



K16 Deaths Involving the Recreational Use of α -PVP (α -pyrrolidinopentiophenone)

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After attending this presentation, attendees will gain a better understanding of potentially fatal consequences involving the stimulant hallucinogen α -pyrrolidinopentiophenone (α -PVP). Attendees will also obtain information addressing the measurement of this compound in human autopsy samples.

This presentation will impact the forensic science community by providing useful information regarding the toxicological analysis of cases involving designer stimulants, highlighting the need to consider the potential involvement of such drugs when presented with suggestive incident circumstances.

Until recently, the most common stimulant hallucinogen used illicitly in the United States was MDMA. However, the rapidly escalating availability of a variety of highly potent analogues has resulted in drug-related morbidity and mortality including violent confrontations, motor vehicle accidents, suicides, and fatal drug toxicity. A group of these compounds, collectively referred to as "bath salts," have been sold via the internet and through a variety of retailers including gas stations, convenience stores, and so-called "head shops." Typically, the compound present in these preparations has been 3,4-methylenedioxypropylvalerone (MDPV). Over a three-month period beginning in March 2012, the West Virginia Office of the Chief Medical Examiner has investigated three deaths involving a similar drug, α -PVP. The mechanism of action of this drug is thought to involve inhibition of the reuptake of norepinephrine, dopamine, and serotonin. Here is reported case circumstances and toxicological findings in three deaths involving α -PVP in which the decedents exhibited aggression, paranoia, violence, and homicidal behaviors.

Samples obtained at autopsy underwent routine postmortem toxicological testing. This included blood alcohol analysis by Gas Chromatograph/Flame Ionization Detector (GC/FID), drugs of abuse by immunoassay, Liquid Chromatography/Time Of Flight/Mass Spectrometry (LC/TOF/MS) screening of blood precipitates, and Gas Chromatograph/Mass Spectrometry (GC/MS) screening of alkaline and acidic/neutral blood extracts. GC/MS analysis of alkaline extraction of urine utilizing Toxi tube A was helpful in identifying the presence of α -PVP. Confirmation and quantitation of α -PVP was performed by GC/MS analysis of an alkaline liquid-liquid extract (without derivatization).

The decedents were adult males aged 31, 35, and 51 years. The oldest male was found deceased on his bathroom floor. Empty packages of bath salts were discovered at the scene with yellowish-tan powder noted within the nostrils. The most significant toxicological finding was α -PVP at a concentration of 0.10mg/L in the blood. THC and carboxy-THC were also present at 2.6 and 25ng/mL, respectively. The second fatality involved witnessed seizure activity preceding the demise. A history of bath salt and prescription drug abuse was reported. Toxicology results included α -PVP at a concentration of 0.52mg/L in the blood in addition to sertraline (0.16mg/L), oxycodone (0.02mg/L), and 7-aminoclonazepam (<0.01mg/L). The youngest male died from firearm injuries during an armed confrontation with law enforcement involving aggressive and paranoid behavior, as well as suicidal threats. Vials believed to contain bath salts were found in the decedent's pockets. Drugs confirmed in the blood included α -PVP and pentedrone at concentrations of 0.29 and 0.48mg/L, respectively. In all three cases, α -PVP was deemed to be the primary cause of death or a significant contributory factor.

Current routine postmortem toxicological analysis may not detect many of the designer stimulant compounds that present an increasing challenge in forensic pathology and toxicology. Often, cases in which the history documents bizarre, aggressive, hallucinogenic, or paranoid behaviors, and/or symptoms consistent with overstimulation of the sympathetic nervous system are positive for compounds such as α -PVP or other cathinone derivatives upon targeted analysis. Similar to other sympathomimetic drugs, establishing toxic and lethal concentrations for α -PVP will likely be difficult. These drugs often demonstrate significant overlap between concentrations tolerated by individuals and those reported in drug-related fatalities. Investigative history, autopsy findings, and toxicology results must be fully assessed to most accurately determine the cause and manner of death in cases involving designer stimulants such as α -PVP.

α -PVP, Bath Salts, Postmortem