

## Case reports

### Water intoxication in the course of an acute schizophrenic episode

M. Ledochowski<sup>1</sup>, M. Kahler<sup>1</sup>, F. Dienstl<sup>1</sup>, W. Fleischhacker<sup>2</sup> and C. Barnes<sup>2</sup>

<sup>1</sup>Coronary Care Unit, Department of Medicine and <sup>2</sup>Biological Psychiatry Research Unit, Department of Psychiatry, University of Innsbruck, Innsbruck, Austria

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**Abstract.** In the course of a schizophrenic episode a woman drank a large amount of tap water. She was found nearly unconscious in her room and was admitted to the clinic. Very low sodium and potassium values in the serum were indicative of water intoxication. During hospitalization she also suffered from several convulsive seizures. After replacement of electrolytes she recovered within 12 to 17 h. This case report demonstrates that water intoxication should also be considered in cases of suspected poisoning with other substances such as drugs. In all these cases an electrolyte status is indicated.

**Key words:** Water intoxication – Psychosis – Hyponatremia – Case report intoxication – Inappropriate ADH secretion syndrome – SIADH-brain oedema

Many cases of water intoxication have been described and have occurred in the course of an acute psychosis [1]. Serious neurological dysfunction (vomiting, confusion, incoherent speech, agitation, somnolence, coma, generalized spasms) are usually the result of the sudden onset of hyponatremia [2]; these frequently have fatal consequences [3]. We believe that the following case report is unique in that a hyponatremia of sudden onset with a serum Na<sup>+</sup> of 101 mmol/l within 2 to 3 h is rarely survived.

#### Case report

A 47-year-old woman was found standing by the washbasin in her room, drinking water and vomiting. She was confused and her speech was incoherent. She was admitted to the Psychiatric Clinic in a somnolent condition and experienced several generalized seizures during admission. The psychiatrists suspected poison-

ing and immediately transferred the patient to the Internal Medicine Section, where she was comatose on arrival and was intubated.

Further examinations produced the following results: blood pressure 110/65 mmHg, pulse rate 54/min, rate of respiration 16, no pathological cardiac or pulmonary murmurs, no oedema. The ECG showed a sinus arrhythmia, U waves and a prolonged QT interval (480 ms). The neurological examination indicated divergent eyeballs deviating downwards, isocoria of the pupils, responding to light, absence of corneal reflexes on both sides, biting of the tongue, no meningism, tendon reflexes the same on both sides, absence of the plantar reflexes and, a little later, positive Babinski's reflex on both sides.

On admission the laboratory findings were as follows:

in the serum – sodium 101 mmol/l, potassium 2.0 mmol/l, chloride 69 mmol/l, calcium 1.8 mmol/l, glucose 11.4 mmol/l (206 mg%), bicarbonate 15.9 mmol/l, osmolality 231 mosmol/l, urea 4.3 mmol/l (26 mg%), creatinine 76 µmol/l (0.86 mg%), protein 68 g/l (6.8 g%), bilirubin 23.3 µmol/l (1.36 mg%), free Hb 25.4 µmol/l (41 mg%), Hb 7.9 mmol/l (12.7 g%);

in the urine – sodium 67 mmol/l, potassium 24 mmol/l, chloride 88 mmol/l, osmolality 258 mosmol/l, urinary glucose positive.

The coagulation state was normal and no toxic substances could be detected in the urine or the blood. The chest X-ray showed obvious signs of excessive water and of a pneumonic infiltrate.

The patient was treated with hypertonic saline solution (256.6 mmol NaCl/12 h), frusemide (initially 40 mg i.v.), potassium replacement (160 mmol/12 h), tetracyclines (doxycycline), dexamethason (4 × 4 mg/day), phenytoin (2 × 125 mg/day), cimetidine and

haemo-filtration (3 l clear fluid removed). She had a pronounced diuresis (5 200 ml/24 h); serum potassium returned to normal approximately 12 h after starting therapy and serum sodium (131 mmol/l) within approximately 17 h.

Thirty-six hours after being admitted the patient was responsive and she was transferred back to Psychiatry for further treatment.

### Comments

Water intoxication occurs when water intake exceeds the renal elimination capacity [4]. Even when the kidney function is normal, this frequently occurs when the oral water intake exceeds 5 l per day. Psychic stress can also provoke inappropriate ADH secretion. Because of inappropriate ADH-secretion urinary osmolality may be relatively high despite an excessively low serum sodium. Various psychotropic drugs also influence renal water elimination capacity [4]. A hyponatremia results and this is probably responsible for the neurological symptomatology. Symptoms usually appear in hyponatremias of <120 mmol/l but the extent of the CNS dysfunction is determined by the speed with which a hyponatremia develops [2].

Therapy consists of restricting fluids, administering Na via hypertonic saline solutions, water elimination by means of frusemide and haemo-filtration or haemodialysis of hypertonic peritoneal dialysis. By blocking the renal ADH receptors, demeclocycline [2] has an additional diuretic effect. Brain oedema therapy is also important, barbiturates being recommended in addition to dexamethasone. According to our own experience slight alkalization with sodium bicarbonate has a favourable effect both on diuresis and on the treatment of the brain oedema.

Opinions differ regarding the rapidity of the electrolyte correction. Norenberg et al. [5] believe that if this is too rapid it can lead to a central pontine myelinolysis. Other authors, however, regard this more as a consequence of the hyponatremia [4]. Mortality is often quoted as being 66–86% [4] when the serum sodium falls below 105 mmol/l. Malnutrition and alcoholism makes the prognosis even more unfavourable.

We believe that this case of water intoxication demonstrates that rapid electrolyte correction (raising the serum sodium by 2 mmol/h) to a serum sodium value of 130 mmol/l may be regarded as the therapy of choice in serious hyponatremias (<105 mmol/l).

### References

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Dr. M. Ledochowski  
Coronary Care Unit  
Dept. of Medicine  
University of Innsbruck  
Anichstrasse 35  
A-6020 Innsbruck  
Austria