CASE REPORT

Acute severe hyponatraemia secondary to polydipsia and associated herbal remedy use

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SUMMARY

A 47-year-old woman presented with seizures secondary to euvoalaemic hyponatraemia. A collateral history revealed recent increased oral fluid intake and increased use of herbal remedies including valerian root over the New Year period. There was no history of psychiatric disease to support psychogenic polydipsia. She responded to careful sodium replacement in the intensive care unit and was discharged with no neurological sequelae.

BACKGROUND

The complementary medicine market is very popular in the UK and the concept of the New Year 'detox' with all-natural products is appealing to those less concerned with evidence-based medicine and more with complementary medicine. Excessive water intake as a way of 'purifying and cleansing' the body is also a popular regime with the belief that harmful waste products can thus be washed from the body. Despite marketing suggesting otherwise, all-natural products are not without side effects however, and it is important that we as healthcare professionals look for their use in our patients and are aware of those side effects as well as interactions with prescription medications. We therefore present the case of a middle-aged woman who presented with a potentially life-threatening complication of a New Year 'detox'.

CASE PRESENTATION

A previously fit and well 47-year-old woman was brought in to the emergency department following a brief period of confusion and altered behaviour lasting an hour followed by a collapse and generalised tonic-clonic seizure which self-terminated. She was postictal on arrival in the department with a reduced Glasgow Coma Scale (9/15) with ongoing teeth grinding. She was intubated and ventilated for CT scan of the head as well as concerns that she was still seizing.

Initial blood gas analysis revealed very low sodium (104 mmol/L), ionised calcium (0.86 mmol/L), raised lactate (3.4 mmol/L) and raised bilirubin (53 µmol/L) with the remaining results unremarkable. Her family reported no regular medications or recreational drugs. According to her partner, she had reported increased thirst over the previous 2–3 days and had been drinking more water and tea as a result but they did not note this to be to an excessive degree. Further conversation with the partner revealed that the patient routinely used herbal remedies for various minor symptoms and

that she was regularly taking milk thistle, molskan, l-theanine, glutamine, vitamin B compound, vervain, sage tea, green tea and valerian root. Following extubation, the patient subsequently revealed that while she takes all of these remedies from time to time, she had more recently been under increased stress and suffering with low mood and so had been increasingly taking them all together. She had no prior psychiatric history.

INVESTIGATIONS

Initial laboratory results showed neutrophilia ($18.7 \times 10^9/L$) with normal C reactive protein, sodium of 111 mmol/L with normal renal function but low urea (0.9 mmol/L). Liver function was mildly abnormal with a raised AST (102 IU/mL) and bilirubin (57 µmol/L). The adjusted calcium was low (1.98 mmol/L) with a normal magnesium and phosphate. Thyroid-stimulating hormone and cortisol levels were within normal range. Serum osmolality was 225 mmol/kg. Urine osmolality was 253 mmol/kg after the initial 50 mL 3% sodium chloride infusion. Urinary electrolytes were analysed after a total of 350 mL 3% sodium chloride, when the urinary sodium was <5 mmol/L and the osmolality was then 104 mmol/kg. ECG and CT imaging of the head, chest, abdomen and pelvis were unremarkable, as was cerebrospinal fluid analysis.

DIFFERENTIAL DIAGNOSIS

The initial confusion and generalised seizures were precipitated by hyponatraemia but it was not immediately clear what had caused this. She was clinically euvoalaemic but with a low urinary sodium, making syndrome of inappropriate antidiuretic hormone secretion unlikely. Cortisol and thyroid levels were normal and she did not use any prescription drugs. She had not had any excessive salt loss through vomiting or diarrhoea nor was there evidence of third-spacing of fluids or other fluid loss through trauma or burns. It was at this point that other medications were explored with the family and the herbal remedy use was identified but there was some disagreement between the family members as to whether there had been excessive fluid intake.

TREATMENT

In the emergency department, she was initially treated by the attending physician with 50 mL 3% hypertonic saline at a rate of 25 mL/hour in addition to a bolus of 10 mL 10% calcium chloride. Sodium replacement was monitored by serial blood

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Figure 1 Trend in sodium levels as measured on blood gas analyser and in the laboratory.

gas analysis with intermittent laboratory urea and electrolytes. Following review by an intensive care specialist, she was induced with thiopentone 250 mg intravenously, fentanyl 200 mg intravenously and rocuronium 50 mg intravenously. She was put on a propofol infusion for maintenance but continued to seize despite thiopentone boluses and phenytoin 1 g infusion. By this point, sodium had increased on blood gas analysis to 110 mmol/L. The blood gas value for the sodium was used for monitoring as it is more accurate in severe hyponatraemia than the laboratory value. The difference between the tests is observable in figure 1. She was then given a further bolus of 150 mL 3% sodium chloride and over the next 8 hours, she continued to receive infusions of 3% sodium chloride to bring her sodium to 120 mmol/L. She was initially polyuric, passing up to 520 mL/hour over the first 12 hours of her admission but this tailed off, and she became oliguric which took a further 24 hours to completely normalise.

OUTCOME AND FOLLOW-UP

The patient was discharged home from the intensive care unit to be followed up with the community mental health team for management of her long-standing issues with low mood. She exhibited no neurological sequelae and her serum sodium remained within normal range. She had no ongoing polydipsia.

DISCUSSION

After researching the various different herbal remedies recently used by the patient, we came across one case report of a similar presentation of a man in his 40s with a history of generalised anxiety disorder who similarly presented with seizures due to severe hyponatraemia.¹ He had an initial sodium of 114 but, like with our patient, a urinary sodium of <10 mmol/L. He was also successfully treated with hypertonic saline and reported afterwards that symptoms had developed shortly after consuming a large amount (3.5 L) of herbal remedy containing valerian root, along with lemon balm, passion flower, hops and chamomile. The authors ascribed the resultant hyponatraemia more to the excessive fluid intake than due to a specific effect of the valerian root, as we were inclined to do in this case. Psychogenic polydipsia however, is unusual in patients without significant psychiatric history and although the family of our patient had

noted increased fluid intake, they had not thought it excessive. She was however, initially polyuric which would be consistent with excessive fluid intake but the polydipsia did not recur after treatment and extubation. In both these patients, the fluid intake did not seem to be excessive enough to cause such a low sodium level acutely, which typically requires of the order of >10 L/day after the limit of urine dilution is reached.² It may well be that the valerian root altered this threshold, allowing severe hyponatraemia to develop at an earlier stage but without further evidence for this or a mechanism to provide a scientific basis, no definite conclusions can be drawn on whether the valerian root had any role in the presentation.

During the initial management, sodium was monitored using blood gas analysis rather than using the laboratory values. This was because recent studies have demonstrated that, due to the blood gas analyser employing a direct method for sodium measurement rather than an indirect method involving dilution employed by laboratory analysers, it produces a more accurate measure of serum sodium in severe hyponatraemia (sodium <120 mmol/L).³ Usually, the laboratory analyser will give a higher reading for the sodium than is true, which obviously has important implications in the management of hyponatraemia, especially if the clinician is not aware of this and uses both results when correcting the sodium.

Learning points

- ▶ Always consider non-prescription remedies, both deliberately taken and unknowingly exposed to, when assessing patients with unusual pathology.
- ▶ Valerian root has now been suspected in two cases associated with severe, life-threatening hyponatraemia and healthcare professionals should be vigilant to this.
- ▶ Patients should be advised of the potential detriment done to their health of undertaking a New Year 'detox' especially if it involves consuming excessive amounts of fluid or alternative remedies.
- ▶ In severe hyponatraemia, blood gas values for sodium are more accurate and should be used in preference to laboratory values for early monitoring.

Contributors OTRT reviewed the literature and prepared the first draft of the case report. IRE provided information on the initial management and reviewed the draft for submission. NM obtained the diagnosis and drug history of the patient and reviewed the draft for submission. All authors have reviewed the final draft for submission.

Competing interests None declared.

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REFERENCES

- 1 Takeshita S, Takeshita J. A case of hyponatremia due to self-treatment of anxiety with a beverage containing valerian root. *Prim Care Companion CNS Disord* 2013;15:PCC.12101482.
- 2 Dundas B, Harris M, Narasimhan M. Psychogenic polydipsia review: etiology, differential and treatment. *Curr Psychiatry Rep* 2007;9:236–41.
- 3 Geoghagan P, Koch CD, Wockenfus AM, et al. Agreement between whole blood and plasma sodium measurements in profound hyponatremia. *Clin Biochem* 2015;48:525–8.

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