
Adverse Symptomatology and Suicide Associated with the Use of Methylenedioxymethamphetamine (MDMA; "Ecstasy")

Richard S. Cohen

Key Words: Ecstasy, MDMA, drug use, serotonin, suicide

BIOL PSYCHIATRY 1996;39:819–820

Introduction

3,4-Methylenedioxymethamphetamine (MDMA) is a synthetic amphetamine analog steadily increasing in popularity. The drug is particularly popular on college campuses and at all night "rave" parties (Randall 1992). MDMA, commonly known as "Ecstasy", has increased in prevalence despite its placement on Schedule I, by the Drug Enforcement Administration, in 1985.

Numerous complications have been commonly reported to occur following MDMA consumption. Tachycardia, hypertension, elevated body temperature, nausea, vomiting (Downing 1986), and pupillary dilation are sympathomimetic symptoms that occur soon after ingestion. There are idiosyncratic psychiatric and psychological disturbances that manifest as a consequence of MDMA intake including anxiety, panic attacks, paranoia, flashbacks, hallucinations, depersonalization, rage, depression, and suicidal ideation (Hayner and McKinney 1986). MDMA has also been associated with several fatalities within the past decade. Lethal organic complications that have accompanied MDMA ingestion include acute renal failure, disseminated intravascular coagulation, rhabdomyolysis, heart failure, convulsions, and hemorrhage (Henry et al 1992). The following cases report adverse psychiatric and organic consequences following MDMA ingestion.

Case 1

A 22-year-old Caucasian female, with no history of behavioral abnormality, reported having recurring symptoms after taking

Ecstasy. She had sporadically taken Ecstasy over the course of a 6-year period. She did not claim to have used any other drugs except for alcohol and a few life-time exposures to marijuana. The subject experienced numerous recurring complications that followed her MDMA use. She described persistent depressive episodes characterized by intermittent instances of paranoia, anxiety, aggressive outbursts, depersonalization, panic attacks, melancholia, suicidal ideation, fear of death, and repetitive thought patterns. Some recurring physical side effects included lower back ache, headaches, heart palpitations, smothering sensations, hypertonicity, and restlessness. She finally sought medical assistance after these symptoms began interfering with social activities, intimate relationships, and her ability to concentrate. Despite having adverse effects that were believed to be Ecstasy-induced, the subject maintained that she had continued to use the drug because of its "intense euphoric high."

Treatment began with psychotherapy; however, therapy alone was deemed to be ineffective in ameliorating the various presenting disturbances. Several medications and medication combinations were prescribed in an attempt to manage the manifesting symptomatology. Medications that were introduced into psychopharmacotherapy included alprazolam, paroxetine, lithium HCl, and carbamazepine. All medication regimens were proven to have an inadequate effect, with little, if any, response. Finally, lorazepam was introduced into the realm of therapy. Treatment with lorazepam 3 mg/day along with supportive psychotherapy was effective in diminishing many of the symptoms that the patient had endured. Follow-up at 6 months revealed that the patient continued to have intermittent episodes of impending doom, palpitations, and insomnia. She did admit, however, that many of her symptoms had improved significantly and that her life had "regained order." The patient has discon-

From the Research Department, Peapack, New Jersey.

Address reprint requests to Richard S. Cohen, Research Department, 535 Main Street, P.O. Box 635, Peapack, NJ 07977.

Received July 5, 1995; revised October 6, 1995.

tinued her MDMA use and continues to receive psychotherapy on a biweekly basis.

Case 2

A 17-year-old Caucasian male attended a rave party in New York City with two of his friends. The subject ingested an MDMA tablet, as did both of his companions. Many of the people at the club were also under the influence of Ecstasy. Although it cannot be completely confirmed, this was believed to be the first time that the subject had taken this particular drug. Approximately 30 min after consuming Ecstasy, the subject indicated that he had a headache and felt nauseous. Although his friends tried to both comfort and calm him, the subject began to have racing thoughts and began expressing a great deal of hostility with regard to a recent breakup with his girlfriend. His friends decided to take him home. Approximately 3 hours after consuming MDMA, the subject began feeling extremely depressed and wanted to call his ex-girlfriend immediately. Being that the subject was not fully coherent, friends discouraged him from doing anything deemed irrational, and asked that he just go to sleep. Despite feeling apprehensive, the patient fell asleep shortly thereafter.

Two days later, the subject continued to show signs of lethargy and agitation, and continued to feel dysphoric. The subject also described how he had been experiencing derealization, confusion, and paranoia. In the early part of the evening, while listening to music, the subject went into the bathroom located in his bedroom and shot himself in the head. Although paramedical personnel were called and arrived quickly to the young man's house, he was pronounced dead at the scene.

Discussion

These cases are in accord with reports in the literature that implicate MDMA with the onset of both psychological and behavioral complications. Many of the presenting symptoms described by these 2 patients have been implicated, in the literature, as being induced by the use of Ecstasy. A wide range

of complications have been well documented in the literature as presenting as a result of MDMA ingestion. These effects have ranged from being short-lived to fatal in nature.

A great deal of research has focused on the effects that MDMA has upon serotonin-regulated systems. Several animal studies have indicated that MDMA has an effect on serotonergic mechanisms and may actually serve as a catalyst for damaging the nerve terminals responsible for the discharge of serotonin (Schmidt 1986). Many psychopathological disorders are believed to arise from the abnormal neurotransmission of serotonin. Studies have found a correlation between suicide and low levels of cerebrospinal fluid 5-hydroxyindoleacetic acid (5-HIAA), the primary metabolite of serotonin (Ricci and Wellman 1990). Furthermore, the concentration of 5-HIAA in cerebrospinal fluid has been shown to be reduced in those individuals who have had prior exposure to MDMA (Ricaurte et al 1990). Cox (1993) and Dowling (1990) have reported cases in which Ecstasy was associated with both suicidal ideation and suicide.

It is not possible, at this time, to conclude that MDMA is solely responsible for inducing depression and suicide in these cases; however, the apparent association between MDMA use and serotonergic alterations warrants further consideration and study. Given the absence of any history of psychiatric disorder in the first patient, it seems quite possible that a causal relationship exists between her use of MDMA and the precipitation of her long-term psychiatric and physical disturbances. In the second case presented, it is possible that MDMA may have either triggered a short-term depressive outburst, or possibly exacerbated a preexisting depressive disorder. The patient's suicide may have also been related to an acute psychotic episode triggered by his MDMA consumption. There is also the possibility that the individual had used other drugs in combination with his MDMA consumption. Unfortunately, it had not been possible to obtain a complete medical history from the patient during the brief time he had been seen. The community at large should be prudent of the immediate effects of MDMA, as well as the residual symptoms that intermittently occur well after the actual drug experience.

References

- Cox DE (1993): 'Rave' to the grave. *Forensic Sci Int* 60:5–6.
- Dowling GP (1990): Human deaths and toxic reactions attributed to MDMA and MDEA. In Peroutka SJ (ed), *Ecstasy: The Clinical, Pharmacological, and Neurotoxicological Effects of the Drug MDMA*. Norwell, MA: Kluwer, pp 63–75.
- Downing J (1986): The psychological and physiological effects of MDMA on normal volunteers. *J Psychoactive Drugs* 18:335–340.
- Hayner GN, McKinney H (1986): MDMA: The dark side of ecstasy. *J Psychoactive Drugs* 18:341–347.
- Henry JA, Jeffreys KJ, Dawling S (1992): Toxicity and deaths from 3,4-methylenedioxymethamphetamine ("ecstasy"). *Lancet* 340:384–387.
- Randall T (1992): Ecstasy-fueled 'rave' parties become dances of death for English youths. *JAMA* 268:1505–1506.
- Ricaurte GA, Finnegan KT, Irwin I, Langston JW (1990): Aminergic metabolites in cerebrospinal fluid of humans previously exposed to MDMA. *Ann NY Acad Sci* 600:699–710.
- Ricci LC, Wellman MM (1990): Monoamines: Biochemical markers of suicide? *J Clin Psychology* 46:106–116.
- Schmidt CJ (1986): Neurotoxicity of the psychedelic amphetamine, methylenedioxymethamphetamine. *J Pharmacol Exp Ther* 240:1–7.