



The Black sea's poison; Mad honey

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Abstract

Honey and honey production have been an important source of revenue among the peoples of Anatolia throughout the course of history. Beekeeping is possible everywhere in Turkey thanks to its ecological and geographical features. The best known of these is the type popularly known as 'mad honey', the name of which appears in ancient texts, because of its effects on human beings. Its toxic effects are caused by the substance known as grayanotoxin in the flowers of "Rhododendron ponticum", known among the local inhabitants as the forest rose, which grows in high-altitude forested areas in the Black sea region of Turkey. Like other cholinergic toxidromes, treatment with intravenous atropine and normal saline infusion, can be life-saving in this poisoning.

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Mankind first made use of honeybees in the Neolithic Period (12,000-5000 BC), while they were first employed for commercial purposes in Egypt in 4000 BC. Honey and honey production have been an important source of revenue among the peoples of Anatolia throughout the course of history. Beekeeping is possible everywhere in Turkey thanks to its ecological and geographical features.¹

The fact that the Eastern Black sea region of Turkey has a variable and rainy climate, together with a variety of plant cover, has enabled beekeeping to develop and different types of honey to be produced. The best known of these is the type popularly known as 'mad honey', the name of which appears in ancient texts, because of its effects on human beings. Its toxic effects are caused by the substance known as grayanotoxin in the flowers of "Rhododendron ponticum", known among the local inhabitants as the forest rose, which grows in high-altitude forested areas in the Black sea region of Turkey. Different species of forest rose spread from Europe as far as the Caucasus

and the Himalayas.

Mad honey intoxication first appeared in the history books with the Athenian army commander and historian Xenophon (430-355 BC) and his men's march to the city of Trabzon and exposure to mad honey poisoning there. These historical accounts describe how the troops ate honey from hives in some villages along their route as the Greeks continued on their journey. Those who ate too much suffered vomiting and diarrhea, were unable to stand and became delirious, while those who consumed less became totally inebriated, although this passed by the next day, and nobody actually died. In 120 BC, Mithridates VI Eupator, the new king of Pontus, quickly expanded his territory, adding all of Anatolia to his kingdom. In addition to his military qualities, King Mithridates was especially interested in natural sciences and toxicology. While fighting the armies of the Roman general Pompey in northern Anatolia, Mithridates placed hives full of mad honey along the road to be taken by the Romans and then

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made a tactical withdrawal. The Romans who consumed this honey collapsed in total weakness and were easily vanquished.¹⁻³

Numerous other instances are described in the history books. Throughout history, human beings have enjoyed the beneficial effects of these honeys, and have even to some extent turned their harmful effects to their advantage.

Clinical Data

Clinical findings associated with mad honey intoxication are caused by grayanotoxin (GTX). The basic effect mechanism occurs through voltage-dependent sodium channels, while another involves vagus nerve inhibition.⁴ Animal studies have investigated the effects of GTX on the respiratory, cardiac and central and peripheral nervous systems.⁵

The most common clinical findings in patients after consumption of mad honey are nausea, vomiting, dizziness, confusion and a feeling of being about to faint.⁶ Patients do not generally present to hospital when this occurs, and treatments based on local custom, such as rest and consuming salty water or salted yoghurt, are administered. Such individuals generally recover within a few hours. Patients most commonly present to hospital with cardiovascular findings such as cardiac arrhythmia. Sinus bradycardia is particularly common. Other arrhythmias developing in association with mad honey intoxication are non-specific bradyarrhythmia, nodal rhythm, complete atrioventricular (AV) block and 2nd degree AV blocks.⁷⁻¹⁰ Only one case of asystole has been reported. Clinical findings in patients who present to hospital are generally nausea, vomiting, bradycardia and hypotension. These findings are seen in the great majority of patients (90%).⁶ Findings such as fatigue, sweating, confusion, dizziness and altered mental status are seen in fewer patients

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(70%).⁷ Syncope is a symptom seen in approximately 1/3 patients. Reduced visual acuity and double vision have also been reported.⁶⁻⁷ Other symptoms such as a sensation of obstruction in the throat, respiratory distress, cyanosis, shivering, increased saliva production, headache, facial erythema and trembling may be seen at varying levels.

Symptoms in mad honey intoxication are dose-dependent. Five to thirty grams are sufficient for intoxication. Symptoms may begin within a few minutes or after more than 2 hours, depending on the amount ingested.⁷ Symptoms may persist from a few hours to a few days, depending on the severity of intoxication. Cases showing symptoms and findings compatible with acute coronary syndrome have been reported in mad honey intoxication. The acute coronary event mechanism in mad honey intoxication is thought to be due to coronary blood flow insufficiency secondary to hypotension and bradycardia.

As with other cholinergic toxidromes, treatment with intravenous atropine and normal saline infusion can be life-saving in this poisoning.^{6,11,12}

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