Unusual association of diseases/symptoms

Severe hyponatraemia during sepsis and marijuana addiction

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Summary

The authors report a 29-year-old kidney transplant patient who presented, four episodes of severe hyponatraemia associated with sepsis from 2006 to 2010. He was a long-term user of marijuana. The association between severe recurrent hyponatraemia during sepsis and marijuana addiction might not be casual, since experimental data show that vasopressin release induced by sepsis is modulated by the endocannabinoid system.

BACKGROUND

Severe hyponatraemia in young subjects has been described in association with use of the illicit drug ecstasy.¹ Here we report the history of a patient with recurrent episodes of hyponatraemia during sepsis, which suggests that marijuana use should also be looked for in young subjects with this electrolyte disorder.

CASE PRESENTATION

The patient, a 29-year-old man affected by polycystic kidneys, received a kidney transplant in 2005. Since then, his glomerular filtration rate was stable around 30 ml/min. He was treated with tacrolimus (Prograf), steroid and azathioprine and was taking atenolol, amlodipine, telmisartan, esomeprazole, folic acid, ω 3-supplements and darbepoietin.

In August 2010, he anticipated his scheduled control because of somnolence, headache and fever. Laboratory investigations revealed hyponatraemia (117 mEq/l). Since he was a known long-term user of recreational drugs, we looked for urinary drug metabolites. The test was negative for metabolites of ecstasy, but strongly positive for cannabis. Haemoculture was positive for *Serratia Marcescens* and the patient was successfully treated with antibiotics and NaCl infusions.

Analysis of patient's records revealed that he had been suffering from three other episodes of severe hyponatraemia (113, 122 and 123 mEq/l) between 2006 and 2010. All three episodes were associated with sepsis (two bacterial, one viral) and required hospitalisation. On the other hand, despite the patient's regular marijuana use, his serum sodium was normal in the scheduled outpatient follow-up visits. He was anti-HIV negative.

To evaluate how frequent severe hyponatraemia is, in kidney transplant patients, in our Unit – we performed an audit using of our electronic medical record. Data from last 10 years were available for 216 patients, and none of whom was a known marijuana user. These patients during a global follow-up of about 18 600 patient-months of observation had 18 episodes of severe hyponatraemia

(ie, <125 mEq/l), that is, an incidence rate of one episode every 1000 patients-months of observation. On the other hand, the incidence rate of severe hyponatraemia in a marijuana-addicted patient was one episode every 15 patients-months.

DISCUSSION

Central to the development of hyponatraemia is an impairment in renal water excretion linked to excessive antidiuretic hormone (ADH) secretion. The latter can be appropriately triggered by congestive heart failure or other conditions associated with a low effective volume, like cirrhosis or severe dehydration. Hyponatraemia can also be caused by inappropriate ADH secretion, which can be induced by drugs or several disease states. Our patient was not affected by evident clinical conditions known to cause excessive ADH secretion. On the other hand, the association between severe recurrent hyponatraemia during sepsis and marijuana addiction might not be casual. The relationship between cannabinoids and pituitary function is a complex one.² In fact, cannabinoid receptors are present in the hypothalamic area and it is well known that exogenous cannabinoids have an inhibitory effect on neuroendocrine function, leading to increase in diuresis and suppression of milk-ejection reflex through inhibition of ADH and oxytocin release, respectively.^{3 4} However, the exception to this inhibitory activity is the stimulatory effect that cannabinoids have on hypothalamic-pituitary axis during stress conditions like sepsis.^{2 5} For instance, in animal models of sepsis with intraperitoneally injection of lipopolysaccharide, cannabinoids have been found to increase the secretion of hypothalamic-pituitary hormones.^{2 5} To this end, it is of interest that all the four hyponatraemic episodes suffered by our patient were associated with sepsis. This observation allows raising the hypothesis that in humans, like in the experimental models, in the clinical setting of sepsis, cannabinoids may enhance the sepsis-related ADH release which may in turn lead to the development of life-threatening hyponatraemia.

Learning points

- ▶ Severe hyponatraemia in young subjects has been associated to ecstasy use
- ▶ The association between severe hyponatraemia during sepsis and marijuana addiction is a new one
- ▶ The cause-effect relationship is possible but not proved
- ▶ The report can stimulate doctors to look for illicit drug addiction in the course of severe hyponatraemia in young people.

Competing interests None.

Patient consent Obtained.

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