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Journal of Toxicology
CLINICAL TOXICOLOGY
Vol. 40, No. 7, pp. 931–932, 2002

LETTER

Acute Hyponatremia, Seizure, and Rhabdomyolysis After Ecstasy Use

To the Editor:

"Ecstasy" or 3,4-methylenedioxymethamphetamine (MDMA) is commonly abused in nightclub "raves" and rock concerts, where its euphoric and stimulantlike effects can enhance social interaction and endurance. Recently, it has become increasingly popular as a recreational drug in Taiwan. The amount of Ecstasy confiscated by law enforcement agencies has increased from 700 to 44,650 g over the last four years.[1] Hyponatremia is a rare adverse event of MDMA and first reported since 1993.[2] To our knowledge, only 13 females and 1 male have reported to have hyponatremia after Ecstasy use.[2–13] We described a young woman who developed acute hyponatremia, seizures, and rhabdomyolysis after the ingestion of Ecstasy.

A 19-yr-old female was hospitalized with coma and seizures. At a party, she ingested several tablets of Ecstasy and drank more than 10 glasses of water (≥ 5 L), with an Ecstasy tablet in each glass. The total ingested dose of MDMA was estimated to be 8–10 mg/kg. Over 10 hours, she gradually became lethargic and experienced a self-limited tonic seizure that lasted for several seconds. In the Emergency Department, her temperature was 39.5°C and she was agitated (Glasgow coma scale = 9). Laboratory investigations showed a leukocytosis (12,300 mm^{-3} with left shift), serum sodium level of 115 mmol/L, serum potassium level of 4.3 mmol/L, serum osmolality of 239 mOsm/kg, and a serum creatinine phosphokinase of 426 u/L. She had a urine sodium level of 223 mmol/L and urine osmolality of 721 mOsm/kg. Serum urea and creatinine levels, thyroid function tests, and serum cortisol level all were within normal limits. Computed tomography of the brain revealed only mild cerebral edema, and electroencephalography did not show sharp waves or spikes. Gas chromatography–mass spectrometry identified MDMA in the urine and serum with the concentrations of 66.4 μg/mL and 202 ng/mL at 12 and 25 hours after the last ingestion, respectively. An intravenous infusion of 3% saline at 10 mL/h for 6 hours raised her serum sodium level to 129 mmol/L. Her level of consciousness improved gradually. Her menstrual period began on second hospital day. Serum creatine phosphokinase reached 15,378 U/L on the fourth day of hospitalization. After six days in hospital, she returned to normal daily activity with some retrograde memory loss.

Our patient developed two significant clinical findings: rhabdomyolysis and hyponatremia. Rhabdomyolysis elicited by hyperthemia, prolonged muscular compression, and seizures occurs after Ecstasy use. In our patient, the correction of hyponatremia may have contributed to the development of rhabdomyolysis.[14]

The low serum sodium concentrations and low serum osmolality with concentrated urine supports the diagnosis of inappropriate antidiuretic hormone secretion. MDMA use has been associated with a syndrome of inappropriate antidiuretic hormone secretion (SIADH). Henry et al. showed that even low doses (e.g., 40 mg) of MDMA can induce vasopressin secretion in humans.[15] In addition, excessive water intake may contribute to

DOI: 10.1081/CLT-120016964
0731-3810 (Print); 1097-9875 (Online)

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the development of SIADH-induced hyponatremia. Female is frequently associated with hyponatremia after Ecstasy use. Our case and the reported 14 cases are all females except one,[2–13] and three females die of severe brain edema.[7,11,13] The antidiuretic activity of vasopressin appears to be affected by the phase of the estrous cycle. In rats, Wang et al. showed that estrogen, but not progesterone, reduces the antidiuretic response of vasopressin.[16] In women, the lowest estrogen levels occur during the menstrual period.[17] Premenopausal women have greater risks of serious morbidity (e.g., permanent brain damage) and mortality from symptomatic hyponatremia than either postmenopausal women or men.[18] Delayed resolution of brain cell swelling resulting from the inhibiting activity of estrogen on the Na^+–K^+ ATPase pump and extrusion of sodium have been postulated to be the mechanism.[19] Because of these factors, young women are at increased risk for hyponatremia and seizures following the use of Ecstasy.

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