



Mad Honey-Related Intoxication in an Infant: A Case Report

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ABSTRACT

Introduction: The nutraceutical value and ingredients of honey make it attractive for complementary and alternative medicine. Herein, we report a case of mad honey intoxication in an infant following the ingestion of honey for an intractable cough.

Case Report: A 5-month-old male infant was given two teaspoons of honey by his mother with his breakfast for coughing for the past 2 days. Four hours later following ingestion, he started to vomit and became drowsy. On arrival at the emergency department, he was drowsy and his Glasgow Coma Scale score was 10. With respect to systemic examination, abdominal sonography, performed to exclude any intraabdominal and renal pathology, revealed no pathology. Urine examination revealed proteins and hemoglobin. He was not given any other treatment except fluid replacement. At the fifth hour of arrival, his symptoms and physical examination findings all resolved. He was thought to have honey poisoning and was admitted to the pediatric clinic for follow-up.

Conclusion: Mad honey is a natural product, but because of its ability to cause allergic reactions in susceptible people, honey should not be given to infants younger than 1 year. Intoxication should be considered in emergency department patients in the eastern Black Sea region of Turkey. Although not clearly established, there might be nephrotoxic effects in human beings.

Keywords: Mad honey, infant, intoxication

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Introduction

Honey is an indispensable natural food and because of its antibacterial, immunological, and other beneficial properties, it has been used as part of complementary and alternative medicine for centuries by different cultures for the treatment of various disorders, such as chronic wounds, burns, gastrointestinal disorders, cardiovascular and metabolic disorders, common colds, and coughs (1). Although it is a natural product, because of its ability to cause botulism and allergic reactions in susceptible people, honey should not be given to infants younger than 1 year (2). Mad honey poisoning occurs through the intake of honey made from the nectar of the *Rhododendron* species containing grayanotoxins, which is responsible for the clinical manifestations of mad honey intoxication. These plants grow in the eastern parts of the Black Sea region of Turkey and in various other parts of the world, such as South America, Europe, and Japan (3). Herein, we report a case of mad honey intoxication in an infant.

Case Report

A 5-month-old male infant without any history of disease was admitted to our emergency department with the complaint of drowsiness by his parents. His mother had given him two teaspoons of honey in the breakfast for coughing for the past 2 days. Four hours later following ingestion, he started to vomit and became drowsy. On arrival at the emergency department, he was drowsy and his Glasgow Coma Scale (GSC) score was 10. His heart rate was 70 beats per minute, blood pressure was 70/40 mmHg, respiratory rate was 20 per minute, body temperature was 37°C, and oxygen saturation was 96%. Systemic examination revealed no pathological findings. The blood glucose level was 105 mg/dL. The electrocardiogram was in sinus rhythm. He weighed 10 kg. First, he was started on 20 mL/kg 0.9% normal saline, then 100 mL/h of 5% dextrose, and 0.3% NaCl

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infusion. Cranial tomography to exclude intracranial pathology did not show any pathology. The complete blood count was normal, and blood chemistry, including hepatic and renal function tests and electrolytes, were all normal. The urine examination revealed 100 mg/dL proteins and 250 RBC/uL hemoglobin. Abdominal sonography, performed to exclude any intraabdominal and renal pathology, revealed no pathology. At the fifth hour of arrival, his symptoms, vital signs, and physical examination findings all resolved, including heart rate. He was thought to have honey poisoning and was admitted to the pediatric clinic for follow-up. He was not given any other treatment, except fluid replacement. At the twelfth hour, the urine examination was also normal. We collected 24-h urine that revealed 2 mg/m²/h protein. He was discharged after 48 h, and 1 week later he was fully normal on follow up. Consent of the patient were taken from their parents because of his age.

Discussion

The ingredients of honey (aminoacids, proteins, antioxidants, and some vitamins and minerals) make it attractive for complementary and alternative medicine. In some trials, it has been shown that honey has some potential benefits with the common cold, nocturnal coughs, and sleep quality in children (4). In this case, his mother had given him two teaspoons of honey with his breakfast for coughing.

Honey intoxication may occur following the ingestion of grayanotoxin-containing honey, named as "mad honey" locally, produced from the nectar of *Rhododendron ponticum* growing on the mountains of the eastern Black Sea region of Turkey. Grayanotoxin is responsible for this intoxication. This toxin binds to sodium channels, which are involved in voltage-dependent activation and inactivation in the cell membrane, and prevents inactivation. As a result, excitable cells are maintained in a state of depolarization, during which entry of calcium into the cells may be facilitated (3, 5).

The symptoms of mad honey intoxication include bradycardia, cardiac arrhythmia, hypotension, nausea, vomiting, sweating, salivation, dizziness, weakness, loss of consciousness, fainting, blurred vision, chills, cyanosis, and convulsions. Symptoms occur after a dose-dependent latent period of a few minutes to 2 h or more. The toxic effects of honey poisoning are rarely fatal and generally last for no more than 24 h (6).

Grayanotoxin has three subgroups. Grayanotoxin I and III are the major ones responsible for the toxic effects (7). Although the major toxic effects of grayanotoxins are on the cardiovascular system, in an experimental study on rats, it also had hepatotoxic and nephrotoxic effects (8). In another study, single-dose grayanotoxin III affected hepatocellular and renal functions, but the researchers could not identify any histopathological changes by light microscopy (9). In another animal study with grayanotoxin I, Ascioğlu et al. (10) conceived hepatotoxicity and renal toxicity manifesting itself as proteinuria and hematuria, just as in our case. But in our case, it is not justifiable to directly associate the observed proteinuria with mad honey poisoning.

The basic principles in the treatment of mad honey intoxication are supportive care with cardiovascular monitoring, normal saline infusion, and intravenous atropine for bradycardia. Our patient was

treated with only saline infusion, and his physical examination findings and laboratory tests related to renal function were all normal after 12 h.

Conclusion

Grayanotoxin-containing mad honey can cause dramatic symptoms when ingested. Symptoms are caused by an inability to inactivate neural sodium ion channels, resulting in continuous increasing vagal tone. Most often, cardiovascular effects have been observed, but hepatotoxic or nephrotoxic effects may also be observed. The treatment of intoxication is normal saline infusion and intravenous atropine. Infants should not be fed with honey because it may cause allergic reactions.

Informed Consent: Written informed consent was obtained from patient's parents who participated in this case.

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