



<https://doi.org/10.1016/j.jemermed.2018.09.040>

## Clinical Communications: Pediatric

### A 21ST CENTURY PROBLEM: CANNABIS TOXICITY IN A 13-MONTH-OLD CHILD

Rachel J. Levene, MD, MED,\* Elza Pollak-Christian, MD,\* and Sigrid Wolfram, MD†

\*Department of Pediatrics, SUNY Downstate Medical Center, Brooklyn, New York and †Department of Emergency Medicine, SUNY Downstate Medical Center, Brooklyn, New York

Reprint Address: Rachel J. Levene, MD, MED, Department of Pediatrics, SUNY Downstate Medical Center, 450 Clarkson Avenue, Brooklyn, NY 11203

□ **Abstract—Background:** Cannabis is one of the most abused drugs worldwide, with more than 20 million users in the United States (US). As access to cannabis products increases with expanding US legislation and decriminalization of marijuana, emergency physicians must be adept in recognizing unintentional cannabis toxicity in young children, which can range from altered mental status to encephalopathy and coma. **Case Report:** We report the case of a 13-month-old female presenting with self-limiting altered mental status and lethargy, with a subsequent diagnosis of tetrahydrocannabinol exposure on confirmatory urine gas chromatography-mass spectrometry. **Why Should an Emergency Physician Be Aware of This?:** Considering caretakers rarely report possible cannabis exposure, history-taking must review caretakers' medicinal and recreational drug exposures to prevent inadvertently missing the diagnosis. In the young child with altered mental status, prompt urine screening for cannabinoid detection can prevent further invasive and costly diagnostic investigations, such as brain imaging and lumbar puncture. © 2018 Elsevier Inc. All rights reserved.

□ **Keywords—**pediatrics; pediatric emergency medicine; cannabis; toxicology; ingestions

Elza Pollak-Christian, MD is currently at the Department of Pediatrics, Neonatal-Perinatal Section, Oklahoma University Health Sciences Center, Oklahoma City, OK.

#### INTRODUCTION

Cannabis is a psychoactive plant composed of more than 500 chemical components called cannabinoids, which exert their psychoactive effect by activating specific receptors in the central nervous system and immune system (1). Cannabinoids are among the most abused drugs worldwide, with an estimated 22.2 million users in the United States (2). Since 2017, medical marijuana has been legalized in 31 states, and 9 states have decriminalized recreational marijuana (2,3). In such states, emergency department (ED) visits and poison center calls for accidental cannabis intoxication have increased (4). With these changes, emergency physicians must be adept in recognizing unintentional cannabis toxicity in young children, as intoxication can result in encephalopathy and coma (5–8).

#### CASE REPORT

A healthy 13-month-old, 12-kg female presented to the ED with injected conjunctiva and inappropriate staring for 2 h, followed by a half-hour period of somnolence. The mother denied any possible ingestions, fevers, vomiting, seizures, or head trauma. Birth and medical history were unremarkable. Growth and development were age appropriate. On presentation, patient was somnolent, but arousable with stimulation. Vital signs were: temperature 36.6°C, heart rate of 127 beats/min, respiratory rate of 39 breaths/

RECEIVED: 4 May 2018; FINAL SUBMISSION RECEIVED: 10 August 2018;  
 ACCEPTED: 20 September 2018

min, blood pressure of 98/66 mm Hg, and an SpO<sub>2</sub> of 100% on room air. Pupils were equal and dilated to 6 mm bilaterally. Physical examination was otherwise unremarkable. Computed tomography of the head, chest x-ray study, electrocardiogram, complete blood count, comprehensive metabolic panel, and serum toxicology were unremarkable. The mother appeared intoxicated, with slurred speech and injected conjunctiva. Maternal cannabinoid intoxication was suspected and urine cannabinoids on the child were sent and returned positive. Upon result disclosure, the mother stated that the child recently consumed hemp seed milk. Urine gas chromatography-mass spectrometry (GC-MS) confirmatory test was positive for  $\delta$ -9-tetrahydrocannabinol (THC). Within 8 h, the child returned to baseline without any medical interventions other than observation. Poison control, social work, and child protection services were all notified and involved.

## DISCUSSION

Cannabis is one of the most abused drugs worldwide (2). Cannabis formulations, such as marijuana (dried, leaves), hashish (resin), and hashish oil (concentrated resin extract) can be inhaled or ingested (8). THC is the main psychoactive ingredient that binds to brain cannabinoid receptors, producing dose- and time-dependent stimulant, hallucinogenic, or sedative effects. Effects of inhaled cannabis occur within minutes after ingestion, peak within 15–30 min, and last up to 4 h post ingestion. Orally consumed cannabis has delayed effects, with onset ranging from 30 min to 3 h, lasting up to 12 h post ingestion (9). With the increased bioavailability of cannabis concentrates and the smaller body mass in children, toddler cannabis ingestion results in high serum THC levels, despite a small amount ingested.

Pediatric cannabis intoxication has variable presentations, ranging from mentation changes to encephalopathy and coma (5,7,8). The most common symptoms are central nervous system depression (i.e., lethargy, coma), confusion, agitation, hypotonia, bilateral reactive mydriasis, and ataxia (2,10). Nausea and vomiting have been reported, along with bradycardia, bradypnea, hypotension, and respiratory depression necessitating mechanical ventilation (6,10). Other symptoms include tremor, hallucinations, nystagmus, slurred speech, and muscle weakness (10). With such nonspecific symptomatology, cannabis toxicity can mimic postictal states, encephalitis, or sepsis, which lead to unnecessary diagnostic evaluations.

Prompt urine screening can prevent further invasive and costly workups, such as brain imaging and lumbar puncture, and may thwart the need for mechanical ventilation or i.v. antibiotics/antivirals for presumed meningoencephalitis (6). Initial urine screening is typically performed with the highly sensitive enzyme multiplied immunoassay tech-

nique, but can have false-positive results, as many drug metabolites can influence the test, including hemp seed products (11). The confirmatory test, GC-MS, will only test positive for THC, making it highly specific for cannabis ingestion (11,12). Hemp is derived from a strain of the cannabis sativa plant species that contains a much lower concentration of the psychoactive component, THC, and higher concentrations of cannabidiol. Due to the increased availability in natural grocery stores, hemp products have become increasingly popular as health supplements in children. In order for hemp products to be commercially sold in the United States, strict regulations enforce the THC component to be < 0.3% of the total product weight (13). Despite these strict regulations on THC content, a recent study by Yang et al. demonstrated that hemp products, in fact, have a variable THC component and may contain up to 12 times the legal THC limit (13). Therefore, prolonged use of hemp seed oil may induce neurologic symptoms of THC. A recent case by Chinello et al. described a case of a 2-year-old child who developed neurologic symptoms after taking 2 teaspoons of hemp seed oil per day for 3 weeks (14).

No antidote exists for cannabis toxicity and activated charcoal is not effective (10). Management is largely supportive and most pediatric patients are observed and return to baseline within 8–12 h (1,14). Pediatric cannabis intoxication should be reported to child protection services to identify neglect and at-risk families and enhance child safety.

Pediatric cannabis ingestions are more frequent due to rising marijuana use in the United States (US) (15–17). In a comparison of state trends in unintentional pediatric marijuana exposures, as measured by call volume to US poison centers, call rates in states that had passed legislation prior to 2005 were increased by 30%, juxtaposed to non-legal states, where call volume remained unchanged (4). Despite its increasing availability, reports of unintentional pediatric cannabis ingestion leading to toxicity are uncommon (8). History taking must review both medicinal and recreational drug exposures to prevent missing the diagnosis. Knowledge of substances that can lead to false positives is imperative. Pertinent to our case, hemp product consumption will not result in a positive cannabinoid urine confirmatory test, as hemp does not contain enough THC to induce toxicity (11). However, recent data show hemp seed oil products may have substantially more THC than the level acceptable for commercial hemp use, and with prolonged exposure may induce toxicity (14). Our case involved an acute exposure and is therefore unlikely to cause any related toxicities. Lastly, with the growing popularity of edible marijuana products, which typically resemble candy and may be alluring to the exploratory toddler, emergency physicians must be vigilant when considering potential cannabis toxicity (2,17).

## WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

As access to cannabis increases, emergency physicians must recognize pediatric unintentional cannabis toxicity. Prompt cannabinoid urine screening can prevent further invasive diagnostic investigations.

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