Lithium Associated Hyperparathyroidism

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Background

Lithium is a commonly prescribed medication in the treatment of bipolar disorder. Its therapeutic window is very narrow, and there is always a risk of toxicity. Lithium can affect any organ, most commonly the central nervous system. We hereby present a case of a patient on chronic lithium therapy presenting with an acute overdose and the manifestations of her toxicity.

Case Presentation

A 28-year-old female with history of bipolar disorder presented to the emergency department after an intentional overdose of an unknown quantity of lithium. On arrival her vital signs were normal. On examination she was orientated to person only, had tremors and nystagmus but no evidence of seizure activity. Her laboratory studies were significant for an elevated creatinine of 1.2mg/dL with a baseline of 0.8mg/dL, elevated corrected calcium of 12.8mg/dL, lithium level of 3.5mmol/L (ref 0.5-1.2mmol/L), PTH was 150.5pg/mL, TSH 5.42 mIU/mL, free T4 of 0.68ng/dL and a vitamin D of 17ng/mL.

Case Presentation Cont.

An EKG demonstrated normal sinus rhythm with a normal QTc of 409. The patient was treated with normal saline, received pamidronate and was started on cinacalcet in view of persistent hypercalcemia. Her lithium level trended down to 0.79mmol/L, creatinine normalized, and she never required dialysis. Urine output was monitored, and she never showed any signs of diabetes insipidus. She was started on low dose vitamin D of 1000 IU and levothyroxine 50mcg. When her mental status improved, she reports no family history of hypercalcemia or other endocrinopathies. She did endorse nausea, and constipation but has no personal history of nephrolithiasis or fractures. Her calcium remains mildly elevated despite cinacalcet, intravenous normal saline and intravenous bisphosphonates. She is planned to follow up as an outpatient for neck imaging and 24-hour urinary calcium measurement.

Discussion

Lithium-associated hyperparathyroidism (LAH) is rare. In addition, lithium can also exacerbate hypercalcemia in someone known with primary hyperparathyroidism. The proposed mechanism by which lithium causes parathyroid-mediated hypercalcemia is changing the set point of receptors in parathyroid cells that function to sense calcium resulting in increased PTH release.

Discussion Cont.

Also, lithium acts by antagonizing calcium sensing receptors thus raising the threshold level of calcium required to suppress PTH secretion. To make this distinction of primary hyperparathyroidism and LAH even more confusing, lithium has the ability through abnormal signaling of the Wnt/β-catenin pathways to cause parathyroid adenomas or hyperplasia. Treatment is centered around stopping lithium, but in some cases, surgery may be required to remove an adenoma if found or perform a subtotal parathyroidectomy. Our case demonstrates multiple complications of lithium therapy including central nervous system toxicity in the form of tremors and nystagmus, her abnormal thyroid function and finally, a rarely encountered complication of LAH. Thus, regular outpatient monitoring for these entities becomes of vital importance in preventing morbidity.