
Case report

Lupine-induced anaphylaxis in a child without known food allergy

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Background: Lupine allergy is caused by ingestion of the flour of a plant called *Lupinus albus*, a member of the Leguminosae family. Lupine allergy has been described in adult patients previously known to have peanut allergy (cross-reactivity).

Objective: To describe the first case of an anaphylactic reaction caused by ingestion of lupine flour in a pediatric patient without a known peanut allergy.

Methods: Symptom assessment, nutritional history, and skin and blood tests.

Results: An otherwise healthy 8-year-old boy had nose and eye discharge followed by facial edema and difficulty breathing 30 minutes after eating an industrially prepared waffle containing eggs, sugar, and lupine flour. He had no history of food allergy and was eating a normal diet, including peanuts and other legumes. Results of skin prick tests using commercial extracts were positive to peanuts and negative to eggs, soy, and nuts; results of a prick-to-prick test using lupine flour were strongly positive (+++). His total IgE level was 1,237 UI/mL. Specific IgE antibodies were positive to lupine seeds (20.8 kU/L) and peanuts (>100 kU/L).

Conclusions: To our knowledge, we describe the first case of an anaphylactic reaction after ingestion of lupine flour in a child without known allergy. In the case of peanut allergy or any anaphylactic reaction without evident cause, especially after industrially prepared food ingestion, lupine should be considered in the list of allergens tested. Lupine is increasingly used in industrially prepared food but is not regularly declared in the composition, leading to difficulties in allergen avoidance.

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INTRODUCTION

Legume (peanuts, sojas, peas, lupines, etc) allergy is one of the major food allergies in adults and children. Lupine flour has been legally allowed in the composition of industrially prepared food for more than 10 years in Europe. It is increasingly used in the preparation of industrially prepared food, and lupine seeds are easily available in dietary shops.

Lupine allergy is caused by the ingestion or inhalation of the flour or seeds of a plant called *Lupinus albus*, a member of the Leguminosae family. Lupine allergy has been described in adult patients known to have peanut allergy (described as cross-reactivity)¹ and after inhalation of lupine flour in employees working with it.² We describe the first case of an anaphylactic reaction caused by ingestion of lupine flour in a previously healthy child.

CASE REPORT

We describe a healthy but atopic (rhinoconjunctivitis due to allergy to cats and grass pollens) 8-year-old boy with sudden nose and eye discharge followed by facial edema and difficulty

breathing 30 minutes after eating an industrially prepared waffle. The waffle contained eggs, sugar, and lupine flour. He responded well to intravenous clemastin and prednisolone administration. The boy had no history of food allergy or anaphylactic reaction and ate a normal diet, including peanuts and other legumes. After the reaction and before the allergy workup the patient was advised not to eat waffles or peanuts; he was allowed to eat eggs and legumes (soja, green peas).

Results of skin prick tests using commercial extracts (ALK, Trimedal, Denmark) were positive to peanuts and negative to sojas, eggs, nuts (nuts, hazel nuts, and almonds), and other Leguminosae (chickpeas and lentils); the results of a prick-to-prick test using lupine flour diluted in a saline solution were strongly positive (+++). The total IgE level was 1,237 IU/mL (CAP System; Pharmacia, Uppsala, Sweden). Specific IgE antibodies were positive to lupine seeds (20.8 kU/L; reference value, <0.35 kU/L) and peanuts (>100 kU/L; reference value, <0.35 kU/L) (CAP System). Using this history and the allergy workup, we excluded other food allergies, Hymenoptera allergy, drug allergy, and angioneurotic edema and concluded that the patient experienced an anaphylactic reaction caused by lupine flour allergy and a strong sensitization to peanuts. The patient was instructed to strictly avoid peanut and lupine flour or lupine seed ingestion, and injectable epinephrine and peroral cetirizine were prescribed. We did not perform an oral challenge for

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security reasons and because there was no doubt about the diagnosis.

DISCUSSION

Lupine is a legume gender *Lupinus* of the family of Papilionaceae, which includes 450 species. It has been cultivated for more than 4,000 years all around the world. It is close to chickpea, green pea, soja, and peanut. Lupine flour has a high protein content and offers monounsaturated fatty acids; it is a gluten-free flour. Because of those nutritional values and culinary qualities (nice color, better conservation, and softness), lupine is increasingly used in the preparation of industrially prepared food (pizzas, cakes, vegetarian foods, and sausages).

Lupine allergy is a rare cause of food allergy recently described in the adult literature. Matheu et al³ presented the case of a woman with an anaphylactic reaction after ingesting lupine seeds and other legumes (chickpeas, lentils, and white beans), and Radcliffe et al⁴ described the case of a young woman allergic to peanuts who developed anaphylaxis after ingestion of hidden lupine flour. Novembre et al⁵ described a child with asthma after inhalation of lupine seed dust, and Moreno-Ancillo et al⁶ reported the case of an 8-year-old child with known peanut allergy who had asthma after inhaling lupine flour.

In the present case, the child had an anaphylactic reaction after ingesting lupine flour in an industrially prepared waffle. He had no previous food allergy, especially no peanut allergy (peanuts were consumed regularly; >10 peanuts at a time), the weeks before the reaction. The allergy workup confirmed the lupine allergy and showed a strong peanut sensitization, probably due to cross-reactivity. Monneret-Vautrin et al⁷ showed that the major allergen of lupines (a protein of 43 kDa) is also present in peanuts. After the reaction and the test results, the child was advised for security reasons to avoid lupine flour and seeds; because of the high level of sensitization to peanuts, he was also advised to avoid native peanuts (peanut oil had been consumed after the reaction without any problem). For security reasons, the family of the child has not chosen until now to perform an oral challenge to confirm the peanut allergy.

Patients known to have peanut allergy (cross-reactivity) and previously healthy people can develop severe allergic reactions to lupines.^{7,8} In the case of peanut allergy or any anaphylactic reaction after industrially prepared food ingestion without an evident cause, one should look for the presence of lupine in the incriminated food. Lupine flour could also be responsible for some cases of idiopathic anaphylaxis. It would be interesting, if possible, to repeat the allergic

workup after a period of elimination diet of peanuts and lupine flour and eventually an oral challenge to see whether the strict avoidance of peanuts would affect the reaction to lupine flour.

Currently, there is no legal obligation in most industrialized countries to declare the use of lupine flour as a component of industrially prepared food unless an elevated amount is used. Because of this lack of specific regulation, the strict avoidance of lupine in the food regimen is difficult, and unintentional ingestion can provoke severe reactions. Patients who are allergic to lupine should be advised to avoid industrially prepared food. Lupine should be specifically mentioned in the national regulations for food products. Because reported cases of lupine food allergy are few, its prevalence and significance, especially in relation to peanut allergy, are not known; therefore, more studies are needed to better understand their relationship.

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