CASE REPORT
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Anaphylaxis to Oatmeal and Psocid Crisps

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ABSTRACT

Occasionally, a seemingly straightforward history of food-induced anaphylaxis may prove to be misleading. Both patients and their physicians have a tendency to attribute the cause of an allergic reaction to the most conspicuous ingredient that had been ingested while overlooking less likely causes. Here, we describe a patient whose history pointed to oatmeal allergy, but skin prick tests to oats and serologic testing for oat-specific IgE were negative. Ultimately, we found that the oatmeal had been contaminated with an allergenic insect, Psocid of the order Psocoptera.

Keyword: Food allergy; Oatmeal allergy; Psocid

INTRODUCTION

The prevalence of self-reported food allergies is very much higher than the prevalence of food allergies confirmed by a detailed clinical history, utilization and interpretation of appropriate tests.[1,2] Modalities recommended in the 2010 Expert Panel Guidelines include a detailed medical history and physical examination, skin prick tests (SPTs), allergen-specific IgE (sIgE) measurements, and oral food challenge (OFC).[3] Sometimes identifying the causative allergen is diagnostically challenging, especially when the evaluations are inconclusive or indeterminate. In addition, a mistaken diagnosis may lead to unnecessary avoidance of food, a false sense of security and the potential for recurrent reactions.

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Here, we describe a patient suspected to have an oatmeal allergy, but investigations for oat allergy were negative. Eventually, we found that her homemade oatmeal crisps had been contaminated by an allergenic insect, Psocid of the order *Psocoptera*, and it could explain all her symptoms.

CASE REPORTS

A 61-year-old female with allergic rhinitis and hypertension was referred to the Anaphylaxis Clinic at St. Michael's Hospital, a tertiary care teaching hospital fully affiliated with the Faculty of Medicine, University of Toronto. Several months earlier, she had been preparing an oatmeal crisp, mixing packaged oatmeal with butter and brown sugar with her bare hands. Within 5 minutes, she developed itchy palms but no other cutaneous or visceral manifestations. She later ingested a small portion of the baked crisp and felt "heaviness in her stomach". Several weeks later, she

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again prepared oatmeal cookies with bare hands but did not have any immediate symptoms on contact. While cleaning up, she believes that she inhaled some airborne oatmeal dust. Several minutes later, she developed paroxysms of sneezing, nasal congestion, itchy palms, and soles, as well as itchy, red, watery eyes. She went to an emergency department where she became lightheaded and vomited. She was treated with IV diphenhydramine and prednisone and discharged 6 hours later in stable condition. Prior to these reactions, she had eaten oatmeal on a number of occasions as a part of Harvest Crunch oatmeal cereal without any adverse symptoms, suggesting a negative oral food challenge. She has avoided eating oats subsequent to the reactions above.

She was a retired dental hygienist. Her physical examination was unremarkable. SPT to food allergens were all non-reactive using commercial diagnostic extracts, including skin tests to oat, wheat, rye, barley, corn, and rice. SPT to fresh oatmeal was similarly non-reactive.ImmunoCAP testing for sIgE to oat was<0.01 KIU/ml (<0.35 KIU/mL is negative).A formal graded oral challenge with an oatmeal cookie was planned for her. In the meantime, she mistakenly ate part of the oatmeal cookie at a party and had no untoward symptoms.

When she was preparing some oatmeal crisps in anticipation of a graded oral challenge, she noted numerous foreign bodies in her oatmeal. A sample was submitted to the Canadian Food Inspection Agency, whose investigations showed a heavy infestation of adult and nymph forms of psocid*s*.

DISCUSSION

Psocid*s*, commonly known as booklice, belong to the order *Psocoptera*. They are tiny, soft-bodied, winged insects, with worldwide distribution.[4] Their biology and ecology differ among various species. They range in size from 1–10 mm in length.[5] Some species of Psocid*s*, such as *Liposcelisbostrychophila*, commonly infest stored products, such as oats. Psocids are able to spread fungal pathogens, which can threaten human health.[6] These insects have been reported to cause allergic reactions in sensitized individuals,[7] as can mealworm infestations in stored grain[8] and dust mite infestation in pancake batter.[9]

Herein, we describe a patient with an IgE-mediated food allergy, who experienced a contact reaction after handling dough made from contaminated oatmeal and a subsequent multisystem reaction after inhalation of contaminated oatmeal dust. *In vivo* and *in vitro* testing for oatmeal allergy were negative. She ate oatmeal cookies accidentally in a party without any symptoms. Visual inspection of the oatmeal revealed the presence of an insect contaminant, subsequently identified by the Canadian Food Inspection Agency as a heavy infestation by Psocidlarvae and adults, which can clinically be suggested as an allergenic trigger of her IgE-mediated multisystem reaction.

Recent studies have shown Psocids are more tolerant to some of the insecticides compared to other stored-product insect pests,[10] leading to an increased prevalence in the commercial food supply. *L. bostrychophila* is reported to be an important trigger of respiratory allergy,[10] and causes IgE mediated responses in up to 20% of the allergic population studied.[11] A novel 26 kDIgE-binding protein from *PsocidLip b 1* has been found[10,11] which does not share sequence homology with any previously described allergenic proteins.[12] Moreover, Several allergenic proteins have been characterized in storage mite-infested foods, including TP Lepidoglyphus destructor (LD) and Tyrophagusputrescentiae (TP) which also cause allergy in human.[13]

Allergic reactions are not necessarily due to the most conspicuous ingredient amongst the foods ingested. A formal investigation is needed to identify the cause so that appropriate avoidance measures may be implemented. In this case, we report the presence of Psocids contaminating oatmeal, clinically could trigger of this patient's multisystem allergic reaction, indeed, detection of *PsocidLip b 1 protein* is necessary to confirm the diagnosis.

Conflict of Interest

The authors have no conflict of interest regarding this case report. The patient signed the informed consent to report the case.

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