

CASE REPORT

“Bath Salts” intoxication with multiorgan failure and left-sided ischemic colitis: a case report

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Abstract

Background: In the recent years, a new group of designer drugs, under the brand name of bath salts has emerged as a new trend. They are mainly β -ketone amphetamine analogs and are derivatives of cathinone, a monoamine alkaloid. They are abused for psychostimulant effects. Their primary ingredient 3,4-methylenedioxypyrovalerone (MDPV), has alerted authorities worldwide due to its severe physiological and behavioral toxicities.

Description of Case: We present the case of a 47-year-old man with coma, seizures, multi-organ failure and ischemic colitis after intoxication with bath salts containing MDPV. After supportive care, he had a successful outcome. To our knowledge, this report is the first to describe ischemic colitis after MDPV intoxication. Clinicians need to be especially alert since MDPV is not detected by routine screens, and its overdose can be life-threatening.

Conclusion: Ischemic colitis should be recognized as a potential complication of bath salts ingestion in order to prevent unnecessary interventions, such as diagnostic laparotomy, which could worsen patient's condition. Hippokratia 2015; 19 (4): 363-365.

Keywords: Ischemic colitis, bath salts, multi-organ failure, MDPV, 3,4-methylenedioxypyrovalerone

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Introduction

“Bath Salts” is a term describing a group of designer drugs that contain synthetic compounds belonging to the chemical class of cathinone derivatives. Cathinone is a β - ketone amphetamine analog. These drugs produce analogous effects to methamphetamine and cocaine^{1,2} and they usually contain 3,4-methylenedioxypyrovalerone (MDPV), a substance with central nervous stimulant properties due to its effectiveness as norepinephrine-dopamine reuptake inhibitor³. Typical doses range between 5 to 20 mg.

Excessive consumption may lead to toxicity with severe organ dysfunctions. Although mortality is below 1%^{4,5}, a substantial percentage (8,7%) of patients, needs intubation and mechanical ventilation⁴. A total of 525 non-fatal intoxications associated with MDPV along with 108 deaths in which MDPV has been detected and/or implicated in the cause of death, have been reported to the Early Warning System of the European Monitoring Centre for Drugs and Drug Addiction⁵. Symptoms of severe toxicity include paranoid psychosis, hypertension, tachycardia, diaphoresis, severe agitation, hallucinations, liver damage, hyperpyrexia, rhabdomyolysis, stroke and acute

renal failure^{4,7}. We report the case of a patient in coma that suffered seizures, multi-organ failure, and ischemic colitis after intoxication with bath salts.

Case Report

A 47-year-old man was transferred comatose with seizures to the emergency department after reported ingestion of “bath salts”. He was immediately intubated and admitted to the intensive care unit (ICU) of our hospital.

His past medical history, reported by family and friends, included use of psychoactive substances. The night before his admission he had accidentally consumed a much larger (1000 mg) than the usual dose of MDPV, and the following morning he was found collapsed on the street. After his recovery, he reported that he experienced terrifying hallucinations.

Initial laboratory values, on admittance to ICU, were significant for the following: serum creatinine: 8.2 mg/dl, urea: 201 mg/dl, alanine aminotransferase: 7,720 IU/L, aspartate aminotransferase: 8,840 IU/L, creatine phosphokinase: 110,790 IU/L, creatine phosphokinase-MB: 1,040 IU/L, myoglobin: 96,800 mg/dl, amylase: 771 IU/L, total bilirubin: 3.2 mg/dl, direct bilirubin: 3.0

mg/dl, and troponin: 8,253 ng/ml. Platelet number was abnormal (55,000) as were coagulation tests (PT: 44.5 sec, PTT: 55.4 sec, INR: 4.92), and fibrinogen was low (135 mg/dl). Multi-organ failure with fulminant hepatic and renal failure, rhabdomyolysis and disseminated intravascular coagulation due to MDPV intoxication were diagnosed. His head computed tomography (CT) scan, and chest radiograph results were unremarkable while his electrocardiography was significant only for sinus tachycardia. During the ensuing hours, he remained critically ill, whereas treatment was largely supportive including benzodiazepines (for sedation and seizure control), fluids and continuous renal replacement therapy for his anuric renal failure.

His urine drug screen was negative for marijuana, opiates, cocaine, barbiturates, amphetamines, phencyclidine, and tricyclic antidepressants. Methanol, ethylene glycol, ethanol, salicylate, and acetaminophen were not detected in his blood.

During the following 48 hours, the patient was stabilized hemodynamically, and his respiratory and liver functions improved.

Seventy-two hours after his admittance, the patient exhibited four episodes of bloody diarrhea which necessitated blood transfusion (four bags of packed red cells). A CT of the abdomen reported mucosal thickening of the descending colon. Flexible sigmoidoscopy revealed patchy mucosal edema, erythema, and submucosal he-

morrhages, interspersed with areas of normal appearing mucosa in the descending colon approximately 40 cm from the rectum. No pathological findings were detected in the rectum and proximal descending colon. Multiple biopsies were taken.

Histological examination showed pieces of colonic mucosa admixed with pseudomembranous material and fragments of necrobiotic tissue originating from adjacent ulcerated areas. Distortion of crypt architecture, mucin loss, and crypt atrophy were noted focally (Figure 1) while the lamina propria showed evidence of ischemia with crypt loss, moderate edema, focal hemorrhage, mild fibrosis, and hyalinization (Figure 2). An infarcted vessel with obliterated lumen filled with fibrinous material was noted in a heavily inflamed fragment of submucosal tissue (Figure 2D). In other areas, the lamina propria showed a moderate lymphohistiocytic inflammatory infiltrate admixed with some neutrophils and increased number of eosinophil polymorphs (10 per high power field) without evidence of degranulation. Mild cryptitis and crypt abscesses were present in some of the specimens with associated regenerative epithelial changes and focal epithelial atypia. No granulomas were seen. A prominent feature was the presence of apoptotic bodies in crypt epithelium (Figure 1 & Figure 2). The overall picture was not supportive of inflammatory bowel disease and all specific histochemical stains for microorganisms were negative.

The bloody diarrhea subsided gradually within 48

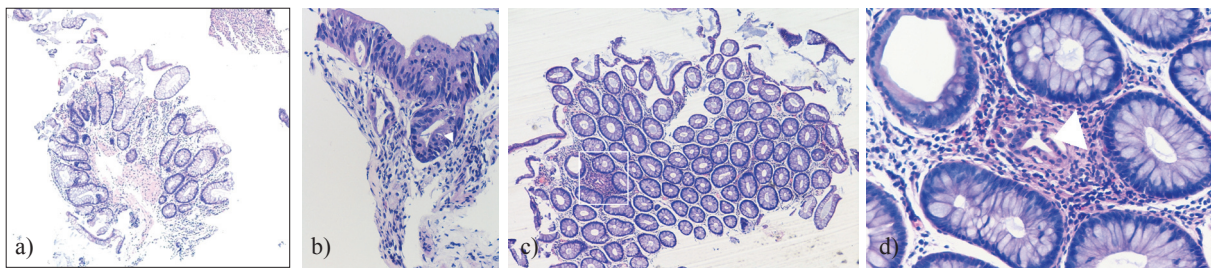


Figure 1: A. Colonic mucosa with mild crypt distortion without mucin loss and mild mixed inflammation in the lamina propria. A. A part of a pseudomembrane is shown in the upper right of the photo, Hematoxylin and eosin stain (H&E stain) x4. B. Active neutrophilic inflammation involving the superficial epithelium, mucin loss and an apoptotic body (white arrowhead) at the base of a colonic crypt, H&E stain x20. C. Colonic mucosa with focal crypt atrophy (rectangle), H&E stain x4. D. A higher magnification of rectangle in 1C, shows the atrophic crypt (white arrowhead), H&E stain x20.

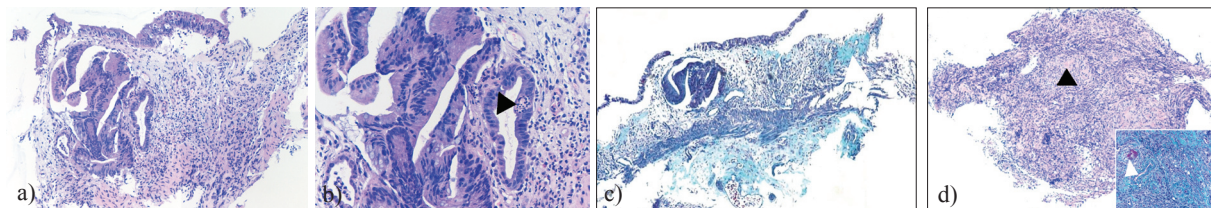


Figure 2: A. Inflamed colonic mucosa with regenerative epithelial changes, distorted crypt architecture, crypt loss and lamina propria fibrosis, Hematoxylin and eosin stain (H&E stain) x40. B. A higher magnification of A, highlighting a crypt abscess (lower left), atypical crypt epithelium due to regeneration and active inflammation, an apoptotic body (black arrowhead) in crypt epithelium, and moderate mixed inflammatory infiltrate in the lamina propria, H&E stain x200. C. Same fragment as shown in A. The masson trichrome stain shows hyalinized lamina propria staining light blue (arrowhead) and prominent crypt loss, x20. D. Fragment from heavily inflamed submucosa, probably at the base of an ulcer, showing an obliterated small blood vessel (black arrowhead) with remnant intraluminal fibrin. In the inset, the masson trichrome stain confirms the presence of fibrin (white arrowhead) in the infarcted vessel, x40.

hours. The patient remained on ventilatory support for two weeks. Supportive care was continued and progressively the patient manifested clinical and laboratory improvement. He was transferred to a medical ward on the 18th day, and two weeks later he was discharged from the hospital without any organ deficiency.

Discussion

MDPV, the main stimulatory ingredient of bath salts, acts as a potent inhibitor of the dopamine and norepinephrine transporters, and thus may cause diverse physiological and behavioral effects, similar to those resulting from cocaine and amphetamine use⁷. When compared to cocaine, MDPV is 50-fold and 10-fold more potent inhibitor of dopamine and norepinephrine, respectively⁸. By blocking norepinephrine reuptake through norepinephrine transporters, MDPV intoxication leads to increased extracellular norepinephrine with consequent sympathetic over-activity, generalized vasoconstriction, and hypoperfusion^{9,10}. Extreme sympathetic stimulation includes tachycardia, hypertension, hyperthermia, and seizures. Published case reports describe hepatic and renal failure, rhabdomyolysis, and compartment syndrome^{1,10}. To our knowledge, current case report is the first to describe ischemic colitis after MDPV intoxication. The patient developed multiple organ damage, i.e. liver, kidney, myocardium and descending colon after a mega-dose (50 times the maximum ordinary dose) of MDPV ingestion. Vasospasm and ischemia, direct cellular drug toxicity, or both could account for the ischemic colitis. Histological features highly indicative of ischemia of the colon, such as lamina propria hyalinization and hemorrhage, atrophic microcrypts, and intravascular microthrombi¹¹ detected in his specimens implied that vasoconstriction of the mesenteric arteries through stimulation of alpha adrenergic receptors was the possible pathophysiological mechanism. Furthermore, apoptosis and eosinophilic infiltration of the lamina propria, suggest a direct toxicity of MDPV on the gastrointestinal mucosa.

Ischemic injury of the bowel caused by drug abuse has been described after cocaine intoxication and has been attributed to arterial vasospasm or vasoconstriction¹². Similarly to MDPV, cocaine acts by blocking the reuptake of dopamine, epinephrine, and norepinephrine, leading to sympathetic nervous system stimulation and subsequent vasoconstriction¹². Although any area of the colon can be affected in ischemic colitis, approximately 75% of cases involve the descending colon¹³.

Although coma, respiratory depression, and multiorgan failure have been associated with unfavorable outcome⁴, our patient ultimately recovered with supportive

therapy. Specific recommendations for management of exposure to MDPV, are not evidence-based. As antidote does not exist, treatment should be mainly supportive.

With the increasing use of bath salts, clinicians should be aware of the severity and potential lethality of their overdose. Ischemic colitis should be recognized as a potential complication of bath salts ingestion. Hence, the MDPV induced ischemic colitis should be considered in the differential diagnosis of bloody diarrhea in order to prevent unnecessary interventions, such as diagnostic laparotomy, which could worsen the patient's condition.

Conflict of interest

Authors declare no conflict of interest.

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