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Acid-Base Balance-Electrolyte Quiz – Case 51

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A 25-year-old woman at week 13 of gestation was presented at the Emergency Department with protracted vomiting and nausea, as well as altered mental status. She had been hospitalized with mild renal impairment due to excessive vomiting until one week before presentation; she was then discharged with normal kidney function and electrolytes.

At admission, the patient was confused and fatigued. Clinical examination revealed mild dehydration (dry mouth and skin) and jaundice, and was otherwise normal.

Blood gases demonstrated a pH of 7.66 with PCO_2 38 mmHg and HCO_3 44.8 mEq/L. The biochemical results were significant for a creatinine of 6.15 mg/dL, urea of 150 mg/dL, sodium of 117 mEq/L, chlorium of 54 and potassium of 2.2 mEq/L. The patient also had increased transaminase levels (AST/ALT=1,220/1,695 IU/L) with mild cholestasis.

The most probable cause of the patient's metabolic derangements is:

a. Hypokalemic paralysis

b. Hyperemesis gravidarum

c. Acute renal failure

d. Acute fatty liver of pregnancy

Comment

Metabolic abnormalities are due to hyperemesis gravidarum. In fact, the patient was presented with prerenal azotemia, alkalemia due to both hypochloremic metabolic alkalosis (HCO_3^- 44.8 mEq/L due to protracted vomiting) and respiratory alkalosis (PCO_2 38 mmHg), hypovolemia-associated hyponatremia and severe hypokalemia due to decreased potassium intake, to vomiting-associated potassium loss, but mainly to inappropriate kaliuria owing to increased delivery of HCO_3^- to the distal tubules leading to raised lumen-negative electrical gradient and enhanced potassium secretion. In fact, urine potassium in a urine sample was markedly increased (60 mEq/g of creatinine). It is worth mentioning that the coexistent effective circulating volume depletion, chloride depletion and hypokalemia impair excess HCO_3^- secretion and allow metabolic alkalosis to persist. The mildly elevated anion gap (15 mEq/L) is possibly related to the coexistent metabolic alkalosis.

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Answer: *Hyperemesis gravidarum*