



HYPONATREMIA SECONDARY TO RESET OSMOSTAT IN A VERY OLD INDIVIDUAL: A CASE REPORT AND PATHOPHYSIOLOGIC PROPOSAL

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To the Editor:

Hyponatremia is one of the most frequent electrolyte disorders usually documented in the elderly¹, and this internal milieu alteration can be generated by different pathophysiologic mechanisms, particularly in this group. These hyponatremia inducing mechanisms are²:

- Inadequate high free water retention and/or income
- Inadequate high sodium loss and/or low sodium income
- Inadequate body potassium content
- Reset osmostat: to set as normal serum sodium a value below 135 mmol/L

Even though, all these pathophysiological mechanisms can be documented in hyponatremic elderly patients, the reset osmostat mechanism is the more infrequent one, and its pathophysiology remains still unexplained³.

In the present report, a case of reset osmostat in a very old individual is presented, and an explanation to the pathophysiology of this entity is here proposed.

A 90 years old woman was taken to the general practitioner in order to perform a health control to her after many years of being without any medical control.

She was lucid, lived alone, took care of herself, had no symptoms, nor was on no medication. Her clinical examination, blood and urine analyses were normal, except for physical signs of malnutrition (subjective global assessment), hypoalbuminemia (serum albumin: 2.5 g/dL), hypocholesterolemia (total serum cholesterol: 100 mg/dl), marked hyponatremia (serum sodium: 126 mmol/l), and serum hypotonicity (plasma osmolality: 260 mmOsm/L).

Initially, since her extracellular fluid was normal, her hyponatremia was interpreted as

secondary to syndrome of inadequate secretion of antidiuretic hormone (SIADH), so she was put on water restriction, and a cerebral, thoracic and abdominal TC scan were performed looking for some oncologic disease (paraneoplastic SIADH), but the patient persisted hyponatremic, and all the performed images were normal.

Thus, her hyponatremia was interpreted as a reset osmostat secondary to ageing and malnutrition, so her serum sodium value was left uncorrected, and her nourishment was put under nutritionist supervision.

In the reset osmostat phenomenon the serum osmolality threshold is decreased (or even increased) respect to the normal serum sodium range⁴. This type of hyponatremia can be identified by the presence of a normal volemia, renal, adrenal and thyroid function, with a normal capacity for diluting and concentrating the urine, and maintaining normal sodium balance^{4,5}. Thus, when a water load test is performed to these patients they can excrete more than 80% of the loaded water (conversely to SIADH)⁴.

Hyponatremia secondary to reset osmostat has been documented in many settings such as pregnancy, people suffering from neurologic diseases, malignancy, alcoholism, malnutrition, and in general in patients suffering from debilitating diseases⁶⁻⁹.)

Since it has already been described in the literature the concept of "sick cell syndrome," which consist of a membrane transport failure (sodium-potassium ATPase pump dysfunction), which leads to an increase in the intracellular sodium and a reduction in intracellular potassium, a phenomenon which can induce hyponatremia in severely ill patients; thus, we propose that the sick cell phenomenon could be the responsible not only of inducing hyponatremia in debilitated patients, but also of leading osmostat cells to change the body threshold for "normal "serum sodium value in order to adapt the whole organisms to a new internal milieu order¹⁰⁻¹¹.

Hyponatremia secondary to reset osmostat is a diagnosis which should be suspected in asymptomatic malnourished very old individuals.

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