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Altered Mental Status in an Elderly Patient Due to Chronic Salicylate Toxicity

Urgent message: Urgent care providers must maintain a high index of suspicion for life-threatening conditions when assessing patients whose self-reporting of symptoms can be vague and nonspecific.

VIVIAN LEI, MD, and JOAN HENNING, MD

Introduction

Elderly patients often present for medical evaluation with vague complaints, oftentimes requiring the provider to obtain additional history from family and caregivers. Urgent care providers must maintain a high index of suspicion for life-threatening conditions based on non-specific symptoms. This case demonstrates the importance of recognizing a rare but serious entity: chronic salicylate toxicity in an elderly patient with altered mental status.

Case Presentation

History of Present Illness

An 82-year-old female presents with generalized weakness for the past week. She lives with her husband and had not been able to get out of bed for the last 5 days. Her family stated that she had not eaten in 5 days. According to family members, her mental status was slightly depressed compared with baseline. She did complain of shortness of breath. She did not have chest pain, abdominal pain, vomiting, diarrhea, fever, cough, rhinorrhea, dysuria, headache, rash, blurred vision, or lymph node swelling.

Medical History

NKDA
PMH: Negative
PSH: Hemorrhoidectomy
Meds: Lisinopril, metoprolol, and nitroglycerin

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SH: Nonsmoker, drinks two beers daily

Physical Exam

On initial presentation, her vital signs were as follows:

- Blood pressure: 146/65 mmHg
- Heart rate: 92
- Respiratory rate: 22

Vivian Lei, MD and **Joan Henning, MD** are both emergency medicine physicians at Vanderbilt University Medical Center. The authors have no relevant financial relationships with any commercial interests.

- Oxygen saturation: 100%
- Temperature: 97.6°F

On physical exam, she was alert but appeared dehydrated and mildly cachectic. Examination of the head, eyes, ears, nose, and throat was normal. She had normal respiratory effort and clear, equal breath sounds. Heart sounds were regular without murmurs, rubs, or gallops. Her abdomen was soft, nondistended, nontender, and without rebound or guarding. Her skin felt warm and dry, without visible rashes or lesions.

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On neurologic examination, she was oriented to herself and place, but not to time. Cranial nerves II through XII were intact. Strength was 5/5 for flexion and extension in all four extremities. Sensation was intact. Deep tendon reflexes were equal and normal. Finger-to-nose testing was equal and normal bilaterally.

Diagnostic Testing

The patient's fingerstick blood glucose was 95. Her white blood cell count was elevated at 11,800. The rest of her CBC was normal. BMP was abnormal with a sodium of 129 mmol/L, potassium of 3.4 mmol/L, chloride of 95 mmol/L, bicarbonate of 13 mmol/L, and anion gap of 21. Her BUN was 51 mg/dL and creatinine was 1.4 mg/dL.

An electrocardiogram showed no acute changes. Urinalysis was unremarkable.

Based on her concerning BMP findings of an anion gap metabolic acidosis, she was referred to the emergency department for further evaluation.

ED Course

Diagnostic evaluation was continued in the ED, where she was found to have an elevated CK of 310. A troponin-I level was 0.01 ng/mL. Liver function tests were normal. Her d-dimer was >1000 ng/mL. TSH was normal.

A chest x-ray showed no acute cardiopulmonary disease. Based on the patient's elevated d-dimer, a V/Q scan was performed but showed no findings of pulmonary emboli. CT of the abdomen with IV contrast showed a large hiatal hernia, but no other acute findings.

ED Diagnosis

The patient was diagnosed with dehydration, an anion gap metabolic acidosis, and elevated CK level.

Hospital Course

The patient was admitted to the hospital for 7 days, where additional history provided by her husband revealed that she had been taking large amounts of aspirin for hip pain. Her salicylate level was five times the normal level. Nephrology evaluated the patient and felt that hemodialysis was not required emergently. She was hydrated aggressively and her anion-gap acidosis improved over 3-4 days. Her hyponatremia and renal function improved with IV fluids. Her mental status improved slowly, and Psychiatry was consulted. Her delirium was determined to be multifactorial, and eventually she became fully oriented and appropriate. She was discharged to a short-term rehabilitation facility for physical therapy.

Discussion

Common diseases can have atypical presentations in the geriatric population, often presenting with the challenge of multiple complicating comorbidities and multiple medications. This case was difficult due to a lack of information about the patient's over-the-counter medications—she did not offer this information, but it is difficult to know if she was specifically asked. In patients who cannot provide a coherent history, utilize any additional sources of information, such as family or caretakers.

Aspirin remains a common over-the-counter analgesic and is regularly prescribed for cardiovascular and cerebrovascular disease. Once ingested, it is rapidly converted to salicylic acid, which acts directly on the medullary respiratory center, often leading to hyperventilation and a respiratory alkalosis. It also uncouples oxidative phosphorylation, leading to a metabolic acidosis. The resulting mixed acid–base presentation is classic for salicylate poisoning. Other salicylate formulations exist, such as topical salicylic acid, methyl salicylate (oil of wintergreen), and bismuth subsalicylate (eg, Pepto-Bismol).

The clinical signs and symptoms of acute and chronic salicylate poisoning are similar, and include nausea and

vomiting, tinnitus, dyspnea, hyperventilation, tachycardia, hyperthermia, and neurologic manifestations such as lethargy, confusion, delirium, agitation, hallucinations, seizures, and coma.[1] However, symptoms are milder and often have an insidious onset in chronic poisonings, leading to delayed or even missed diagnosis; this has been associated with higher morbidity and mortality.[2]

In this case, the diagnosis of salicylate toxicity was not made until the patient was hospitalized and further history obtained from the family.

The management of salicylate toxicity varies between acute and chronic ingestions. The "tip off" in this case was the presence of metabolic acidosis, as demonstrated by the serum bicarbonate level of 13, with an anion gap of 21.

The classic mnemonic of MUDPILES should be considered:

M – methanol, metformin
U – uremia
D – diabetic ketoacidosis
P – phenformin
I – iron
L – lactate
E – ethanol ketoacidosis, ethylene glycol
S – salicylates

With appropriate history, serum salicylate levels should be drawn; however, salicylate levels correlate poorly with symptoms, thus making serum levels an unreliable marker of illness. A patient's clinical condition should ultimately guide therapy.

Treatment of *acute salicylate toxicity* consists of use of activated charcoal, restoring intravascular volume, alkalization of the serum and urine, and supportive measures. In patients presenting with acute lung injury, renal failure, seizures or coma, deteriorating clinical status, or persistent acidemia refractory to treatment, dialysis should be considered.

Chronic toxicity, which can occur even with therapeutic salicylate concentrations, is treated with drug withdrawal and supportive therapy in the absence of significant end-organ dysfunction.

The majority of poisonings in the elderly are unintentional and may result from underlying dementia, improper use of the product, improper storage, or mistaken identities.[3] Elderly patients are more likely to develop chronic salicylate toxicity due to chronic renal insufficiency and coadministered medications.[4] Salicylates should be considered early in the differential diagnosis of an unexplained acid–base abnormality, especially in elderly patients with nonfocal neurologic abnormalities.[5]

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Urgent care providers can play a key role in early identification of possible medication toxicities by specifically inquiring about nonprescription medications and remedies. In any patient with suspected poisoning or medication toxicity, urgent care providers should call the United States Poison Control Network at 1-800-222-1222 to obtain emergent consultation with a medical toxicologist.

Take-Home Points

- Elderly patients with altered mental status require a thorough medical evaluation for high-risk clinical conditions.
- Patients and family should be questioned specifically about over-the-counter or herbal medications.
- Chronic salicylate toxicity is a life-threatening poisoning which has a subtle clinical course with a gradual onset of symptoms.
- Chronic salicylate toxicity must be considered in the presence of an unexplained anion gap metabolic acidosis and altered mental status.
- Management of salicylate toxicity is based on the patient's clinical picture, rather than the serum salicylate level. ■

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