Persistent Psychosis After a Single Ingestion of "Ecstasy" (MDMA)

To the Editor: The street drug "ecstasy" (3, 4-methylenedioxymethamphetamine [MDMA; also "X" or "E"]) is a synthetic amphetamine that has both stimulant and hallucinogenic properties.[1] It is increasingly used as a recreational drug and has a strong association with the "rave" culture. Subjective effects of MDMA include elevated mood, increased self-confidence and sensory sensitivity, and a peaceful feeling coupled with insight, empathy, and closeness to persons.[2] It has gained a deceptive reputation as a "safe" drug among its users. MDMA use has been associated with various medical complications such as renal and liver failure, rhabdomyolysis, disseminated intravascular coagulation, hepatitis, cerebral infarction, seizures, delirium, fulminant hyperthermia, intracranial bleed, cerebral edema, and coma.[3–6] Adverse psychiatric symptomatology associated with MDMA includes panic attack, depression, suicidal ideation, flashbacks, rage reactions, psychosis, and severe paranoia.[3] Persistent psychosis after even a single use has been reported.[1,4,7] This case report describes persistent psychosis in a previously healthy adolescent girl after a single ingestion of MDMA

Case report. In October 2010, Ms A, a 17-year-old African American girl without previous psychiatric or medical history, obtained MDMA from her friend and ingested the pill. She began experiencing auditory hallucinations and displaying disorganized speech and behavior shortly thereafter. She was taken to the University of South Alabama, Mobile, emergency department for evaluation and treatment of her behavior. In the emergency department, the consultation-liaison psychiatrist noticed that the patient was awake and alert, but could not engage in meaningful communication. Results of routine laboratory testing showed no alcohol or illicit drugs present. Physical examination findings were unremarkable. She was seen by the neurology service, where physicians believed that the patient had no obvious etiology for her current symptomatology. There was no family history of mood disorders or psychosis among first- or second-degree relatives. The patient was cleared medically in the emergency department and was then transferred to an acute care inpatient psychiatric unit affiliated with the University of South Alabama.

In the psychiatric unit, she continued to demonstrate odd, bizarre behavior. She exhibited frequent episodes of crying and using profanity. She displayed sexually inappropriate behavior, eg, touching others sexually, dancing seductively, and assuming unusual postures by putting her hands underneath her pelvis while pushing the pelvis upwards. In addition, she attempted to eat food from another person's plate and multiple trash cans. Her speech was mostly nonsensical, and at times she claimed that she was pregnant and had an acquired immunodeficiency syndrome (AIDS) infection. She appeared to be responding strongly to internal stimuli. She gave the appearance of being paranoid, feeling scared, and being socially withdrawn.

After a literature review, we decided to institute olanzapine orally disintegrating tablets 10 mg every 12 hours. Haloperidol 5 mg and lorazepam 1 mg were also employed on an as-needed basis and were administered frequently over several days. After 14 days of this medication regimen, normal behavior was noticed, but there were intervals during which she became agitated and confused. After that point, her family had decided to take her home against medical advice. She was sent to school for a day by family to resume a normal life (she is an honor roll student and had been accepted to college on a scholarship). According to the family, the school personnel advised her to go back home immediately because "she is not normal." She was promptly rehospitalized in our care due to frequent agitation, confusion, leaving the house at night, and walking in traffic.

In the unit, her assessment demonstrated her to be staring off blankly into space and making repetitive hand, eye, and head movements while screaming. She was placed on 1:1 observation due to her unpredictable behavior. Olanzapine was increased to 15 mg every 12 hours. Gradually, her behavior improved, such that she was no longer displaying stereotypic behavior. She was capable of having meaningful conversations. Furthermore, her reality testing improved. Upon discharge, she showed improvement of symptoms and organized thoughts. However, she continued to describe dysphoric mood. She recounted use of MDMA in October. Instantaneously she noticed she was not herself nor did she recall what happened immediately after taking MDMA.

MDMA-induced psychotic disorder can be distinguished from schizophrenia by several characteristics associated with the former, including complete lack of prodromal symptoms (social withdrawal, anxiety, or lack of motivation), absence of sustained mood disturbance, and good premorbid functioning.[1] The cause of MDMA-induced psychotic symptoms is not well understood.[1] Evidence from animal and human studies suggests that MDMA reduces levels of brain serotonergic activity and depletes serotonin stores.[8] MDMA acts by binding to presynaptic monoamine transporters, most strongly to the serotonin receptor transporter, causing rapid release and subsequent depletion of serotonin and dopamine from presynaptic terminals.[6,9–11] Further damage is caused by the generation of free radicals that are taken by the serotonin nerve terminal, exhausting the antioxidant capacity of brain tissues.[12] In laboratory animals, MDMA causes persistent damage to serotonergic neurons.[6,9,12] It is thought that it causes similar damage to neurons in the human brain. MDMA does not have a potent direct agonist effect on dopamine receptors.[1,2] MDMA may induce psychosis through dopaminergic or serotonergic pathways.[13] Our patient did not have medical complications, as compared to a published case report.[14] In our case, there was no laboratory toxicology evidence of MDMA exposure; however, routine toxicology screens do not screen for MDMA. Furthermore, presumptive diagnosis of MDMA use is often made without toxicologic evidence. In our patient, we were able to support MDMA use through patient interview and collateral from friends and family. The use of high-dose antipsychotic medication (haloperidol and olanzapine) and anticonvulsants (diazepam and carbamazepine) has been documented for the treatment of psychosis after MDMA use.[1,5,6,15]

The widespread use of MDMA and the potential adverse effects associated with it underlines the need for clinicians to inquire carefully about MDMA use and to include MDMA in toxicology screenings. MDMA use as a differential diagnosis in patients presenting with paranoid psychosis, affective disorders, or anxiety has become increasingly important. When MDMA exposure is suspected, there should be close collaboration between the psychiatrist and medical personnel, since MDMA use is associated with serious medical complications. Whether these complications are due to MDMA use directly or caused by unrelated adulterants added during manufacturing is an area of ongoing research. Further studies are required to clarify the etiology of persistent psychosis after MDMA use and to describe the treatment options.

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