



A Case of Anaphylaxis Induced by Contact with Young Radish (*Raphanus sativus L*)

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Young radish (*Raphanus sativus L*), a member of the mustard family (*Cruciferae*), is a common ingredient of Kimchi. Although few reports have described anaphylaxis to cruciferous vegetables, we report the case of anaphylaxis induced by contact with young radish. A 46-year-old female with a history of contact allergy to metal presented to our emergency room (ER) with dizziness, generalized eruption and gastrointestinal upset. Her symptoms developed after re-exposure to young radish while chopping it. Hypotensive blood pressures were noted. Three days prior, the patient had experienced generalized urticaria with pruritus immediately after chopping the fresh young radish, which resolved spontaneously. In the ER, her symptoms improved by the administration of epinephrine (0.3 mL), antihistamine (chlorpheniramine) and isotonic saline hydration. A skin prick test with young radish extract showed positive reactivity. The same skin test was negative in five adult controls. IgE-mediated hypersensitivity could be an important immunologic mechanism in the development of young radish-induced anaphylaxis.

Key Words: Anaphylaxis; food hypersensitivity; *Raphanus*; skin test

INTRODUCTION

Anaphylaxis to foods is a severe life-threatening allergic reaction that is an important health problem.¹ Various types of allergic reaction are manifested by skin contact with food, mostly at the site of contact.^{2,3} The edible root vegetable young radish (*Raphanus sativus L*), a type of radish in the mustard family (*Cruciferae*), is an important ingredient in Korean food, especially in the summer. Stem and leaves of the plant are used traditionally for Kimchi. There have been few reports of radish-induced hypersensitivity.⁴⁻⁷

The root material, stem, leaves and seeds of the mustard family yield isothiocyanates known as mustard oils.⁸ These compounds contain 4-methylthio-3-butenyl isothiocyanate, which has a chemical structure similar to that of toluene diisocyanate (TDI). Notably, TDI exposure is associated with occupational asthma.⁹ Here, we present a case of anaphylaxis to young radish caused by skin contact.

CASE REPORT

A 46-year-old female presented to the emergency room (ER) with dizziness, generalized eruption and gastrointestinal upset.

She was known to have metal allergy and her history included no food allergies. She strongly denied a past history of allergic reaction to fresh radish and radish Kimchi; however, she had few exposure opportunities to raw radish until she began working as a kitchen porter in a Korean restaurant 2 months prior. Two episodes induced by contact with young radish occurred before her presentation to the ER. The first contact occurred 3 days prior after chopping fresh young radish. The contact caused immediate urticaria with pruritus and burning sensation on her body, but these dermatologic manifestations disappeared spontaneously. Two days after the first contact with young radish, she chopped the radish again, and pruritus presented more severely with generalized erythematous eruption and dizziness. As the skin involvement persisted, she visited a general practitioner and hypotension was found. Intravenous saline hydration and intravenous anti-histamine were adminis-

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tered, and she returned home. At 12 hours after the second contact with young radish, she presented to the ER with systemic manifestations.

On examination, her mental status was drowsy, her blood pressure was 80/35 mmHg, pulse was 80 beats/min, body temperature was 36.4°C and respiratory rate was 24 breaths/min. The laboratory test showed white blood count of 6,780/ μ L with 0% eosinophil count, hemoglobin of 12.8 g/dL, platelet count of 293,000/ μ L and erythrocyte sedimentation rate of 7 mm/h. The serum total immunoglobulin E (IgE) level was 30 IU/L. On admission, she received subcutaneous epinephrine (0.3 mL) followed by intravenous isotonic saline hydration and antihistamine (chlorpheniramine).

Three weeks after her recovery from systemic anaphylaxis symptoms, allergic diagnostic tests were performed. Young radish extract was used for the skin prick tests, patch tests and specific bronchial challenge at a concentration of 1:10 w/v.

The results showed a positive skin prick test to the extract of young radish. Young radish extract and 55 common allergens were tested in skin prick tests in 5 control subjects; however, no erythematous reactions or wheals were detected in the control subjects.

A patch test, a good model of T-lymphocyte hypersensitivity, was performed with young radish. Skin reactions on the test sites were defined after 20 minutes and on days 2, 3, and 4. According to the International Contact Dermatitis Research Group (ICDRG) grading system,¹⁰ the patch test showed a weak positive response. Additionally, specific bronchial challenge with young radish extract showed no bronchoconstriction after inhalation of the radish extract.

DISCUSSION

In this report, we described a case of IgE-mediated anaphylaxis that was induced in a subject upon chopping fresh young radish. To our knowledge, this is the first case report of IgE-mediated anaphylaxis to young radish by contact.

One case of anaphylaxis to the mustard family of plants (*Cruciferae*) was reported in 1980.¹¹ Skin exposure is an important route for allergic response, although ingestion of suspicious food material is the predominant cause in food allergies.² A previous report described one case of radish hypersensitivity that developed by skin contact.⁴ In our case, allergic symptoms developed repeatedly after chopping the fresh young radish.

No anaphylaxis was noted after she ingested the radish Kimchi. One explanation is that the cooking processes changed the antigen reaction to hypersensitivity.¹² Boiled or fermented food can lose their allergen potential.

Our patient was diagnosed with IgE-mediated young radish-induced anaphylaxis based on her clinical symptoms and positive skin prick test response to young radish extract. The time course of her allergic reaction was correlated with the biphasic

response of IgE-mediated anaphylaxis. She was transferred to the ER 12 hours after the second contact with young radish. Biphasic anaphylaxis is the recurrence of symptoms within 1-72 hours with no further exposure to the allergen.¹ Therefore, she showed both early and late responses after exposure to young radish. In this case, IgE antibody specific to young radish was detected using the skin prick test with allergen extract, but not by the enzyme-linked immunosorbent method.

Isothiocyanate, the specific component responsible for the radish flavor (4-methylthio-3-butenyl isothiocyanate, MTB-NCS), is changed into isocyanate by an undefined enzyme reaction. Several studies demonstrated the relationship between TDI-induced occupational asthma and the radish.^{13,14} Isocyanate is a possible causative component that induces hypersensitivity,^{15,16} and immunologic and non-immunologic (pseudo-allergic) responses to isocyanate should be considered as possible mechanisms of young radish-induced anaphylaxis. To understand the precise mechanism of radish-induced anaphylaxis, further study is needed.

In conclusion, we describe a case of anaphylaxis to young radish (*R. sativus L.*) by skin contact. In addition, IgE-mediated hypersensitivity could be involved in the pathogenesis of young radish-induced anaphylaxis. Young radish should be considered as an important food allergen in Korea.

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