Hypotension and Bradycardia Caused by the Inadvertent Ingestion of *Rhododendron japonicum*

Ryo Koda¹,³, Miho Honma³, Kazuo Suzuki¹,³, Akio Kasai³, Tetsuro Takeda², Ichiei Narita¹ and Kazukiyo Yoshida³

Abstract

A 61-year-old man was transferred to our hospital with the complaints of dizziness, severe nausea and abdominal discomfort after consuming approximately 50 g of the flowers of *Rhododendron japonicum*. On admission, hypotension and sinus bradycardia were evident. Symptoms including hypotension and bradycardia completely recovered within 12 hours following normal saline infusion and intravenous atropine. The ingestion of certain types of *Rhododendron* species can cause intoxication, referred to as "mad honey poisoning", due to the action of grayanotoxins. This is the first local case of acute intoxication caused by *Rhododendron japonicum*.

Key words: bradycardia, grayanotoxin, *Rhododendron japonicum*


Introduction

The ingestion of certain types of *Rhododendron* species causes acute intoxication featured by hypotension, bradycardia, nausea, vomiting and dizziness due to the action of grayanotoxins. This intoxication is well known in the Black Sea Regions of Turkey since wild honey produced by bees in this area is often derived from *Rhododendron ponticum* or *Rhododendron luteum* that contain grayanotoxins (1). *Rhododendron japonicum* is commonly found in Japan. Intoxication caused by this flower has not yet been reported. We herein report a case of acute intoxication presented by dizziness, nausea, hypotension and bradycardia due to the inadvertent ingestion of *Rhododendron japonicum*.

Case Report

A 61-year-old man was transferred to our hospital with the complaints of dizziness, severe nausea and abdominal discomfort in early May. He had a medical history of traumatic brain injury 10 years previously, however, he had recovered without any significant complications. He did not have any coronary risk factors except age. About one hour previously, he consumed approximately 50 g of *Rhododendron* flowers in the garden of his home. His family reported that this flower blooms annually in their garden. The patient claimed to his family that he obtained information from a local botanical book that this flower is safe for consumption, and he decided to eat the flower in the raw state on this occasion.

On presentation, his consciousness was alert but he was severely ill due to nausea and abdominal discomfort. His body temperature was 35.5°C, blood pressure 80/50 mmHg, heart rate 45 beats per minute, and respiratory rate 24 per minute. The oral mucous and skin were dry. Mild epigastric pain was noted. Neurological abnormalities were not obvious. A blood test showed mild kidney injury (creatinine 1.42 mg/dL), however, other hematological and biochemical results including cardiac enzymes were within the normal ranges. A chest X-ray was unremarkable. An electrocardiogram showed sinus bradycardia with a heart rate of 47 beats

¹Department of Nephrology, Uonuma Institute of Community Medicine, Niigata University Medical and Dental Hospital, Japan, ²Department of Nephrology, Dokkyo Medical University Koshigaya Hospital, Japan, ³Department of Internal Medicine, Niigata Prefectural Muikamachi Hospital, Japan and ⁴Department of Clinical Nephrology and Rheumatology, Niigata University Graduate School of Medical and Dental Sciences, Japan

Received for publication July 9, 2015; Accepted for publication July 12, 2015

Correspondence to Dr. Ryo Koda, ryokouda@gmail.com
per minute (Fig. 1a). Echocardiography showed normal left ventricular systolic function without significant valvular disease.

His family brought the remnant of the flowers which the present patient had ingested (Fig. 2). According to the clinical course, acute intoxication of some species of *Rhododendron* was suspected. This flower was sent to the local health authority and identified to be *Rhododendron japonicum*. Be-
cause the patient was hypotensive and bradycardic, fluid resuscitation with normal saline (0.9% sodium chloride) and 0.5 mg of intravenous atropine was administered. The patient’s blood pressure and heart rate responded promptly. Four hours later, 0.5 mg atropine was readministered intravenously because his heart rate lowered below 50 beats per minute. After the second injection of atropine, his vital signs stabilized and the symptoms had disappeared 12 hours later. An electrocardiogram examined 24 hours after admission showed a normal sinus rhythm with a heart rate of 86 beats per minute (Fig. 1b). The patient was discharged without any significant complications. The clinical course is summarized in Fig. 3.

Discussion

It is known that the ingestion of certain members of Ericaceae, in particular Rhododendron species, causes acute intoxication mainly by the action of toxic substances called grayanotoxins. This intoxication is well known in the Black Sea Regions of Turkey as “mad honey poisoning”, since beekeeping and honey production has been historically practiced in this area and the consumption of wild honey, which is produced from grayanotoxin-containing plants such as Rhododendron ponticum, lead to this acute intoxication (1, 2). Rhododendron japonicum is widely distributed in the mountains of Japan and its peak bloom time is from April to June. Rhododendron japonicum is reported to contain grayanotoxin subtype I (3, 4), which is the principal toxic compound (1). Grayanotoxins are polyhydroxylated cyclic hydrocarbons that do not contain nitrogen (5). Grayanotoxins bind to the alpha-subunits of the sodium channel and keep the channel activated, so that cells are maintained in the depolarized state (6). Skeletal and myocardial muscles and central and peripheral neurons are the possible targets of this toxin (7). Onat et al. demonstrated in vagotomized rats that the administration of grayanotoxin did not cause bradycardia, implying the involvement of vagal nerve activation in grayanotoxin intoxication (7). They also demonstrated in experimental animal models that while non-selective muscarinic receptor atropine restored both bradycardia and respi-
The authors state that they have no Conflict of Interest (COI).

References


Figure 3. Clinical course. One hour after the ingestion of Rhododendron japonicum, the patient developed dizziness, severe nausea and abdominal discomfort. Fluid resuscitation with 0.9% sodium chloride and two injections of intravenous atropine successfully recovered the patient’s blood pressure and heart rate within 24 hours. DBP: diastolic blood pressure, i.v.: intravenous administration, SBP: systolic blood pressure.