A curious case of recurrent episodes of multiple-electrolytes derangement

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Introduction

Single-electrolyte derangement is a common biochemical finding. Multiple-electrolytes derangement is less common and require multiple and simultaneous corrective therapies. We present a patient who had multiple admissions with multiple-electrolytes derangement, which after further evaluation required a single therapeutic intervention.

Case

A 26-year-old lady had eight admissions over three years with abdominal pain and vomiting. During each admission she had life-threatening hyponatraemia, hypokalaemia, hypomagnesaemia, hypochloraemia, hypo-osmolality, and low serum urea and creatinine values. She was also being investigated for a 4-year history of abdominal pain, cyclical vomiting with chronic mild hypokalaemia and hypochloraemia. Conditions such as carcinoid syndrome, acute porphyria, celiac disease, adrenal dysfunction, diabetes mellitus, intestinal polyps and other intra-abdominal pathologies had been ruled out.

Investigation and results

We suspected excessive fluid intake, which she denied. We therefore, assessed a paired serum and urine electrolytes and osmolality before and after a 12-hour fluid-fast. Her electrolytes normalised soon after the fluid-fast test indicating prior water intoxication (Table 1).

Table 1 – Before and after the fluid fast test

Chemical test	Reference range	Before the test	After the test
Serum sodium	133-146 mmol/l	132	143
Serum potassium	3.5-5.3 mmol/l	3.4	4.8
Serum chloride	95-108 mmol/l	94	102
Serum urea	2.5-7.8 mmol/l	1.4	2.5
Serum creatinine	50-120 µmol/l	47	62
Serum osmolality	275-295 mOsm/kg	259	282
Urine sodium		23	22
Urine potassium		15	53
Urine osmolality	300-110 mOsm/kg	112	286

Management

The patient later admitted drinking 3-5 litres of water daily to relieve abdominal discomfort but during episodes of abdominal pain she would drink more than 6 litres in one sitting before presenting to the Emergency Department. An explanation of water-intoxication and patient-counseling resulted in only mild vomiting-related electrolyte derangement on subsequent admissions, which also became less frequent.

Discussion

Water intoxication is when excessive intake of water results in over-dilution of serum electrolytes which can lead to potentially fatal brain disturbance. **Psychogenic polydipsia** is a psychiatric condition in which the patient feels compelled to drink large quantities of water putting them at risk of water intoxication. **Potomania** (usually beer potomania) is a hypo-osmolality state that arises after massive consumption of water (beer), which is poor in solutes and electrolytes. This hampers the electrolyte-gradient-dependent free water excretion in the kidneys, thereby contributing to serum dilution. Signs and symptoms of hyponatremia include nausea and vomiting, headache, short-term memory loss, confusion, lethargy, fatigue, loss of appetite, irritability, muscle weakness, spasms or cramps, seizures, and decreased consciousness or coma. Treatment involves fluid restriction in mild cases. Intravenous electrolytes correction may be required in severe cases, but caution must be excised, especially if chronic. Diuretics and vasopressin receptor antagonists have been used for severe cases.

Conclusion

We have presented a case of multiple-electrolytes derangement due to chronic and acute water intoxication. If left unchecked, this condition can be associated with serious neurological sequelae. Early detection, explanation and patient counseling are required to prevent further harm.

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