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Acid-Base Balance-Electrolyte Quiz – Case 25

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A 60-year-old female visited our hospital with an one-week history of nausea, vomiting, anorexia and general weakness. She was taking levothyroxine (0.1 mg/day) for iatrogenic hypothyroidism, as well as calcium carbonate (1,000 mg/day) and alfacalcidol (1 μg/day) for iatrogenic hypoparathyroidism.

Laboratory data on admission were as follows: Urea 134 mg/dL, creatinine 3.4 mg/dL, serum calcium 14.7 mg/dL, serum phosphate 2.4 mg/dL, pH 7.46 and serum bicarbonate 28 mmol/L. Urinalysis was normal.

Which is the underlying diagnosis?

a. Calcium-alkali syndrome
b. Hypovolemia-induced acute tubular necrosis
c. Hypercalcemia-induced nephropathy
d. Hypercalcemia-induced metabolic alkalosis

Comment

The patient presented with the classical features of calcium-alkali syndrome: Hypercalcemia, alkalosis and impaired renal function associated with ingestion of calcium and alkali. The pathogenesis of this syndrome involves the interplay of bone, intestine and kidney. It has been suggested that some elderly individuals can absorb more calcium than others leading to hypercalcemia, which may affect renal function, since it can cause both renal vasoconstriction and polyuria with sodium losses. The alkali consumption and the volume depletion-induced increased absorption of bicarbonate in the proximal tubules can contribute to the pathogenesis of metabolic alkalosis. The calcium-alkali syndrome is associated with hypophosphatemia due to the phosphorus-binding properties of calcium carbonate as it was the case in our patient.

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Diagnosis: *Calcium-alkali syndrome*