Hyponatremic Encephalopathy Induced by “Ecstasy”

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Ecstasy ingestion should be high on the list of differential diagnoses for young patients who present with acute, unexplained encephalopathy.

A 21-year-old woman was rushed to the emergency department (ED) with altered mental status following a witnessed seizure. She was agitated, confused, and incoherent on arrival and unable to provide a medical history. Vital signs were stable and blood glucose level was normal (123 mg/dL). Further clinical examination revealed mildly constricted pupils. She had another seizure episode in the ED that was followed by vomiting. She was sedated and intubated for airway protection because she demonstrated a significant risk of aspiration.

Her initial laboratory work revealed electrolyte imbalances: sodium, 113 mmol/L, (normal range [NR], 136 to 145 mmol/L); chloride, 79 mmol/L (NR, 98 to 107 mmol/L); anion gap metabolic acidosis: bicarbonate, 18 mmol/L (NR, 21 to 32 mmol/L); pH, 7.3 (7.35 to 7.45); paCO₂, 33 mm Hg (NR, 35 to 48 mm Hg); serum osmolality, 236 mOsm/kg (NR, 285 to 295 mOsm/kg); urine osmolality, 349 mOsm/kg (NR, 50 to 1200 mOsm/kg); and urine sodium, 30 mmol/L (NR, 20 to 110 mmol/L ). There was no serum osmolar gap, alcohol level was zero, and serum albumin was normal. Her qualitative urine toxicology screen was positive for phencyclidine (PCP).

Her clinical presentation was felt to be consistent with acute severe hyponatremia caused by a variant of syndrome of inappropriate antidiuretic hormone (SIADH) and was likely drug induced. Results of a CT scan of the brain were normal. Her hyponatremia was corrected slowly over 48 hours to a level of 139 mmol/L. She made a swift and uneventful recovery. Further quantitative analysis of her urine toxicology revealed a 3,4-methylenedioxy-N-methyl amphetamine (MDMA) level of 420 ng/mL (normal reporting limit 50 ng/mL). Additional history found she had attended a “rave” party on the night of her ED admission at which she admitted to having tried a number of street drugs.

Discussion

Ecstasy is the street drug of choice in the “rave” culture. It is usually adulterated and in addition to its base drug MDMA (a metamphetamine derivative), it can contain a mix of drugs such as PCP, as in this case, heroine, ketamine, and ephedrine to mention a few. The relatively purer forms of ecstasy are referred to as “Molly” in the US and “Mandy” in the UK. The popularity of ecstasy is related to its ability to enhance energy, endurance, sociability, and sexual arousal. The drug postpones fatigue and sleepiness and is falsely believed to be safe. Ecstasy, however, has debilitating acute and chronic effects many of which are dose-dependent and can lead to fatal complications. Consumption of high doses can result in autonomic hyperousal manifested as anxiety, restlessness, and paranoia. Tolerance develops rapidly to its psychoactive properties and so multiple doses are often consumed in an attempt to reproduce the desired effect. The result is a predominance of sympathomimetic effects manifested as cardiovascular instability, arrhythmias, and hyperthermia. Altered consciousness, agitation, severe anxiety, and muscle stiffness with rhabdomyolysis are also common presentations. Although rare, fatalities related to ecstasy use have been reported and are related to multiorgan failure following hyperthermia and brain edema following hyponatremia. MDMA has been shown to induce syndrome of inappropriate antidiuretic hormone (SIADH), as demonstrated in this case.

Ecstasy ingestion should be high on the list of differentials for young patients presenting acutely with unexplained encephalopathy. Special attention should be directed toward electrolyte levels, particularly sodium. Toxicology screening in these patients expedites active management and allows preventive management in anticipation of new symptoms and complications. Remember that given the typically adulterated nature of street drugs, clinical signs may be variable depending on what other compounds may have been “mixed” in with the primary agent, as was the case with our patient. It is sometimes unclear which of the drugs account for particular symptoms.
References:

1. Harold Kalant. The pharmacology and toxicology of “ecstasy” (MDMA) and related drugs. CMAJ. 2001;165:917–928.


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