The Syndrome of Excited Delirium
Following Use of “Bath Salts”

To the Editor: In their case report “Bath Salts–Induced
Psychosis and Serotonin Toxicity,” Joksovic et al provide a detailed
description of a case of intoxication delirium associated with use
of synthetic cathinones, or “bath salts,” a popular substitute for
stimulant drugs. The illustrated toxidrome has been described in
a subset of recreational users of these substances, presenting as both
a medical and a psychiatric emergency.2

While the primary substance reported with cases of cathinone-
related reactions in the European literature has been mephedrone
(4-methylmethcathinone), all cases reported in the United States in
which laboratory confirmation has been obtained have identified
the cathinone derivative involved as methylenedioxyxprovalerone
(MDPV).3 In the case report by Joksovic et al,4 and in a commentary
by Rasimas,4 this constellation of symptoms is attributed to a
“serotonin syndrome.” Support cited for this attribution is a single
animal study reporting blockade of the serotonin reuptake enzyme
(SERT) involving mephedrone.

The “bath salts–induced psychosis” described in several case
reports is consistent with the description of patients with “excited
delirium,” a condition associated with other stimulants such as
cocaine and methamphetamine, which has been associated with
a significant mortality rate.5 The reference to “serotonin syndrome” in both articles is
unfortunate and not well supported. MDPV has been shown in
multiple studies to have powerful actions as an inhibitor of the
dopamine transporter enzyme with only a weak effect on central
serotonin.6–8 While the patient reported by Joksovic and colleagues
responded well to supportive care, many such patients present to
the acute setting with extreme agitation and violent or self-destructive
behavior that results in the use of physical, chemical, or electronic
restraint prior to or during the early part of a hospital stay. The
patient described by Joksovic et al demonstrated evidence of
temperature dysregulation, also described as part of the syndrome
of excited delirium.9,10 The distinction between serotonin syndrome and excited delirium has consequences for treatment of these
challenging patients. Rasimas’ recommendation that antipsychotics
be used should be evaluated with some caution. While time-limited
administration of very low-dose antipsychotic agents might have
some usefulness in resolving the psychotic symptoms of delirium,
use of drugs that inhibit central dopamine, such as haloperidol,
should be discouraged in this context, as they have the potential to
exacerbate the hyperthermia and rhabdomyolysis that frequently
complicate the management of these patients.

While the syndrome of excited delirium has now found
acceptance within Emergency Medicine, its pathophysiology
remains incompletely understood.9 It appears, however, that the
cases described over the past 30 years involve dysregulation of
dopamine and norepinephrine and do not result in a classical
serotonin syndrome.10

References
2. Penders T, Gestring RE, Vilensky DA. Excited delirium following use of
3. Penders TM, Gestring RE, Vilensky DA. Intoxication delirium following use
5. Well CV, Fiahsbain DA. Cocaine-induced psychosis and sudden death in
with dopamine and serotonin targets in rats. Eur Neuropsychopharmacol.
2012;22(3):231–236.
7. Kelly JP. Cathinone derivatives: a review of their chemistry, pharmacology
3,4-methylenedioxyxprovalerone (MDPV), a principal constituent of
psychoactive “bath salts” products [published online ahead of print October
17, 2012]. Neuropsychopharmacology.
DEFINING BASED ON A REVIEW OF THE LITERATURE. J Emerg Med.

Thomas M. Penders, MD, FAPA
penderst@ecu.edu

Author affiliation: Department of Psychiatric Medicine, Brody School of Medicine,
East Carolina University, Greenville, North Carolina.
Potential conflicts of interest: None reported.
Funding/support: None reported.
© Copyright 2013 Physicians Postgraduate Press, Inc.