

A Case of Altered Mental Status in the Setting of Bromethalin Toxicity

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Abstract

Bromethalin is one of four different types of rodenticide ingredients. Accidental or intentional ingestion of that poison can cause serious symptoms and signs that would require hospitalization and might lead to death. It works by depleting ATP from brain and liver mitochondria by uncoupling of oxidative phosphorylation process which leads to disruption of the function of sodium/potassium ion pumps in those organs causing cerebral edema with intracranial hypertension. Our case presented with altered mental status after patient was found down in his car with green discoloration around mouth and holding Tomcat rat poison in one hand and a bottle of Vodka on the other hand. Patient was intubated and admitted to ICU. Supportive care was started and later on was weaned off mechanical ventilation and improved over the course of his hospital stay.

Keywords: Bromethalin; Poisoning; Intoxication; Seizures; Supportive; Prognosis

Introduction

There are four different types of rodenticide ingredients; Long-acting anti-coagulants, cholecalciferol, bromethalin, and phosphides (zinc, calcium, aluminum). Human ingestion of these toxins whether accidentally or intentionally can cause serious symptoms and signs that would require hospitalization and might lead to death. Bromethalin was discovered in the 1970s and first registered by the U.S. Environmental Protection Agency (EPA) in 1984. It works by uncoupling oxidative phosphorylation in the brain and liver mitochondria resulting in depletion of cellular adenosine triphosphate (ATP). Cerebral edema and elevated CSF pressure result from decreased ATP production which disrupts the function of the sodium potassium ion channel pumps [1,2]. There is no antidote for bromethalin; symptomatic treatment and inpatient hospitalization are the only interventions that can be offered in case of bromethalin intoxication [3]. The prognosis for most accidental ingestions appears to be excellent. However, bromethalin exposures may result in a higher number of symptomatic patients than long-acting anticoagulant agents.

Case Report

A 74 year-old Hispanic male with past medical history of hypertension who presented to the hospital with altered mental status after being found in his car with a bottle of Vodka in one hand and Tomcat rat poison on the other hand and green discoloration on his hands and around his mouth. In the ED, patient had a Glasgow coma scale of seven and was intubated for airway protection. Physical exam showed vital signs within normal limits except for low blood pressure of 94/63 and normal head to toes exam except for meiotic pupils (3 mm) with sluggish reactivity to light and inability to assess patient neurologically at that time secondary to sedation for intubation.

Patient's CMP was normal except for low calcium of 7.8 mg/dl and high total bilirubin of 1.4 mg/dl, CBC was normal except for elevated WBCs of 12.50 THOU/MCL with neutrophilic predominance. UDS was negative, ETOH level was 384 mg/dl, and negative salicylate and acetaminophen levels. Arterial Blood Gas (ABG) showed a PH of 7.29, PCO₂ of 34, HCO₃ of 17 and Lactic acid of 4.96. INR was 1.1.

Head CT showed generalized atrophy with prominence of extra-axial fluid collections with absence of acute intracranial finding and CXR showed Left basilar airspace opacity likely atelectasis and/or pneumonia. Poison control was contacted which recommended monitoring for s/s Bromethalin toxicity: seizures, cerebral edema. Patient was admitted to the ICU and was started on folic acid, thiamin, pantoprazole and broad-spectrum antibiotics (vancomycin and piperacillin/tazobactam). Within twelve hours; patient's mentation improved and patient was extubated.

Patient stated that he ingested 4 pills of Rat poison mixed with water and drank it down with vodka for a suicidal attempt due to social issues. Patient's WBCs peaked at 14.9, lactate peaked at 6, total bilirubin peaked at 3, INR peaked at 1.2. In the third day of his hospital stay, patient endorsed frontal headache with no focal neurologic symptoms and repeat CT of the head was negative. Patient labs gradually improved to normal and were discharged to a mental health institution after 5 days of hospitalization.

Discussion

Bromethalin is one of four different types of rodenticide ingredients. Accidental or intentional ingestion of that poison can cause serious symptoms and signs that would require hospitalization and might lead to death. It works by depleting ATP from brain and liver mitochondria by uncoupling of oxidative phosphorylation process which leads to disruption of the function of sodium/potassium ion pumps in those organs causing cerebral edema with intracranial hypertension. No antidote is available for this toxin and only treatment is monitoring and supportive care. Even though symptoms of bromethalin can be fatal, the prognosis for most accidental ingestions appears to be

excellent. Our patient ingested it intentionally as a suicidal attempt but had good prognosis and was able to be weaned off ventilation and his vitals and labs improved over the course of his hospital stay.

References

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