

Toxicology **FOCUS**

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POISON
Help
1-800-222-1222

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**Benzodiazepines for drug-induced hyperthermia?**

Michelle Hieger, DO

Drug-induced hyperthermia is often a concern with overdose patients in the emergency department and intensive care settings. In contrast to endogenous fevers (i.e. due to infections) which alter the hypothalamic set point, hyperthermia due to drug ingestion or overdose results from disruption in normal thermoregulation. Due to this difference, drug-induced hyperthermia will generally not respond to antipyretics because antipyretics work by resetting the body's hypothalamic set point.

Drug-related hyperthermia can result from alcohol or benzodiazepine withdrawal, seizures, neuroleptic malignant syndrome, malignant hyperthermia, serotonin syndrome, anticholinergic syndrome, and sympathomimetic toxidrome. These induce hyperthermia through agitation, increased muscle tone, seizures, prevention of peripheral vasodilation and/or prevention of diaphoresis.

Benzodiazepines are frequently used to treat drug-induced hyperthermia. Benzodiazepines decrease muscle tonicity, stop seizures, decrease agitation, and prevent shivering during cooling if active cooling is used as an adjunctive therapy in severe cases. Very large doses or stacking of doses may be required to sufficiently achieve the desired effects. Active cooling can be performed quickly and easily by applying wet towels or sheets to the patient's body, then using a fan to allow for evaporative cooling. Intravenous fluids can also help cool and are often necessary due to dehydration. Other antidotes which may be recommended by a toxicologist include bromocriptine for neuroleptic malignant syndrome, cyproheptadine for serotonin syndrome, dantrolene for malignant hyperthermia and physostigmine for anticholinergic syndrome.

**Journal Review from the Medical Literature:****S. Rutherford Rose, PharmD**

Nutmeg Poisonings: A Retrospective Review of 10 Years
Experience from the Illinois Poison Center; 2001-2011.
Ehrenpreis JE et al. J Med Toxicol 2014; 10:148-51.



Nutmeg is a spice obtained from the seeds of fruit from the deciduous tree *Myristica fragrans*. The chemical composition of nutmeg is complex, containing many volatile oils and hydrocarbons. The principle "active ingredient" is thought to be myristicin, which reportedly has psychogenic properties. For this reason nutmeg is ingested by teens and young adults in an attempt to get "high".

This study reviewed 32 cases of nutmeg ingestion reported to the Illinois Poison Center over a 10-year period. Most cases were either pediatric unintentional exposures or intentional use/abuse in teenagers. The most commonly occurring clinical effects following exposure were agitation, drowsiness, hallucinations, visual disturbances and dizziness. There were no deaths, though one patient suffered a seizure. About 1/3 of patients were treated in a hospital, but only one (a 16 y/o girl) required temporary life support in a critical care unit.

It is important to note that laboratory confirmation was not done, and the four patients who were hospitalized had ingested at least one additional substance in addition to nutmeg. This report of nutmeg exposures suggests that children are likely to tolerate accidental exposures, but abuse by adolescents may result in significant toxicity.



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In October, 2014
Hydrocodone
containing drugs
became DEA
Schedule II



Cannabinoid Hyperemesis Syndrome

Tammy Scott, BS, RN, CSPI

Cannabinoid hyperemesis syndrome (CHS) is a relatively new diagnosis associated with long term cannabis use—first reported by Allen and colleagues in Australia in 2004. There have been limited case reports of this vomiting syndrome occurring in patients using synthetic cannabinoids such as Spice and K2. Characterized by cyclic episodes of nausea, vomiting, and abdominal pain, patients report temporary relief of their symptoms when bathing or showering in hot water. This can lead to compulsive bathing and a very high water bill, as some have described bathing up to 10 times a day, or continuously for days. One patient reportedly had to be coaxed out of the shower for assessment! Symptoms can be permanently relieved when cannabis use is discontinued, but tend to be refractory to opioids or antiemetics. These patients are often subjected to extensive testing, diagnostic imaging, and even exploratory surgeries.

An intriguing recent case series was presented at the 2014 North American Congress of Clinical Toxicology conference. Doctors from Kaiser Permanente in San Diego, CA studied 7 patients who presented with symptoms matching the diagnostic criteria for CHS (abdominal pain, nausea and vomiting, heavy frequent THC use, and symptoms relieved with hot showers). A trial of topical capsaicin cream (0.075%) was initiated after verbal consent was obtained, and the cream was applied to the abdomen. All patients reported significant improvement of symptoms within 45 minutes of the capsaicin treatment. The authors postulate that TRPV1, capsaicin's only known receptor, may play a role in the pathophysiology of CHS, and suggest that OTC capsaicin cream is a safe and convenient option for these often challenging cases.

References:

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- Patterson, D.A., Smith, E., Monahan, M., Medvecz, A., Hagerty, B., Krijger, L., Chauhan, A., & Walsh, M. (2010). Cannabinoid hyperemesis and compulsive bathing: A case series and paradoxical pathophysiological explanation. *Journal of the American Board of Family Medicine* 23, 790-793.
- Lapoint, J Southern California Permanente Medical Group, San Diego, CA 2014 Case Series of Patients treated for Cannabinoid Hyperemesis Syndrome with Capsaicin Cream.

AMERICAN ASSOCIATION OF POISON CONTROL CENTERS NEWS RELEASE

AAPCC Publishes Joint Position Statement on Expanding Access to Naloxone

Alexandria, VA - On Oct. 6, 2014, the AAPCC joined with the American Academy of Clinical Toxicology (AACT) and the American College of Medical Toxicology (ACMT) to jointly publish a position statement advocating expanding the access to naloxone throughout the United States in the **October 2014 issue of *Clinical Toxicology***.

Over the past three decades, drug overdose deaths in the US have tripled and in 2008, unintentional poisoning deaths surpassed the number of motor vehicle deaths for the first time. Of the 38,329 drug overdose deaths in the US in 2010, 60 percent (22,134) were related to pharmaceuticals, with 75 percent of those deaths involving prescription opioid analgesics. Concurrently, heroin deaths have risen 55 percent between 2000 and 2010.

For the full press release, go to www.aapcc.org, scroll to the bottom left side of the main page to find "Press Releases" and press "View More".