Limb-Threatening Ischemia in a Young Man with Cathinone ''Bath Salt'' Intoxication: A Case Report

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"Bath salts" are synthetic designer drugs that have stimulant properties and are a growing medical concern. The chemical compounds in the mixtures have an affinity for receptors in the brain resulting in a stimulant effect similar to that seen with methamphetamines and cocaine. Although illegal in Canada, these drugs are widely available online with over 20 synthetic drugs marketed as "bath salts" and used increasingly among recreational drug users. Much of the medical literature regarding these drugs comes from emergency medicine case reports, which outline the acute, severe medical, and psychiatric effects of "bath salt" toxicity. In this report, we outline severe vascular limb compromise, which occurred in a 24-year-old man who took large doses of bath salts obtained online from China. We detail our experience to re-establish perfusion to the limbs, and the morbidities encountered due to the ischemic insult our patient experienced. The duration and clinical presentation of "bath salt" toxicity are frequently complicated by lack of toxicology screens for the agents on board, and lack of any pharmacokinetic evidence surrounding these synthetic compounds. Although "bath salts" are now illegal in Canada, these drugs are widely available online and have become an increasing public health concern that involves significant morbidity and mortality to users. Creating a base of knowledge and front-line experience are the only current tool in combating the diverse detrimental aftermath of these synthetic agents' abuse.

''Bath salts'' are synthetic designer drugs that have stimulant properties and are a growing medical concern.[1] These drugs are widely available online with over 20 synthetic cathinones marketed as ''bath salts'' and used increasingly among recreational drug users.[1] Much of the medical literature regarding these drugs comes from emergency medicine case reports, which outline the acute, severe medical, and psychiatric effects of ''bath salt'' toxicity.[2] In this report, we outline another complication of bath salt ingestion, severe vascular compromise, which occurred in a 24-year-old man who took large doses of bath salts that he obtained after purchasing them online and having them mailed to Canada from China.

CASE REPORT

A 24-year Caucasian previously healthy man presented to his local emergency room with sudden onset of bilateral lower-extremity pain and paresthesias after consuming ''bath salts'' for 2 consecutive days. The patient purchased the drug online from a vendor advertising it as a ''synthetic methamphetamine produced in China.'' His previous drug usage included marijuana, Lysergic acid diethylamide, and methamphetamines; he denied any history of intravenous drug use or previous hospitalizations for drug abuse. This was his first experience with synthetic drugs. He allocated the powder into ''hits'' of 1.8 mg and orally consumed a total of 70 doses over the span of 48 hr. He described using increasing dosages to attain the initial methamphetamine-like desired effects, without experiencing any significant side effects. During this time, he also consumed alcohol and marijuana in unknown quantities. He denied experiencing any symptoms

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of vascular ischemia until his symptoms began on the morning of his presentation to the emergency room.

On initial ER presentation, the patient's physical examination revealed pale and cool lower limbs to the level of the knees. Pulses by palpation and Doppler could not be obtained throughout the lower extremities. The patient was urgently transferred to a tertiary care center under the care of Vascular Surgery and placed in the intensive care unit.

On arrival at the tertiary care center, the patient's vitals were normal apart from a widened pulse pressure. A general cardiorespiratory examination was unremarkable. An abdominal examination revealed a benign abdomen with no signs of peritonitis or tenderness.

Vascular examination also revealed absence of pulses at the ulnar and radial levels and in the lower extremities including the femorals. He showed signs of sensory compromise but had intact motor function. This would categorize him as Rutherford 2A ischemia.[3]

An urgent computed tomography (CT) angiogram of the aorta and runoff outflow revealed normal visceral and renal vessels, but severe, greater than 70% narrowing secondary to extreme vasospasm, at the external iliac arteries which extended distally to include the femorals and crural arteries bilaterally (Fig. 1). There was no evidence of intravascular thrombus or external compression.

The patient was admitted to the intensive care unit for medical management of persistent severe limb ischemia and started on intravenous (IV) phentolamine, an $\alpha 1$ antagonist at a dose of 2.5 mg IV every hour, and IV nitroprusside, an arterial vasodilator at 120 mcg/kg/hr. The patient's blood pressure was monitored with a radial arterial line to ensure no substantial systemic drop in mean arterial pressure (MAP) which remained greater than 65 throughout treatment, with a widened pulse pressure. The patient was also initially placed on full-dose IV heparin drip, which was eventually discontinued when arterial and venous thrombus was ruled out though augmented venous ultrasound and CT angiogram. After initiation of both of these treatments, femoral and popliteal pulses became audible with Doppler examination. Unfortunately, there was no improvement in flow to the limbs below the popliteal arteries. The patient continued to complain of pain and paresthesias and began to develop a mottled discoloration of his feet to the level of the midleg. Furthermore, although initially normal, he developed an elevated creatine kinase (CK) enzyme peaking at over 9,000 U/L.

Subsequently, the patient was started on a series of other vasodilators including a prostaglandin infusion, Epoprostenol at 14 ηg/kg/min, IV nitroglycerin at 200 mcg/hr, and p.o. calcium channel blockers (diltiazem and nifedipine). Over the course of 48 hr, his tissue ischemia continued to progress with the development of gangrenous changes to the tips of his lower-extremity digits. In a bid to further improve his arterial dilation, the patient was started on an oral phosphodiesterase inhibitor, sildenafil at 25 mg 3 times daily with careful blood pressure monitoring. With all of these agents on board, the patient remained hemodynamically stable with an average MAP of greater than 65.

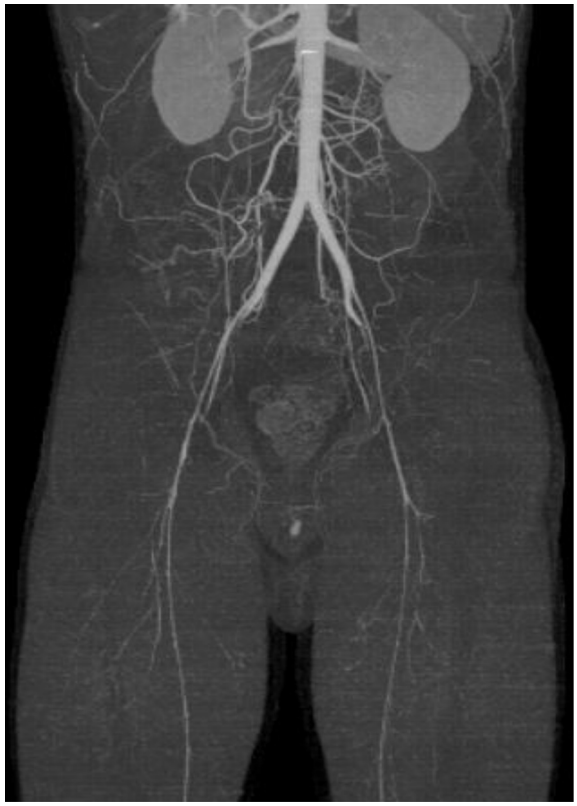

Fig. 1. CT angiogram. An image demonstrating severe vasospasm beginning at the level of iliac bifurcation and extending distally to include all crural vessels.

Four days after hospitalization, the patient developed bilateral compartment syndrome and required urgent 4-compartment fasciotomies secondary to his time of ischemia and steady improvement in perfusion (Fig. 2). On opening of the fascia, edematous muscles were released, and the patient's pain resolved. Within 72 hr after fasciotomies, there was some evidence of improved vascular perfusion and return of pedal pulses bilaterally, on palpation. He was then transferred to the ward for further rehabilitation and observation of his distal tissue recovery from ischemic insult. As the patient's CK enzymes peaked at 9,600 U/L, to avoid renal injury, high IV fluid rates and a bicarbonate infusion were maintained, with no subsequent evidence of increased creatinine throughout hospitalization.

The patient was eventually discharged home after a 14-day hospital stay and seen in follow-up clinic. At that time, he had palpable pedal pulses bilaterally. He did continue to have evidence of lower-extremity gangrene to the distal digits bilaterally and did require amputation of 2 left foot digits due to unsalvageable tissue loss.

DISCUSSION

There are over 20 synthetic cathinones marketed as ''bath salts'' and are increasingly being used