Paradoxical Worsening of Hyponatremia in SIADH

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ABSTRACT

A patient with cancer, hyponatremia, and the syndrome of inappropriate antidiuresis (SIADH) gets normal saline (NS), and the serum sodium decreases, paradoxically. To explain, desalination is often invoked: If urine is more concentrated than NS, the fluid’s salts are excreted while some water is reabsorbed, exacerbating hyponatremia. But comparing concentrations can be deceiving. They should be converted to quantities, as mass balance is key to unlocking the paradox. The [sodium] equation can legitimately be used to track all of the sodium, potassium, and water entering and leaving the body. Each input or output module can be counterbalanced by a chosen IV fluid so that the serum sodium stays stable. This equipoise is expressed in terms of the IV fluid’s infusion rate, an easy calculation called the ratio profile. Knowing the infusion rate that maintains steady state, we can prescribe the IV fluid at a faster rate in order to raise the serum sodium. Rates less than the ratio profile may risk a paradox, which essentially is caused by an IV fluid underdosing. Selecting an IV fluid that is more concentrated than urine is not enough to prevent paradoxes; even 3% saline can be underdosed. Water drinking adds to the problem and is underestimated in its ability to provoke a paradox. In conclusion, the quantitative approach demystifies the paradoxical worsening of hyponatremia in SIADH and offers a prescriptive guide to keep the paradox from happening. The ratio profile method is objective and quickly deployable on rounds, where it may change patient management for the better.