



Northern Exposures

The regional newsletter devoted to enhancing the management of and improving health outcomes for poisoned patients.

Northern New England Poison Center

January 2012

Bath Salts and Tasers

What exactly are bath salts?

Bath salts is a slang name for powdered products consisting of one or more designer drugs with stimulant and hallucinogenic properties. The name was given to mask the true intent of the product. Initial packaging included pictures that matched the name. Brand names included "Ivory Wave" and "Pure Ivory." After it became clear that the products were intended for abuse, the brand names became more obvious, such as "Rave On," "Cloud Nine," "Sextacy," "Purple Wave," "Cloud Nine" and "Monkey Dust." These powders/crystals have been available at head shops, convenience stores, on the Internet and through dealers, mostly coming in from out of the country. Some still attempt to hide the products' intended use with labels that suggest legitimate products, such as plant food, insect repellent, research chemical, Hoover Freshener, jewelry cleaner, hookah cleaner, pipe cleaner, toy cleaner and decorative sand. Labels often note, "not for human consumption."

The chemicals in bath salts are structurally similar to stimulants such as methamphetamine and methcathinone, as well as some that cause altered perceptions, such as ecstasy (methylenedioxy-methamphetamine). As would be expected, the effects are both stimulating and mind-altering. Although the stimulation can be problematic all on its own, the associated paranoia and violence that can occur seem to be a bigger problem. Some patients are so violent and out of control that they are a danger to themselves, their families, the community, law enforcement and the health care professionals attempting to treat them. A bath salts product may contain one or more of the following, or similar, chemicals:

- 3,4-Methylenedioxypropylvalerone (MDPV)
- 4-Methylmethcathinone (Mephedrone)
- 3,4-Methylenedioxymethcathinone (Methylone)
- 4-Methoxymethcathinone (Methedrone)
- Fluoromethcathinone



**Pictures to the right provided by
Lt. Thomas J. Reagan
of the
Bangor Police Department**



Use/High:

Bath salts are typically snorted, like cocaine. Some smoke it in pipes or on cigarettes. Others shoot it intravenously. It may be swallowed, but is not commonly used that way. Euphoria is followed by stimulation, then altered perceptions. Reportedly, the good part of the high lasts two or three hours and is followed by less desirable effects for up to eight hours after the drug is used. It appears that repeated and prolonged use is more likely to lead to psychosis. Even users with bad trips have severe cravings and want to use again.

Epidemiology

The American Association of Poison Control Centers reported just over 300 cases of bath salts intoxication in 2010, and over 6,000 through the end of 2011. The reports peaked in June 2011 and have been declining since. The NNEPC, which manages poisonings for Maine, New Hampshire and Vermont, received over 200 reports of bath salts intoxication through 2011, more than 150 of which occurred in Maine, most all during 2011. The last peak was in August 2011. The number of poisonings reported fell by about 50% from the third quarter to last quarter of 2011. The Maine counties affected follow:

Penobscot	46	Piscataquis	4
Knox	24	Somerset	4
Kennebec	20	York	4
Cumberland	10	Lincoln	3
Aroostook	9	Washington	3
Androscoggin	7	Franklin	2
Oxford	7	Unspecified	2
Hancock	6		

New Hampshire had 35 poisonings, 11 in Strafford, 6 each in Cheshire and Hillsborough, 3 in Coos, 2 each in Grafton and Merrimack, 1 in Rockingham and 4 in unspecified counties.

Vermont had 11 poisonings, 4 in Chittenden, 2 each in Washington and Windham and 1 each in Orange, Orleans and Rutland.

Four poisonings were reported from unspecified or other states.

Poison centers receive calls about poisonings when callers, including health care professionals, have questions and require assistance. Reporting is encouraged but voluntary. Therefore, poison center cases are probably only a fraction of the total number of poisonings.

Pharmacology/Clinical Effects:

Although the pharmacology is not completely understood, based on the chemical structures and the observed clinical effects, it appears that serotonin, norepinephrine and dopamine are all increased. Patients are stimulated and sometimes paranoid. Initial euphoria is followed by hyperactivity, then paranoia and some dysphoria. Paranoia can be severe and can result in violence. Despite bad trips, users describe significant craving for the drug and difficulty abstaining from continued use.

Acutely, patients may present with tachycardia, hypertension, hyperthermia, agitation, dilated pupils, hallucinations and paranoia, which can be severe. Dystonia, chorea, bruxism and seizures may occur. Patients may develop rhabdomyolysis and associated renal dysfunction. Although much of the serious harm is caused by traumatic acts taking place during paranoid episodes, patients extreme enough to be categorized as having excited delirium are probably at risk for sudden death, the cause of which is not clear. Reportedly, the paranoia and frightening hallucinations may recur over a three-day period. Once sedated, the patient may wax and wane between sleep and severe agitation. After this period, some patients remain paranoid and psychotic.

After chronic, repeated use, patients appear more likely to develop psychosis that may days or weeks. It is unclear whether some of these effects may be permanent. Underlying psychiatric disorders may be contributing factors.

Management

Due to the route, amount and timing of bath salts exposure, there is no role for decontamination under usual circumstances. The goal is to keep the patient and those around them safe from harm, and calm the patient enough to allow for a thorough evaluation. As many of the patients present in a state of excited delirium, aggressive sedation is often necessary. Law enforcement advises against arguing with the patient about their delusions or contradicting them, as this usually worsens the agitated state. They advise to redirect the patient's attention to what you need—in the case of the health care professional, their cooperation to help ensure they will be safe and allow you to check to be sure they are all right.

Sedation is challenging. Large doses of benzodiazepines are commonly required. Midazolam (Versed®) has a more reliable and quicker onset than lorazepam (Ativan®), and works more rapidly and safely than the antipsychotic haloperidol (Haldol®), even when given by intramuscular (IM) route. The Northern New England Poison Center recommends 5 mg of midazolam by intravenous (IV) or IM route, which can be repeated in 10 minutes. If this is insufficient, add another 5 mg of midazolam IV or IM and 5 mg of haloperidol IV or IM, the midazolam and haloperidol doses may be repeated in 10 minutes (now cumulative total of 20 mg of midazolam and 10 mg of haloperidol). If the patient is still uncontrollable or if this sequence is too slow for the safety of the patient, contact the NNEPC at 1-800-222-1222 to discuss higher or further doses and the use of ketamine.

The purpose of ketamine is to gain quick control of the patient safely. After the patient is stabilized, further sedation should be achieved with midazolam.

Ketamine has a quicker onset than benzodiazepines and antipsychotics. Doses of 1 to 2 mg given IV over 60 seconds or 4 to 5 mg IM may calm the patient within 3 to 5 minutes. Midazolam and/or haloperidol may take up to 10 to 15 minutes to begin to sedate the patient. Heart rate and blood pressure may increase after ketamine use. Other than decreasing agitation and movement, ketamine does not address hyperthermia or seizure potential. Patients may vomit, although this is not common. Rarely, laryngospasm may occur. However, ketamine should be used with benzodiazepines. In that case, the benzodiazepines will address some of these concerns. The emergence reaction caused by ketamine should be addressed with the benzodiazepines and should be insignificant in comparison to the effects of the bath salts. Ketamine has obstetric use, but should probably be avoided in pregnant patients intoxicated with bath salts. Women who are pregnant may have contractions or deliver prematurely if given high doses of ketamine. High doses of ketamine may also affect the baby adversely, causing respiratory depression.

Some patients may need to be paralyzed and sedated to ensure their safety and prevent life-threatening hyperthermia and/or rhabdomyolysis and associated renal dysfunction.

Patients who require only minimal sedation may be well managed with oral lorazepam in 2 mg doses with or without oral olanzapine 10 mg or risperidone 2 mg. These doses may be repeated. If agitation increases, the midazolam and haloperidol management may be necessary.

Antipsychotics should not be used as lone agents to manage acutely intoxicated bath salts patients. Without benzodiazepines these drugs are more likely to cause dystonia, akathisia and hyperthermia, and may lower the seizure threshold. Used in combination with benzodiazepines, these effects are somewhat mitigated.

Regarding evaluation and consideration for discharge, be aware that patients without significant tachycardia, hypertension or mydriasis have been reported to seize shortly after evaluation. Patients may only have akathisia, bruxism, dystonia or chorea. Patients may be psychotic without overt vital signs changes except when extremely agitated. Patients with abnormal mental status should be observed for several hours until it is apparent they are medically clear and/or appropriate accommodations for their safety (and that of others) can be arranged.

Special Section: TASERS

TASER is a brand name for a handheld electronic control device (ECD) that discharges electricity. Some devices have two fixed prongs that cause pain when pushed into a person (a “drive stun”). Others have two mobile barbed prongs that can be shot into a person from 15 to 35 feet away, causing pain and incapacitation. The barbed prongs work whether embedded in skin or clothing. ECDs provide only brief incapacitation (seconds) and should not be expected to control an individual for long. If used in an emergent situation for the safety of patients, health care professionals and bystanders, security or law enforcement personnel should be poised to physically restrain the patient and medical staff should be poised to chemically sedate the individual quickly before they begin moving again. Touching the person being subdued during the release of electricity or touching the prongs while electricity is not being discharged will not lead to electrical discharge into the caregiver.

When the patient can be safely evaluated, a health care professional (or in some cases another trained individual) should assess the patient for significant injuries. Drive stuns should not cause puncture marks but may cause scratches. The skin may appear red and a minor burn could occur. Those shot with mobile, barbed prongs will have two minor puncture wounds if the prongs penetrate the clothing. Bleeding should not be excessive and it is highly unlikely that the prongs will go deep enough to cause any significant injury. Remove prongs with in-line traction. Expect a puncture wound with a red area surrounding it. A burn is not anticipated. Obtain consultation from the appropriate expert for penetration involving the eyes, face, skull or genitals. For those who are incapacitated, muscle fatigue will occur and may last from hours to a day or so. Muscle contraction injury is possible. Falls may lead to secondary traumatic injury, such as fractures, scrapes, bruises or bleeds (including intracranial hemorrhage).

The electrical discharge is sufficient to inhibit motoneurons that innervate skeletal muscles, causing uncontrollable skeletal muscle contraction, which then prevents voluntary movement. The ECD charge is not generally sufficient to affect cardiac muscle significantly. It is difficult to anticipate all injuries. Many studies involve healthy individuals under controlled circumstances, not a severely agitated patient with psychiatric or drug-induced psychosis who may already be tachycardic, hypertensive, hyperthermic, acidotic and/or in medical crisis. Also, patients with underlying cardiac issues may be more at risk for electrical changes that would not significantly impact a healthier individual. Retrospective studies and case reports suggest that although ECDs are relatively safe, certainly much safer than bullets, there may be some concerns. Patients may be at risk for rhabdomyolysis, atrial or ventricular fibrillation, interference with pacemaker or implanted defibrillators or sudden death from unclear cause. While all of these have been reported in association with ECD discharge, the reports are rare, and it is unclear whether the ECD was responsible or contributed at all. However, in an individual who is predisposed due to intoxication or underlying medical issue, it is certainly possible that adding an electronic charge (and the associated stress) to the situation may contribute to morbidity or mortality. In bath salts patients and other intoxicated patients presenting with excited delirium, the initial state of the individual already puts the patient at risk of sudden or delayed death. If extreme physical restraint or electronic control is necessary, this will add stress that may worsen the situation. The restraint or electronic control should be limited to what is necessary to make the situation safe, and should be followed immediately with aggressive chemical restraint.

Initial Assessment of Post-ECD Patients

- Check mental status and for pain or other complaints
- Consider drug-related or medical condition-related issues
- Evaluate the site of discharge, including prong holes, for minor burns/puncture wounds
- Consider muscle contraction-related issues
- Consider secondary trauma associated with falling after discharge

Management of ECD patients:

All patients	<ul style="list-style-type: none"> Remove any embedded prongs Check tetanus status Seek consultation for injuries to the eyes, face, skull or genitals
Patients with a pacemaker or defibrillator	<ul style="list-style-type: none"> EKG Double-check functioning of device
Special populations <ul style="list-style-type: none"> Agitated or intoxicated Cardiopulmonary symptoms Cardiac disease history Multiple or prolonged ECD discharges 	<ul style="list-style-type: none"> Monitoring of temperature, heart rate, blood pressure EKG and labs (rhabdomyolysis, acidosis) Monitoring for secondary traumatic injuries

Healthy patients with normal mental status and no complaints probably do not need additional monitoring.

Suggested References

American College of Emergency Physicians Excited Delirium Task Force. White Paper Report on Excited Delirium Syndrome, September 2009.

Azadani PN, et al. Funding source and author affiliation in TASER research are strongly associated with a conclusion of device safety. *American Heart Journal*, September 2011; 162(3): 533-7.

Battaglia J, et al. Haloperidol, Lorazepam, or Both for Psychotic Agitation? A Multicenter, Prospective, Double-Blind, Emergency Department Study. *American Journal of Emergency Medicine*, July 1997; 15(4): 335-40.

Benzie F, et al. Emergency Department Visits After Use of a Drug Sold as "Bath Salts"—Michigan, November 13, 2010 – March 31, 2011. *CDC Morbidity and Mortality Weekly Report*, May 2011; 60 (19): 624-7.

Le Cong M, Gynther B, Hunter E, and Schuller P. Ketamine sedation for patients with acute agitation and psychiatric illness requiring aeromedical retrieval. *Emergency Medicine Journal*, published online May 12, 2011.

Drug Enforcement Administration, Drug & Chemical Evaluation Section. 3, 4-Methylenedioxypropylvalerone (MDPV) (Street Names: "bath salts," "Ivory Wave," "plant fertilizer," "Vanilla Sky," "Every-1"). DEA/OD/ODE, October 2011.

Pasquier M, Carron PN, Valotton L, and Yersin B. Electronic Control Device Exposure: A Review of Morbidity and Mortality. *Annals of Emergency Medicine*, August 2011; 58(2): 178-88.

Roberts JR and Geeting GK, MD. Intramuscular Ketamine for the Rapid Tranquilization of the Uncontrollable, Violent, and Dangerous Adult Patient. *The Journal of Trauma*, 2001; 51: 1008-10.

Ross EA, Watson M, and Goldberger B. "Bath Salts" Intoxication. *New England Journal of Medicine*, September 2011; 365(10): 967-8.

Smith C, Cardile AP, and Miller M. Bath Salts as a "Legal High." *The American Journal of Medicine*, November 2011; 124(11): e7-8.

Spiller HA, Ryan ML, Weston RG, and Jansen J. Clinical experience with and analytical confirmation of "bath salts" and "legal highs" (synthetic cathinones) in the United States. *Clinical Toxicology*, 2011; 49: 499-505.

Strote J and Hutson HR. Taser Use in Restraint-Related Deaths. *Prehospital Emergency Care*, October/December 2006; 10(4): 447-50.

Swerdlow CD, et al. Presenting Rhythm in Sudden Deaths Temporally Proximate to Discharge of TASER Conducted Electrical Weapons. *Academy of Emergency Medicine*, August 2009; 16(8): 726-39.

TREC Collaborative Group. Rapid tranquilisation for agitated patients in emergency psychiatric rooms: a randomized trial of midazolam versus haloperidol plus promethazine. *BMJ*, September 2003; 327: 708.

Vilke GM, Bozeman WP, and Chan TC. Emergency Department Evaluation after Conducted Energy Weapon Use: Review of the Literature for the Clinician. *The Journal of Emergency Medicine*, 2011; 40: 598-604.

Call the
Northern New England
Poison Center

1-800-222-1222

Voice/TTY/ 

Interpretation Services Available
Relay Service: 7-1-1

Poison Emergencies
Prevention Questions
Medication Safety
24/7 • Free • Confidential
www.nnepc.org

The Northern New England Poison Center is the nationally certified regional poison center serving the states of Maine, New Hampshire and Vermont.

Northern Exposures, January 2012

Authors

Karen Simone, PharmD, DABAT, FAACT
Tamas Peredy, MD, FACEP

Layout/proofreading

Colin Smith

Additional research

Jane Clark

POISON
Help 
1-800-222-1222

The NNEPC is supported by Maine Medical Center, a member of the MaineHealth Family; the Maine Department of Health and Human Services; the New Hampshire Department of Health and Human Services; the Vermont Department of Health; Fletcher Allen Health Care; and The United Way. The NNEPC is also supported by funds received through grant #H4BHS15557, awarded by the U.S. Department of Health and Human Services Health Resources and Services Administration. The contents of this newsletter are solely the responsibility of the NNEPC and do not necessarily represent the views of HRSA.