Hyponatremia and heart failure: the overlooked piece of the puzzle

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Answer: D. Drug induced hyponatremia+hypotonic hypontremia, fluid restriction+drug cessation

Hyponatremia may occur with a high, low, or normal serum osmolality. Pseudohyponatremia is an artifact of measurement as a result of interference between abnormally high concentrations of lipids or proteins and sodium. In pseudohyponatremia, the serum osmolality is usually normal (1).

In hypertonic hyponatremia, the serum osmolality is more than 295 mOsm/kg. Hypertonic hyponatremia occurs when the plasma contains an osmotically active substance such as mannitol or excess glucose. The serum Na concentration falls approximately by 1.6 mEq/L for every 100 mg/dL rise in the serum glucose concentration above the normal concentration (1).

Hypovolemic hyponatremia is associated with a deficit in serum sodium and total body water. Sodium loss is more prominent than water loss. As sodium deficits can be due to renal or extrarenal losses, urine sodium may be <30 mmol/L or >30 mmol/L, respectively (2).

In chronic heart failure, the incidence of hyponatremia is approximately 20–30%, and loop diuretics have less potential for causing hyponatremia than thiazides (2). In our patient, we considered hypotonic hyponatremia (effective serum osmolarity<275 mOsm/kg, urine sodium concentration<30 mmol/L, and high urine osmolality>1.003) as a consequence of water retention. Despite fluid restriction, ultrafiltration, and intravenous diuretic therapy, hyponatremia did not resolve. After reviewing the relevant literature, we did not find any possible offending drug other than thiazide or loop diuretics that could be associated with hyponatremia. However, according to 4766 reports from the FDA and social media, 4619 people reported having side effects when taking rivaroxaban. Among them, 8 (0.17%) had hyponatremia (3). As in our case, hyponatremia was found among those who take rivaroxaban, especially for those who are females, more than 60 years old, have been taking the drug for <1 month, also take medication hydrochlorothiazide, and have atrial fibrillation/flutter. After the cessation of rivaroxaban, serum sodium levels continuously increased, and the patient was discharged from the hospital with a serum sodium level of 136 mmol/L. At the two-week follow-up, her serum sodium level was 138 mmol/L.

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