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Case Report

An Unusual Case Report of Fatal Oral Ingestion of the Emerging "Bath Salt" Eutylone

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ABSTRACT

Background: The abuse of novel psychoactive substances, such as synthetic stimulants, is increasing each year with modifications to drug scaffolds to alter pharmacokinetics or pharmacodynamics. Psychosis, cardiotoxicity, and excited delirium have been documented with intense sympathomimetic stimulants. The clinical recognition of these substances is challenging as routine blood and urine drug screening protocols do not readily detect the presence of these synthetic substances. We report an unusual case of oral ingestion of eutylone with subsequent confirmation of this substance.

Case details: A 49-year old female with history of chronic cardiovascular comorbidities, type 2 diabetes, depression, and end stage renal disease was presented to Emergency Department with 2-3 week history of abdominal distention with melenic stools. She was found to have onset ascites with melena prompting GI consultation. An esophagogastroduodenoscopy was performed revealing a white crystalline material obstructing mid oesophagus. A sample was obtained and the procedure was halted due to sever hemodynamic instability. To the best of our knowledge, there are no previous reports of fatal oral ingestion of eutylone by a 49-year old with no documented history of substance abuse.

Discussion: This case is concerning because eutylone is new substance that may not be detected during routine testing, is easy to obtain over the internet, and has the potential to cause mortality.

Keywords: Eutylone toxicity; Novel psychoactive substance; Synthetic cathinones; Case report; Bath salt; Esophagogastroduodenoscopy

INTRODUCTION

Synthetic Cathinones (SC) are β-ketone analogs of amphetamine, and represent one of the most prevalent, widely abused, and dangerous classes of Novel Psychoactive Substances (NPS). NPS are chemically similar to classic psychoactive substances but dissimilar enough to evade legal prosecution, and are widely marketed with labels such as "not for human consumption" or "research chemicals." Common toxicities caused by Synthetic Cathinones (SC) use include autonomic symptoms such as tachycardia, hypertension, and hyperthermia, psychiatric symptoms such as anxiety, paranoia, panic, and violence, and even more tragic fatal overdose.

The United Nations Office on Drugs and Crime (UNODC), the National Forensic Laboratory Information System (NFLIS), the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), and the United States Drug Enforcement Agency

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(DEA) are tasked with tracking changes in substance use patterns for NPS and other drugs of abuse. It has been consistently reported that synthetic stimulants are the largest class of Novel Psychoactive Substances (NPS), and there has been a substantial increase in the prevalence of SC abuse and seizures since the mid-2000 s [1,2]. SCs with methylenedioxy moieties have consistently ranked as some of the most widespread synthetic stimulants. Methylone and N-ethyl pentylone previously exhibited a high prevalence of abuse and seizures, and as such have been approved for scheduling by the Drug Enforcement Administration (DEA) under the Controlled Substances Act, restricting their availability.

Recently, a new methylenedioxy modified SC called eutylone has shown an alarming increase in its prevalence. For example, The National Forensic Laboratory Information System (NFLIS) reported that eutylone was detected 5,787 times in 2019 [3]. The Drug Enforcement Administration (DEA) Special Testing and Research Laboratory publish a quarterly, midyear, and annual Emerging Threat Report detailing changes and patterns in NPS availability. In 2019, as well as through the first half of 2020, eutylone was the most prevalent reported synthetic stimulant, based on archival queries of seizures and other analysis across the Drug Enforcement Administration (DEA) laboratory system [4,5]. Highlighted in these reports are recent findings of oral ingestion of eutylone in users of "Ecstasy" and "Molly", particularly in the context of all night dance parties [6]. In the current case report, we document a fatal oral ingestion of eutylone by a 49 year old with no documented history of substance abuse, a profile that does not match current profiles of individuals likely to consume SCs in general or eutylone specifically.

CASE REPORT

A 49-year old female had documented history of depression and was prescribed citalopram from 2012-2015. Citalopram was discontinued by the patient and was not seen from 2016-2019 when she reinitiated care. She had a history of coronary artery disease complicated with protracted wound dehiscence/healing, chronic heart failure (Left Ventricular Ejection Fraction (LVEF) 20-25%), and other comorbidities previously mentioned presented to the Emergency Department (ED) with abdominal distention and melenic stools. The patient denied chest pain, shortness of breath, abdominal pain, nausea, vomiting, and did not have a history of substance abuse other than tobacco. Within 24 hours of presentation to the ED she was admitted and had onset ascites in combination with melena. An esophagogastroduodenoscopy was performed within 24 hours of admission that revealed a white crystalline material obstructing mid oesophagus that was able to easily break apart and obtain a sample. The procedure was halted due to sever hemodynamic instability which developed minutes into the procedure. The patient coded and was intubated with successful resuscitation and transferred to the ICU. Miosis was detected as well as pupils were nonreactive. She was also are flexic and comfort care was initiated. She expired within 72 hours of the procedure.

Analytical toxicology

During the hospital stay the patient's blood and urine were screened for drugs of abuse by immunoassay, both of which detected benzodiazepines. The obtained sample was analyzed by the Waters UNIFI Forensic Toxicology screening methodology using previously published specifications [7]. Briefly, 500 µL of the sample was combined with 1.0 mL of cold acetonitrile containing a mixture of deuterated internal standards. The sample was vortexed for 30 seconds and centrifuged at 3,000 rpm for 15 minutes. The supernatant was removed and concentrated under a steady stream of nitrogen heated at 35.0°C. The sample was reconstituted with 200 µL of aqueous 5 mM ammonium formate (pH 3). 10 µL of the prepared sample was injected onto the instrument.

Data processing for eutylone and other substances was performed using a targeted approach through Waters UNIFI v1.9. Analysis of the prepared sample detected the presence of cocaine, benzoylecgonine, and eutylone. The observed neutral mass of each of these analytes was detected within 5 ppm and had a retention time within 6 seconds of a certified reference standard. The low energy and high energy high resolution mass spectra for eutylone is presented in Figure 1. A quantitative analysis of the detected compounds was not explored.

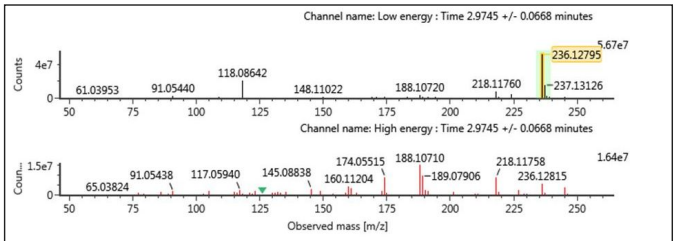

Figure 1: Mass spectral data of eutylone samples.

DISCUSSION

NPS proliferate within the drug trade community in an effect to beat drug detection, evade current laws, and obtain an enhanced euphoria. Organizations such as The National Forensic Laboratory Information System (NFLIS), Drug Enforcement Administration (DEA), and European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) report a growing trend of NPS abuse. The EMCDDA reports that 77% of seizures of Novel Psychoactive Substances (NPS) are either synthetic cannabinoids or cathinones [2]. Unfortunately, this growing trend of abuse may evade detection of typical immunoassay testing regimens currently utilized in the patient care setting as seen in this case. However, awareness of clinical abnormalities as seen in this case may be helpful to patient care.

This report has several limitations. The patient was diagnosed with depression, but has a span of time in which she wasn't seen. Blood or urine samples could not be obtained and post-mortem records were unavailable. It is unknown when the patient may have ingested the crystalized powder/tablet that was found during the Esophagogastroduodenoscopy (EGD). Additionally, it is unusual to find Synthetic Cathinones (SC) in patients without history of substance abuse; however, 3 years of

medical history isn't well documented. Common toxidromes caused by SC would exacerbate a patient with cardiovascular and psychiatric comorbidities as documented with this case.

CONCLUSION

Eutylone is a novel synthetic cathinone in which abuse may result in cardiovascular affects such as arrhythmias or myocardial infarctions. It is easy to obtain, may not be readily detected and the authors anticipate a growing use of the drug, which may lead to an increase of morbidity and mortality.

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