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Case Report

Iatrogenic hypermagnesemia following Epsom salt enema

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Abstract

Constipation is a common problem in the older population. Among other treatment modalities, Epsom salt enema has been used in emergency rooms. Since Epsom salts are 100% magnesium sulfate and excreted wholly through the kidneys, hypermagnesemia may result from their use, particularly in patients with impaired renal function. A case of fatal iatrogenic hypermagnesemia resulting from the administration of an Epsom salt enema is presented here. We suggest that magnesium-containing enemas should be avoided in patients with impaired renal function.

Keywords: enema; Epsom salts; hypermagnesemia; iatrogenic; renal failure

1. Introduction

Hypermagnesemia is a rare but potentially fatal condition if unrecognized. The majority of reported cases of hypermagnesemia are iatrogenic, arising from the administration of magnesium-containing laxatives or antacids,[1–4] magnesium-containing enemas,[5,6] or intravenous magnesium sulfate.[7] Magnesium toxicity presents with nonspecific signs and symptoms[8] and is therefore difficult to diagnose based on clinical findings. We present a case of iatrogenic hypermagnesemia resulting from the administration of an Epsom salt enema.

2. Case Report

An 85-year-old woman presented to the emergency department with a 3-day history of constipation and diffuse abdominal pain. Her past medical history was significant for amyloid light chain amyloidosis, hemodialysis-dependent end-stage renal disease, gastric angiodysplasia, and anemia. On presentation, her blood pressure was 147/69 mmHg, and all other vital signs were normal. Her cardiac, respiratory, and abdominal examinations were unremarkable. Complete blood count revealed a hemoglobin level of 99 g/L (120–160 g/L), with a normal white blood cell and platelets count; prothrombin and partial thromboplastin times were normal; and urea was 18.6 mmol/L (3.0–7.1 mmol/L), creatinine 972 μmol/L (60–130 μmol/L), sodium 133 mmol/L (135–145 mmol/L), potassium 4.6 mmol/L (3.5–5.0 mmol/L), chloride 99 mmol/L (98–110 mmol/L), calcium 2.36 mmol/L (2.14–2.66 mmol/L), phosphate 1.79 mmol/L (0.89–1.55 mmol/L), and magnesium 0.81 mmol/L (0.70–1.10 mmol/L). An abdominal X-ray revealed dilated small bowel loops and a minimally distended colon. No air–fluid levels or free air was seen.

Shortly after presentation, an enema containing water, glycerin, and 28 g of Epsom salts (approximately 3 g of elemental magnesium) was administered, with no evacuation of stool. Over the subsequent 7 hours, the patient developed worsening abdominal distension and bowel sounds became absent. A large ecchymosis appeared on the right side of the patient's face, accompanied by the onset of rectal and vaginal bleeding. The patient's neurologic status deteriorated, with

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progressive skeletal muscle paralysis, loss of deep tendon reflexes, and inability to speak. Breathing became shallow, and oxygen requirements increased to 10 L on a nonrebreather mask. Rectal temperature fell to a nadir of 33.8°C (Figure 1). Electrocardiography was performed, which showed first-degree atrioventricular block (PR interval 218 milliseconds) and a prolonged QRS interval (118 milliseconds). Piperacillin–tazobactam was administered due to concern of sepsis, followed by cryoprecipitate and platelets in an attempt to correct the bleeding. Blood work drawn 2 hours after the enema revealed the following: a calcium level of 2.94 mmol/L, a phosphate level of 1.72 mmol/L, and a magnesium level that exceeded the detectable range of the assay (>7.8 mmol/L). Unfortunately, the treating team of physicians was unaware of these results.

Seven hours after the administration of the magnesium-containing enema, the consulting internal medicine team noted the patient's elevated magnesium level. Repeat blood work confirmed the diagnosis of hypermagnesemia (>7.8 mmol/L), and revealed normal partial thromboplastin time (PTT) and International normalised ratio (INR), hemoglobin level 89 g/L, white blood cell count 10.7×10^9/L, and platelet count 139×10^9/L. The patient was sent urgently for dialysis. Post dialysis, the patient's oral temperature

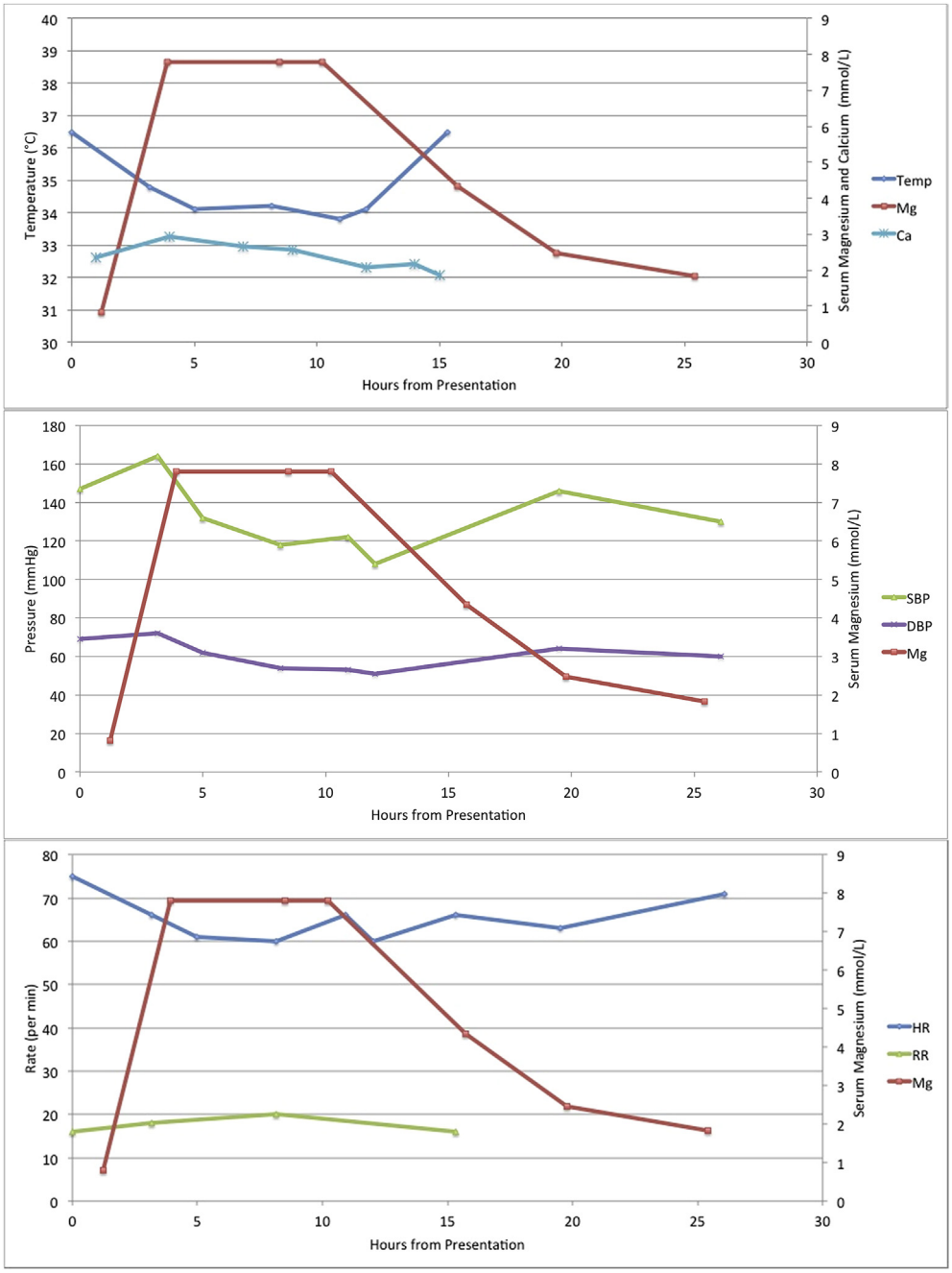

Figure 1. Vital signs in relation to magnesium levels. DBP = diastolic blood pressure; HR = heart rat; RR = respiratory rate; SBP = systolic blood pressure.