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*The author reported no
potential conflict of interest
relevant to this article.*

How to recognize a patient who's high on "bath salts"

Forget about a routine drug screen; it won't help. Here's how these patients will present and how best to care for them.

PRACTICE RECOMMENDATIONS

- › *Include cathinone use in the differential diagnosis for any patient exhibiting paranoid psychotic behavior or hallucinatory delirium. (C)*
- › *Keep in mind that cathinone effects can mimic the "excited delirium" attributed to cocaine, methamphetamine, PCP, and Ecstasy. (C)*
- › *Consider using benzodiazepines to control agitation, or low-dose antipsychotics to treat hallucinations. (C)*

Strength of recommendation (SOR)

- A** Good-quality patient-oriented evidence
- B** Inconsistent or limited-quality patient-oriented evidence
- C** Consensus, usual practice, opinion, disease-oriented evidence, case series

A 31-year-old construction worker with a history of intermittent cocaine use was brought to the emergency department (ED) by the police. He was handcuffed and appeared confused and frightened. The patient's wife had phoned the police after he began running through a field in pursuit of perceived invaders of their home. The wife reported that a few hours earlier, the patient had begun to hallucinate and had become very fearful after getting high.

His heart rate was 126, blood pressure 136/96 mm Hg, and temperature 99.6°F. During the initial exam, the patient became agitated, attempted to assault a nurse, and tried to leave the ED before being subdued. A urine screen for drugs was negative for cocaine. His creatine phosphokinase was 850 U/L, creatinine 2.32 mg/dL, and blood urea nitrogen 27 mg/dL.

The health care team learned that the drug he'd been snorting earlier that day—and the day before—was "bath salts."

This patient was one of the 30 that we've seen at our university hospital over the past year.

Since early 2010, EDs, psychiatric facilities, and poison control centers have seen a surge in the number of patients abusing novel synthetic stimulants—cathinones—that had once been sold innocuously as "bath salts" or "plant food." Sales have largely gone underground, sold by those trafficking in methamphetamine and cocaine. These products are also available for online purchase and may be sold under such provocative names as "Cloud Nine" or "Rave."¹ In 2010, poison control centers received 304 calls related to the use of these substances; in 2011, the number was 6138.²

Cathinone: An emerging recreational drug

For centuries the peoples of East Africa and the Arabian Peninsula have used the leaves of the indigenous khat plant

(*Catha edulis*) for its amphetamine-like properties.³ Its active ingredient, cathinone, is a central nervous system stimulant that inhibits dopamine reuptake.⁴ In 2005, extracts from the plant were imported to Israel as “Hagigat” and promoted as a stimulant or aphrodisiac. These products were banned by the Israeli government in 2008 following documented cases of cardiovascular and neurologic sequelae.⁵

■ **The growing problem of synthetic cathinone analogs in the United States.** In 2008, synthetic analogs of cathinone were first identified in an analysis of drugs seized in the United States from individuals suffering psychological reactions to their use.¹ Two such substances, 4-methylmethcathinone (mephedrone) and 3,4-methylenedioxy-py-rovalerone (MDPV), have since circulated worldwide, publicized by information on the Internet. Although the packets sold as “bath salts” clearly state that the contents are not for human consumption, Web sites promote the chemicals as “legal highs.”⁶

While these substances were being banned in many Western European countries, their use rapidly increased throughout the United States and elsewhere, often as an alternative to cocaine. Increases in the number of reports to poison control centers throughout the United States provide evidence of the increasing use of these drugs, despite legislation outlawing possession and sale in many states.⁷ In September 2011, the US Drug Enforcement Agency, using its emergency scheduling authority, made possession and sale of MDPV and mephedrone illegal throughout the United States.⁸

■ **Who’s using bath salts?** A review of calls to 2 poison control centers involving 236 patients over a 7-month period ending in February 2011 suggests that users of cathinones are primarily male (78%) and young (modal age 26).⁷ Many users of cathinones do not regularly use other drugs recreationally, and they believe the open sale of these substances implies low risk.⁷ However, one reported series from a hospital in Michigan indicated that 69% of users presenting to the ED had acknowledged past use of illicit drugs.⁹

■ **What the drugs look like.** Mephedrone and MDPV are supplied as white

powders packaged in small packets of 500 mg and sell for about \$25. Most users take the drug by nasal insufflation, although there is an alarming trend toward intravenous use.⁷ The intended effects in using these stimulants are improved attention and energy, as well as euphoria. Doses of about 25 mg produce these effects in most individuals and last for 2 to 3 hours, leading some users to compulsively re-dose to maintain the effects.

Use of bath salts leads to paranoid delusions, violent behavior

Both mephedrone and MDPV are strong inhibitors of dopamine reuptake in areas of the brain regulating reward and motivation.^{10,11} With prolonged exposure, the resultant stimulant effect of dopamine in reward centers of the brain moves a user from recreational pleasure seeking to addictive use just to maintain normal function.¹² This transition occurs in a matter of days or weeks in some individuals, and we have seen multiple readmissions for paranoid psychotic reactions shortly after discharge from hospitalization.

Multiple serious complications of use have been described. The mainstream media have reported bizarre suicides and some homicides.^{13,14} Our clinic has reported on a unique hallucinatory delirium after use of MDPV, resulting in paranoid delusions and violent behavior in response to vivid hallucinations.¹⁵ Other patients suffer prolonged anxiety and panic reactions or depressive symptoms with suicidal ideation.¹⁶

Cardiovascular and other sequelae

About half of patients presenting to hospital EDs have cardiovascular complications such as tachycardia, chest pain, and hypertension from the sympathomimetic effects of these agents.^{9,16} There have also been reports of rhabdomyolysis and renal failure requiring intensive medical treatment.^{7,9,16}

Taken together, mental status changes and physiologic reactions are similar to the “excited delirium” attributed to cocaine, methamphetamine, phencyclidine (PCP), and methylenedioxymethamphetamine (Ecstasy), all drugs that act on central mono-



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amines.¹⁷⁻²⁰ There have also been reports of death after the use of these drugs.²¹

Cathinones do not show up on routine drug screens

A routine urine screen for synthetic cathinones is not available, although a specific test arranged through commercial laboratories is available for cases when use is suspected. According to a written communication from A. Macher, MD, in 2011 (manuscript in preparation), urine drug screens for PCP using the immunoassay method may yield a false-positive result in the presence of MDPV. Simply asking patients whether they've been using these products often elicits an honest answer.

Treatment is largely supportive

Management guidance based on clinical trials is lacking. Cardiovascular complications require usual treatment.^{9,16} Serious psychiatric reactions may necessitate hospitalization to assure patient safety, particularly with evidence suggesting the potential to act on

paranoid delusions or suicidal ideation. Benzodiazepines may be needed to control agitation, and low-dose antipsychotics, such as risperidone 1 mg, can aid in treating hallucinations.^{9,15}

The hallucinatory psychosis seen with these substances is best characterized as a toxic delirium.¹⁵ Aggressive use of antipsychotic agents is not advised, given the risk of treatment-related morbidity in patients with a history of repeated stimulant use.²² Many patients presenting with acute delirium may require restraints. These procedures should be used with caution to minimize muscle tissue damage; patients should be monitored frequently for hyperthermia, dehydration, and rhabdomyolysis.¹⁶

Nothing is known about the long-term effects of these drugs, although substances with similar actions are associated with long-term cognitive and memory deficits after repeated use.⁴

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