

CASE REPORT

Food-induced anaphylaxis caused by ingestion of royal jelly

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ABSTRACT

We report a case of food-induced anaphylaxis caused by ingestion of royal jelly. After taking royal jelly and several other medicinal products, a 33-year-old Japanese male developed severe facial pruritus and erythema, followed by vertigo, numbness in his fingers, generalized pruritus, wheals, dyspnea, wheezing and impaired consciousness. He was treated with corticosteroid and fluid therapy, and his symptoms subsided. Upon allergy testing, his only positive reaction was to royal jelly. Given the clinical symptoms and the positive prick test to royal jelly, a diagnosis of anaphylaxis due to the ingestion of royal jelly was made. In this paper, we describe this case and review the relevant published work.

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

INTRODUCTION

Royal jelly (RJ) is a secretion of the hypopharyngeal and mandibular glands of worker honey bees (*Apis mellifera*). It is a creamy, yellow-white, acidic material, slightly pungent in odor and taste. Approximately half of its dry weight consists of protein; other components include free amino acids, fatty acids, sugars and vitamins.¹ RJ is a health tonic that is widely consumed in Japan and has perceived benefits that range from promoting growth in children to improving general health status and enhancing longevity in the elderly. In Japan, RJ is marketed widely and used by all age groups.

Recently, we treated a patient with food-induced anaphylaxis (FIA) caused by the ingestion of RJ. Although a case of contact dermatitis due to RJ was described in Japan in 1983,² this is the first Japanese report of RJ-induced anaphylaxis.

CASE REPORT

A 33-year-old Japanese male developed a persistent fever of approximately 38°C with generalized

fatigue for a few days in January 2005. On 11 January, before going to sleep, he took RJ (Flouvil Cosmetic, Nishi-Ku, Osaka, Japan), Pabron Ace, which is a common cold remedy consisting of ibuprofen, bromhexine hydrochloride, dehydrocodeine phosphate, noscapine, *dl*-ephedrine hydrochloride, lysozyme hydrochloride, caffeine, thiamine nitrate and mecobalamine (Taisho Pharmaceutical, Toshima-Ku, Tokyo, Japan); Bishin Club Seatome, which is a powdered shell product (Flouvil Cosmetic); and Bishin Club Vitamin C&E Granules, consisting of ascorbic acid and tocopherol acetate (Flouvil Cosmetic). At 3 AM, the patient awoke with severe facial itching and erythema. This was followed by vertigo, numbness of the fingers, generalized itching, wheals, dyspnea, wheezing and impaired consciousness. His systolic blood pressure was 100 mmHg during transport to our hospital. He had difficulty breathing and complained of itching and discomfort in his throat. Respiratory sounds in both lung fields were normal, and no rales were heard. The patient was noted to have generalized erythema and edema, and he could not open his eyes because of forehead edema. After

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admission, 100 mg hydrocortisone sodium succinate was administered by drip infusion, and fluid therapy was started. The patient soon regained consciousness, his dyspnea disappeared, and his blood pressure rose. On hospital day 2, the patient had no further pulmonary symptoms or erythema, and his blood pressure normalized. He had taken RJ, Pabron Ace, and Bishin Club Vitamin C&E Granules several times in the past, and he had not had any symptoms. The patient was instructed to stop using the medicines and health foods that he had taken and was then discharged from the hospital.

After the patient's symptoms subsided, closed patch testing and prick testing were performed using RJ, Pabron Ace, Bishin Club Seatome, and Bishin Club Vitamin C&E Granules, adjusted with Vaseline to weight ratios of 5% and 10%. The patient's only allergic reaction was to prick testing with RJ, as he developed a 2 cm × 2 cm wheal and a 4 cm × 4 cm erythematous area. The patient did not consent to further testing, such as closed patch testing and prick testing with components of the other medicines and health foods, immunoglobulin (Ig)E radioallergen sorbent test or a drug lymphocyte stimulation test.

After obtaining informed consent from five healthy volunteers (three males and two females; mean age, 40 years), skin prick testing with RJ, adjusted with Vaseline to weight ratios of 5% and 10%, was performed. None of the volunteers had a positive skin reaction to RJ.

A positive diagnosis of anaphylaxis due to RJ ingestion was made based on the positive prick test, the systemic clinical symptoms and the negative prick test among healthy volunteers.^{3,4}

DISCUSSION

Food-induced anaphylaxis is a form of IgE-mediated hypersensitivity that manifests with an abrupt onset of symptoms occurring within minutes to hours of food ingestion.^{3,4} The symptom complex results from the generation and release of a variety of potent biologically active mediators and their combined effects on target organs, such as the skin, gastrointestinal tract, respiratory tract and cardiovascular system. The majority of FIA reactions in the United States and Europe are the result of allergic reactions to peanuts, tree nuts, fish or shellfish.^{3,4} On the other

hand, the majority of such reactions in Japan are the result of allergic reactions to egg, milk, wheat, buckwheat and shrimp. Thus, the cause of food-induced anaphylaxis seems to vary with the population and its dietary habits.^{3,4}

Two cases of severe adverse reactions to RJ were published in 1993, and this has been followed by only a few other cases.^{1,6-8} Thus, RJ-induced anaphylaxis is quite rare. Of interest, one report found that IgE antibody binding of blotted RJ proteins was most marked in the molecular weight region 25–55 kDa, and one component of the molecular weight region 55 kDa was detected in the sera of all seven patients who developed RJ-induced asthma and anaphylaxis; this component may be the major RJ protein.¹

Given that RJ is widely used in Japan, there are surprisingly few reports of anaphylaxis. Leung *et al.* reported that, in Hong Kong, where there is a high prevalence of RJ consumption, atopic individuals were at high risk of sensitization to it. It has been found that such atopic individuals have a high rate of positive skin tests to RJ.¹⁰ Almost all patients who have had allergic reactions to RJ have previously had some type of atopic disorder, such as bronchial asthma, allergic rhinitis or eczema.⁶⁻⁹ Therefore, atopic individuals might be more easily sensitized to RJ than those who are not atopic. However, there is no precise relationship between RJ use, a positive RJ skin test, and the clinical manifestations of adverse reactions to RJ.¹⁰

Of note, the suppression of allergic reactions by RJ has recently been investigated by many researchers.^{11,12} Taniguchi *et al.* reported that oral administration of RJ inhibited the development of atopic dermatitis-like skin lesions in NC/Nga mice.¹² Thus, in the future, RJ may be used as a treatment for atopic individuals. However, when clinicians use RJ to suppress allergic reactions in atopic patients, they should be cognizant of the possibility of severe allergic reactions caused by RJ in these patients.

The increased use of RJ in "health food supplements" may also increase the incidence of RJ-related allergic reactions. Although the Welfare, Health, and Labor Ministry of Japan has established an effective drug adverse reaction reporting system, there is no such reporting system for health food supplements at this time. Thus, there is an immediate need to establish an adverse reaction reporting system for

health food supplements in Japan. Such a system would help identify and ultimately prevent health hazards related to health food supplements, whose efficacy is also for the most part essentially undocumented.

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