

Grayanotoxin Poisoning From Flower of *Rhododendron mucronulatum* in Humans

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There exists a traditional belief in Korea that although the rhododendron species contains grayanotoxins (Ellenhorn, 1997; Norton, 2001), the azalea (*Rhododendron mucronulatum*) does not. Therefore, Koreans have been using the blossoms of azalea to make wine, honeyed flower juice, and flower-patterned griddle cakes. This report describes my experience treating a patient admitted to our emergency department with symptoms of dizziness, hypotension, and bradycardia, which resulted from consuming azalea blossoms.

Materials and Methods

A 76-year-old man was brought to the hospital with major symptoms of dizziness and general inertia, which had begun approximately 10 min before his admission to the emergency department. The patient had ingested about 10 azalea blossoms approximately 1 h before his admission to the hospital. His medical history showed no cardiac disorder or any drug use. A physical examination showed a blood pressure of 70/50 mmHg, a pulse rate of 45/min, and a body temperature

of 36°C. Furthermore, there was drowsiness and an electrocardiogram rhythm indicative of sinus bradycardia. There was no neurologic disorder or any other specific symptom.

An intravenous administration of atropine sulfate 1 mg completely resolved all the symptoms and restored normal sinus rhythm, with blood pressure of 100/60 mmHg and pulse rate of 91/min. Progress observation monitoring was conducted on the patient for 24 h, with no specific medical symptoms found on the transthoracic echocardiogram. Therefore, the patient was discharged from the hospital.

Results and Discussion

The azalea belongs to the Ericaceae family, which is widely distributed in Asian countries such as Korea, Japan, China, and Mongolia. Its blossoms are used as food because they are believed to be nonpoisonous, unlike the blossoms of the royal azalea (*Rhododendron schlippenbachii*). This case, however, showed toxic symptoms similar to those for the grayanotoxin contained in *Rhododendron schlippenbachii*, which also belongs to the Ericaceae family. However, the patient did not show the symptoms of organophosphate poisoning, which is characterized by meiosis, laceration, salivation, bronchorrhea, and diaphoresis.

Grayanotoxins bind to sodium channels in cell membranes and increase membrane sodium permeability in excitable membranes. They then induce a positive inotropic effect in the cardiac muscles. In addition, grayanotoxins inhibit cardiac and respiratory actions within the central nervous system, leading to a bradycardiac effect on the heart, which is mediated by

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vagal stimulation at the periphery in proportion to the amount absorbed (Onat et al., 1991). However, in the reported case, azalea blossom poisoning caused only cardiotoxicity, which reacts as a selective M₂-muscarinic receptor antagonist by vagal stimulation without respiratory rate depression. The symptom of intoxication by azalea blossoms showed bradycardia and hypotension different from those described by Klein-Schwartz and Litovitz (1985) as follows: “Ingestion of moderate amounts of azalea poses little toxic hazard.”

Considering that azalea blossoms are still eaten with no noticeable medical symptoms, it is presumed that there must be a particular blooming period during which the intoxication develops. With regard to the treatment, it is believed important to restore the blood pressure and heart rate by administering atropine sulfate and fluid resuscitation in the same manner as in the general treatment for grayanotoxin. However, for cases in which treatment with atropine does not result in recovery, the use of epinephrine, dopamine, dobutamine, and cardiac pacing have been reported.

When patients with no specific medical history visit a hospital with reports of bradycardia, hypotension, dizziness, and the like during the period from March to May, it is advisable to confirm whether they have eaten azalea blossoms or consumed any alcohol made from azalea blossoms. This may make it possible to avoid unnecessary examination and to provide quick treatment for these patients.

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