

CASE REPORT

Case of anaphylaxis caused by ingestion of royal jelly

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ABSTRACT

Anaphylaxis is a severe form of allergic disease. Royal jelly is widely consumed in Japan, but a few cases of anaphylaxis caused by royal jelly have been reported. We encountered a 26-year-old Japanese woman who developed anaphylaxis after drinking a beverage of crude royal jelly including honey. She had a history of bronchial asthma, allergic rhinitis, allergic conjunctivitis, atopic dermatitis and food allergy (abalone). Prick tests were performed with the beverage of crude royal jelly including honey and with two other beverages including honey. Only the crude royal jelly beverage showed a positive reaction. An oral challenge test with the crude royal jelly beverage was not performed, but a similar test with a beverage including honey caused no symptoms. A positive response to the beverage of crude royal jelly was not observed in normal volunteers. A positive diagnosis of anaphylaxis due to royal jelly was made based on the positive prick test, systemic clinical symptoms and the negative prick tests in healthy volunteers. Moreover, the patient had no symptoms when taking lemon and orange, which were present as essences in the crude royal jelly beverage, and also had no response to honey after anaphylaxis. Increased consumption of royal jelly in health food supplements may increase the incidence of royal jelly-related allergic reactions. Therefore, royal jelly should be considered as a causative allergen in food-induced anaphylaxis.

Key words: asthma, food-induced anaphylaxis, health food supplement, prick test, royal jelly.

INTRODUCTION

Royal jelly (RJ) is secreted from the hypopharyngeal and mandibular glands of worker honey bees (*Apis mellifera*). It is a creamy, yellow-white, acidic material with a slightly pungent odor and taste. RJ mainly consists of protein, with other components including free amino acids, fatty acids, sugars and vitamins.¹ In Japan, RJ is marketed widely and consumed by all age groups. It is a health tonic that has perceived benefits that range from promoting growth in children to improving general health status and enhancing longevity in the elderly. Recently, we experienced a patient with food-induced anaphylaxis caused by ingestion of RJ.

CASE REPORT

A 26-year-old Japanese woman was admitted to our hospital because of anaphylaxis, generalized erythema, and itching and swelling of the eyelids, which developed 15 min after drinking a beverage of crude RJ in June 2006. Wheezing was heard and hypoxemia was present, but the patient was conscious. She was treated with s.c. epinephrine and i.v. hydrocortisone, but had difficulty with breathing. Her blood pressure and pulse were measurable for approximately 1 h after the start of the medical examination, but then she lost consciousness and was treated with endotracheal intubation. Her symptoms gradually improved and she was discharged on the

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Received 16 October 2007; accepted 25 December 2007.

fourth hospital day without any sequelae. The patient was instructed to stop drinking the RJ beverage.

The patient had a history of bronchial asthma, allergic rhinitis, allergic conjunctivitis, atopic dermatitis and food allergy (abalone), but no history of honey allergy. She had drunk another RJ beverage several times in the past and had not had any symptoms, but this was the first time she had drunk the RJ beverage of concern. In February 2007, the patient visited our outpatient clinic to try to find the cause of anaphylaxis. Laboratory data revealed no abnormalities except for mild elevation of the serum immunoglobulin (Ig)E level (608 IU/mL). CAP-RAST data showed positive responses against house dust, mites (class 6) and cat hair (class 3), and negative responses against honey bees, long-legged wasps and hornets.

Skin prick tests were performed with a prick-lancetter (EW Care AB, Mölnlycke, Sweden). Responses were read after 30 min and graded according to the standard method recommended by the European Academy of Allergy and Clinical Immunology² in which reactions are defined as: (+) over 25% of the area of a wheal induced by a positive histamine control (10 mg/mL); (++) 50%; (+++) 100%; and (+++++) 200%. A response of grade (+) or larger is considered positive provided that the response to the test solution is also larger than that to the negative control. Skin prick tests were performed using the beverage of crude RJ including honey, and for another two beverages including honey, because it was possible that honey was the allergen. A positive reaction was observed only with the crude RJ beverage, because the patient developed a 5 mm × 6 mm wheal and a 30 mm × 20 mm erythematous area (Fig. 1). A negative physiological saline control showed no reaction, whereas a positive histamine control (10 mg/mL) gave an 8 mm × 7 mm wheal and a 40 mm × 30 mm erythematous area. Therefore, the crude RJ beverage including honey was considered to have given a positive grade (++) response in the prick test. The results were negative for other beverages including honey and the patient was able to drink these beverages without appearance of symptoms.

The ingredients of the beverage of crude RJ including honey are shown in Table 1. A prick test could not be performed for individual ingredients,



Figure 1. Prick tests gave a positive reaction with the beverage of crude royal jelly and a negative reaction with physiological saline.

Table 1. Ingredients of the beverage of crude royal jelly including honey

- | |
|----------------------------|
| • High-fructose corn syrup |
| • Nigero-oligosaccharide |
| • Honey |
| • Royal jelly |
| • Citric acid |
| • Essence |
| • Vitamin B1, vitamin B2 |

because the sales agency would not provide these ingredients. However, high-fructose corn syrup and citric acid were present in the crude RJ beverage and in the other beverages that the patient drank without development of symptoms. The essences in the RJ beverage were lemon and orange, and these were the only volatile fragrant ingredients. After anaphylaxis, the patient had no symptoms when taking lemon, orange and honey. After obtaining

informed consent from 10 healthy volunteers (one male and nine females), skin prick testing with the crude RJ beverage was performed, and none of the volunteers had a positive skin reaction. A positive diagnosis of anaphylaxis due to RJ was made based on the positive prick test, systemic clinical symptoms, the negative prick tests for healthy volunteers, and the lack of symptoms when the patient ingested lemon, orange and honey after anaphylaxis.

DISCUSSION

Anaphylaxis is a severe form of allergic disease, and when such a response occurs as a food allergy it is important to confirm the causative food component to prevent recurrence. Severe allergic reactions caused by RJ are rare: to our knowledge, only six cases have been reported in Japan^{3–5} and 19 further cases have been reported overseas.^{1,6–9} The patient was aged less than 30 years in 15 of these cases, and was female in 14 cases. This is consistent with younger women being interested in health foods such as RJ. Most of the patients had a known history of asthma or atopy, and it has been suggested that patients with a history of asthma, atopy or other allergic conditions might have an increased risk of allergic reactions to RJ^{5,7} and should be careful of taking this product. In the present case, the patient had a known history of plural atopy, asthma, atopic dermatitis, allergic rhinitis, allergic conjunctivitis and food allergy.

Immunoglobulin E antibody binding of blotted RJ proteins in the molecular weight region 25–55 kDa has been reported, and a component with a molecular weight of approximately 55 kDa was detected in the sera of seven patients who developed RJ-induced asthma and anaphylaxis, suggesting that this component may be the major RJ protein.¹

Increased consumption of RJ in health food supplements may increase the incidence of RJ-related

allergic reactions. In fact, a label on the beverage of crude RJ in the current case carried a warning that the product “should not be used by children or patients with a history of asthma and allergic conditions”. However, the patient felt able to drink the beverage of crude RJ because she had not developed symptoms after drinking similar RJ beverages in the past. Furthermore, many beverages including RJ do not carry warning labels. RJ is believed to be very good for health and circulation, but the possibility of RJ allergy should also be more widely recognized. Therefore, we suggest that warning information should be clearly labeled on every preparation containing RJ, because our case suggests that RJ can be a causative allergen in food-induced anaphylaxis.

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