CLINICAL VIGNETTE

Treating an Emergent Salicylate Overdose

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Introduction

Salicylate overdose is a medical emergency that can be recognized by an anion gap metabolic acidosis, and concomitant respiratory alkalosis due to alterations to the central nervous system's respiratory center. Identification of the specific acid-base derangement in an obtunded patient is vital in diagnosing this life threatening condition.[1] Not all patients will present with these classical findings as the nervous system depression can occur to the point of apnea rather than the expected tachypnea.[1]

A wide range of clinical manifestations can be observed. In addition to the acid-base disturbance and altered mental status, cardiac arrhythmias, pulmonary edema, hepatitis, bleeding diatheses, hypoglycemia, and rhabdomyolysis can also occur. Once a salicylate level confirms the clinical diagnosis, treatment is usually initiated with activated charcoal via nasogastric tube to prevent further absorption and alkaline intravenous fluids. Severe cases will require hemodialysis, mainly when patients develop renal failure, severe acidemia, or obtundation.[2,3] We discuss a case of salicylic acid toxicity that resulted in respiratory depression and severe kidney injury requiring airway support and acute hemodialysis.

Case Report

Our patient is a 64-year-old Caucasian female who was brought by paramedics to the emergency room. She was found on the floor minimally responsive and was promptly intubated in the field. Arterial blood gas showed a pH of 7.0, PCO2 77 mmHg, and serum HCo3 (bicarbonate-measured not calculated) was 18 meq/L. The anion gap was slightly elevated at 13 after correction for low albumin of 3.2 g/dL. The ABG suggested a mixed metabolic and respiratory acidosis. This was in contrast to the expected anion gap metabolic acidosis and respiratory alkalosis in salicylate overdose. Lactic acid was slightly elevated at 2.5 mmol/L, and the elevated salicylate level of 71.2 mg/dL [normal $\leq$ 20 mg/dL] confirmed the diagnosis of salicylate toxicity. She was given activated charcoal, started on isotonic bicarbonate infusion at 150ml/hour. She also was hypokalemic and required potassium repletion.

The patient had acute kidney injury with a serum creatinine of 1.39 mg/dL from elevated baseline of 0.5 mg/dL. Because of a persistently elevated salicylate level, she was started on acute hemodialysis for removal of the toxin. The patient's salicylate level decreased and became undetectable on the second dialysis day. Her serum creatinine also declined to 0.5 mg/dL and remained normal baseline after discontinuation of hemodialysis. Figure 1 shows trends of serum creatinine, serum anion gap, and serum salicylate level over the hospitalization.

Figure 1

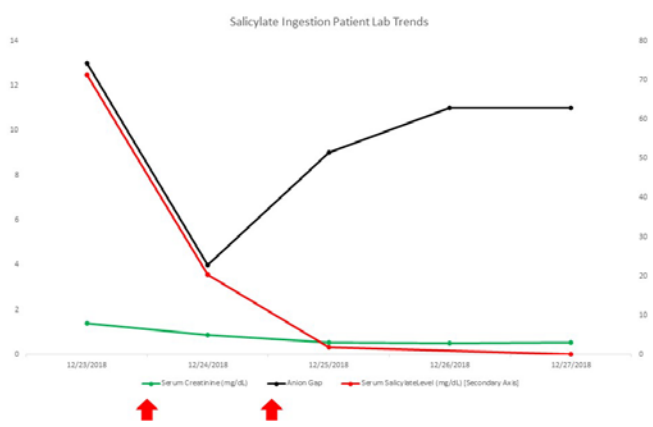

Figure 1. Plot of serum creatinine (mg/dL), anion gap [adjusted for serum albumin of 3.2 g/dL base value + 2], salicylate level (mg/dL) versus Date. Red arrow-hemodialysis event.

Discussion

Approximately 10,000 tons of aspirin are consumed in the United States each year. Aspirin can be found in many other formulations including methyl salicylate (e.g., oil of wintergreen; 98% salicylate), over the counter migraine medications, and Pepto-Bismol, Ben-Gay, and several herbal supplements containing willow tree bark can be sources of salicylates (4-6).[4-6] Even infant salicylate teething gels have ben reported to cause salicylate toxicity.[7] Greene et al. recommended the allowable daily intake of methyl salicylate to be 11 mg/kg/d.[4] Salicylic acid toxicity can present differently in the elderly, and there are chronic forms of salicylate toxicity.[5,6] Topical creams with salicylates, are intended to reduce systemic absorption and can contribute to toxicity if sufficient dermatological absorption occurs.[7,8]

We reviewed an emergent presentation of severe salicylic acid toxicity that required mechanical ventilation, urine alkalization, and hemodialysis for removal of the toxin. This treatment resulted in rapid clinical improvement with shorten critical care requirements and subsequent recovery of renal function. The patient survived to discharge because of the prompt recognition and treatment of this often encountered fatal salicylate overdose.

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Submitted March 2, 2019