical examination were normal. Allergy skin tests revealed positive reactions to tree, grass, and ragweed pollens; house dust mite; several molds; and chicken. Skin test responses to

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