Hyponatremia Due to Secondary Adrenal Insufficiency

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Abstract

Hyponatremia is a common electrolyte seen in critical care patients. The rapid diagnosis to the cause of hyponatremia is crucial as delay may lead to poor outcome especially in elderly group of patients. Among the variety of cause of hyponatremia, secondary adrenal insufficiency is a overlooked cause. Here I present two cases in which hyponatremia got corrected once adrenal insufficiency was detected and treated.

Introduction

Hyponatremia is defined as plasma Na+ concentration <135 mm and is a very common disorder in patients admitted in ICU. The causes include euvolemic, hypovolemic, hypervolemic hyponatremia. Among the euvolemic cause, adrenal insufficiency is a important consideration which requires high degree of suspicion in order to detect early and treat properly.

Case Report

1. 71 yr. old male, known diabetic, presented to ICU with generalised weakness for last 2 weeks along with confusion and irrelavant talk for last 3 days. There is no history of fever, headache, vomiting. On examination patient in altered sensorium, pulse-80/min, BP-130/80 mmhg, chest, cvs-normal, JVP not raised, plantar bilateral flexor, neck rigidity absent, perabdomen-normal; edema of absent. There is no past history steroid medication or drug abuse. Investigation revealed- Na+-118.5 mg/dl, K+-3.42 mg/dl, serum osmolality-252.04 mos/kg urinary osmole-312 mos/Kg, urinary spot Na+72 mmol/l. TSH-3.79 mIU/L, T3-1.6 nmol/l, T4-1.28 nmol/l. LFt, RFT is normal. CVP was 8 cm water, Abg-normal. Echo-normal study. Serology for dengue, malaria, typhoid was normal. USG abdomen-normal study: MRI brain-diffuse atrophic changes in brain. Patient was treated with hypertonic saline slowly and over next 48hrs sodium level increased to 120 mg/dl but then it again came down to 116 mg/dl despite treatment with hypertonic saline along with decreased sensorium of the patient. This prompted to again look at blood investigation report which showed to be a case of euvolemic hyponatremia as patient had no edema, normal JVP, normal CVP, urine spot na>20. The causes now included 1. Hypothyroidism 2. Siadh 3. Adrenal insufficiency. Hypothyroidism was ruled out as patient had normal thyroid function. The next possibility was adrenal insufficiency. Serum cortisol morning (8 am) was sent which showed level of 25 .2 nmol/l (normal range 123-626 nmol/l), and the evening sample of 23.5 nmol/l (46.2-389 nmol/L). ACTh level sent came to be 13 pg/ml. The patient is now diagnosed to be a case of secondary adrenal insufficiency and treated with hydrocortisone injection. Gradually the sensorium of the patient improved and sodium reached normal level in next 3days. The patient is discharged on tablet prednisolone and is now on regular follow up.
2. 70 yr old female came to hospital with weakness, reduced appetite for 10 days and decreased sensoriumfor last 2 days.No past history of fever, headache, vomiting, over the counter drugs or steroid medication. On examination patient conscious,vitals normal, no edema, JVP not raised, per abdomen normal. Blood investigation revealed Na+116.1mmol/L, K+4.59 mmol/L, urinary osmolality 332.02 mosm/kg, serum osmolality of 224.0 mosm/kg, urine spot Na+ 158mmol/L. TSH-3.56 mIU/l. Abg normal, CVP-7 cm water. USG abdomen, X-ray chest, MRI brain-normal study. Echo-normal study. Serum cortisol morning-78 nmol/L (range 123-626 nmol/l), evening-40.2 nmol/l (range 46.2-389 nmol/L). Serum ACTH-21 pg/ml, serum aldosterone-2.17 ng/dl, plasma renin-0.84.

Patient was diagnosed to be case of hyponatremia due to adrenal insufficiency and treated with hydrocortisone injection following which sensorium improved and sodium level reached to normal range.

Case Discussion

In both the cases mentioned above, patient both elderly group, presented with altered sensorium, weakness, loss of appetite, and on investigation found to have very low sodium. Despite correcting initially with hypertonic saline, the sensorium and sodium level did not improve. On further elucidating the, cause secondary adrenal insufficiency was detected and treated promptly leading to quick recovery.

Hyponatremia is a common disorder occurring in 22% of hospitalised patients.[1] It is subdivided diagnostically into 3 groups based on history and volume status, hypovolemic, euvolemic, hypervolemic.[1] Among the euvolemic condition, secondary adrenal insufficiency is a important cause of hyponatremia.[1] Secondary adrenal insufficiency is a condition associated with deficient production of ACTH. The symptoms include weakness, fatigue, weight loss, loss of appetite.[2] Laboratary investigation findings include hyponatremia, low to normal ACTH, normal rennin and aldosterone levels.

The mechanism leading to hyponatremia in adrenal insufficiency are multifactorial-this include

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1. Cortisol feeds back negatively on CRH and ACTH, an inhibitory effect that is removed with adrenal insufficiency.[3-5]
2. Cortisol deficiency results in increased hypothalamic secretion of corticotropin releasing hormone (CRH), an ADH secretagogue.[5-7]
3. In addition, cortisol appears to directly suppress ADH secretion.[6,7] Thus, ADH levels increase when plasma cortisol levels are low. The increase level of ADH causes water retention and hyponatremia

Conclusion

In summary a high degree of suspicion is needed to detect cortisol deficiency especially in elderly group who may present with nonspecific symptoms of weakness, lethargy, reduced appetite and hyponatremia as happened in both the above cases.

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