Acute hyponatraemia

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A previously healthy 24-year-old woman was admitted stuporous, with brief periods of agitation, in the early evening. The night before she was said to have drunk six rums in a nightclub. Her friends became concerned on her return home because of her repeated vomiting and deteriorating conscious level. She was found to be normotensive with no renal or adrenal disease. Vaginal examination revealed a tampon that had been in place for around 24 hours when her menses had commenced.

Her biochemistry was consistent with the syndrome of inappropriate antidiuresis. Serum: sodium 113 mmol/l, osmolality 240 mmol/l; urine: sodium 153 mmol/l, osmolality 639 mmol/l. Her arginine vasopressin was measured and at that time found to be 0.4 pmol/l. She rapidly improved with fluid restriction (500 ml daily), regaining full consciousness within 16 hours, when her sodium had risen to 122 mmol/l. She continued to improve and made a rapid and uneventful recovery, but had no recollection of events beyond arriving at the club.

Question

What is the most likely diagnosis?

Answer

Ecstasy-induced hyponatraemia.

Discussion

Ecstasy is the amphetamine analogue 3,4-methylenedioxymethamphetamine, which, along with its congeners, is frequently used at nightclub 'raves' or rock concerts. Its popularity in these settings is associated with the energy and 'bonhomie' that users claim; this and the perceived lack of after-effects, reinforces feelings of security in its use.

While there are well-described dose-effect relationships,¹ there are also seemingly idiosyncratic reactions. Nine deaths from ecstasy-associated malignant hyperthermia syndrome have been recorded.² The principle factor in this syndrome would appear to be prolonged periods of intense physical activity in hot environments with inadequate fluid intake; there does not seem to be any way of identifying susceptible individuals. The advice given to users of ecstasy in such conditions is to rest periodically and to drink plenty of fluids, indeed clubs are advised to make water readily available.

Recently there have been reports of another rare syndrome: ecstasy-associated hyponatraemia and catatonic stupor^{3,4}; three patients, all women, had taken between one-half and one-and-a-half tablets of ecstasy. This effect appears unpredictable, being found in both naive and previous users. The hyponatraemia appears to be due to the syndrome of inappropriate antidiuresis, although arginine vasopressin has not been measured.

A notable feature of such hyponatraemia is the rapidity of onset which is an extremely unusual presentation of the syndrome of inappropriate antidiuresis. Rapid change in osmolality could result in significant morbidity and mortality.⁵

In our patient, ecstasy was detected in the urine, while the arginine vasopressin was inappropriately elevated, confirming its role in the aetiology of the hyponatraemia. The rapidity of onset of the syndrome in this patient and those in other reports^{3,4} suggests a marked change in arginine vasopressin homeostasis; either through release of stored arginine vasopressin from the posterior pituitary or inhibition of the endocytic removal of renal tubular luminal membrane water channels.

Following reports of malignant hyperpyrexia³ at 'raves', ecstasy users have been advised to drink plenty of non-alcoholic fluids. However, in the presence of the syndrome of inappropriate antidiuresis this may rapidly lead to symptomatic hyponatraemia, as occurred in our case, and could result in permanent neurological damage and possibly death. Current advice is that ecstasy users drink isotonic fluids.

Why only a very few ecstasy users suffer the syndrome of inappropriate antidiuresis we do not know; it may be related to impurities in ecstasy production or increased susceptibility to ecstasy toxicity. It may be pertinent to note that this and other published cases^{3,4} involve pre-menopausal women, in whom acute hyponatraemia due to water overload has a high incidence of morbidity and mortality.⁵ Thus pre-menopausal women may be at particular risk from the syndrome of inappropriate antidiuresis if they use ecstasy and drink excess water in an attempt to avoid malignant hyperthermia.

Final diagnosis

Ecstasy-induced hyponatraemia.

Keywords: ecstasy, syndrome of inappropriate antidiuresis, hyponatraemia

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