

# Delta-8 Tetrahydrocannabinol in the Emergency Department: A Case Series

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## ABSTRACT

**Introduction:** “Delta-8,” or delta-8 tetrahydrocannabinol (delta-8 THC), is a cannabinoid product that is growing in popularity for recreational use across the nation. This report aims to characterize the clinical presentation of acute delta-8 ingestions presenting to the emergency department.

**Case Series:** This is a case series of 6 patients who presented to a regional network of small- and medium-volume emergency departments in northwest Wisconsin. Patient histories confirmed that all patients had delta-8 exposure. Patient ages ranged from 5 to 57 years old. Amounts ingested and routes of ingestions varied from patient to patient. The most common symptoms reported were respiratory depression, unresponsiveness, altered mental status, tachycardia, and chest pressure.

**Conclusions:** This case series is a snapshot of the burden experienced by emergency departments because of delta-8 availability. Clinicians should maintain a high index of suspicion for delta-8 use, especially in patients with altered mental status, anxiety, or cardiac.

## INTRODUCTION

“Delta-8,” or delta-8 tetrahydrocannabinol (delta-8 THC), is a cannabinoid product that is growing in popularity for recreational use across the nation. It is widely advertised on billboards, television, and social media and is even available for purchase at gas stations. But what is delta-8 and what side effects should emergency departments (ED) be prepared to treat? This report is a case series of 6 patients who presented to a regional network of small- and medium-volume EDs in northwest Wisconsin during June 2021 to October 2022. The patients’ history confirmed delta-8 exposure, and their ED presentation was attributed primarily to this exposure. To our knowledge, this is the largest

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case series involving delta-8-related ED presentations in a non-urban ED system. It provides insight into several phenotypes of delta-8-related symptoms, including altered mental status, anxiety, and cardiac symptoms and also demonstrates the burden placed on EDs secondary to widespread legal access of delta-8. The paper concludes with education on the regulatory status of delta-8 and on the presentation, testing, and management of delta-8 intoxication.

## CASE PRESENTATIONS

### Case 1

A 36-year-old female presented to the ED via emergency medical services (EMS).

According to EMS and the patient’s son, she was using a vape pen with delta-8 THC prior to arrival. Her son stated that she became less responsive while sitting on the couch. He propped her head up with a few pillows. After an hour of her becoming increasingly unresponsive he called EMS.

When EMS arrived, she was minimally responsive. Naloxone was administered without improvement. Upon arrival to the ED, she remained unresponsive to any stimuli and was given a Glasgow Coma Scale (GCS) score of 4. Her oxygen saturation was in the mid to high 90s on nasal cannula with respirations between 12 and 16. Blood gas showed pH 7.38, carbon dioxide (CO<sub>2</sub>) 34, and bicarbonate 20. Initial vital signs were heart rate (HR) 77 and blood pressure (BP) 127/86 mmHg. Given her continued altered mental status, she was intubated for airway protection. Her urine drug screen came back positive for amphetamines (not methamphetamines) and THC. The positive screen for amphetamines was likely a false positive due to her home medication of trazodone. The other toxicology labs (ethyl alcohol, acetaminophen level,

salicylate level) were negative. Computed tomography (CT) of the head was unremarkable.

The patient was admitted to the intensive care unit and was extubated later that evening. She had 1 seizure-like episode that evening and was treated with lorazepam. Neurology was consulted and no other cause for her altered mental status or seizure were identified—both were attributed to the ingestion of delta-8. She spent a total of 7 days in the hospital and was discharged home in her baseline neurologic state.

### Case 2

A 45-year-old female presented to the ED by ambulance for a syncope episode at work. According to EMS, the patient had normal vital signs and blood sugar upon their arrival, but she remained “unconscious” with occasional nonpurposeful movements. Upon arrival to the ED, the clinician performed a sternal rub, at which point the patient’s eyes opened, she localized to push hands away, and said “stop that.” Her GCS was 12. She did not respond to naloxone. Vital signs on arrival were HR 87 and BP 140/83 mmHg. Urine drug screen was positive for THC. Head CT was negative.

An hour after arrival, the patient’s behavior was still altered. She occasionally would follow commands and state, “I am tired,” but then would not answer any more questions and would blink her eyes and smack her lips. At this point, her mental status level was only A and O (alert and oriented) x 1.

Two hours after arrival, she became increasingly lucid and began to answer questions appropriately. She stated that the evening of her presentation, just before going to work, she consumed 2 delta-8 gummies, which she had never tried before. She denied any other substance use. She eventually was discharged in a normal mental state 6 hours after her initial arrival. Her transient severe altered mental status was attributed to delta-8.

### Case 3

A 5-year-old female presented to the ED with her mother with concerns of dizziness, abdominal pain, pallor, and lethargy. When her mother picked her up from her father’s house, he noted that she was complaining of dizziness and stomach pain. Her mother noted that she seemed unsteady with ambulation and was lethargic. When the clinician entered the room, the patient was staring at the ceiling and unable to answer questions. She was looking around the room, opening and closing her eyes, but she was not responsive to commands from her mother or the clinician.

She continued to be somnolent with a GCS of 10 and her oxygen level briefly desaturated to 80%. She was started on 0.5 L nasal cannula oxygen, was placed on end-tidal CO<sub>2</sub> monitoring, and remained responsive to physical stimuli. Her urine drug screen was positive for THC. At that time, it was revealed that on the day of presentation while in her father’s care, she had consumed 12 delta-8 THC gummies, total of approximately 324 mg. Poison Control recommended 4-hour observation and supportive care,

after which the patient was transferred to Minnesota Children’s Hospital for further monitoring. She improved in the ED and was discharged home.

### Case 4

A 21-year-old female presented to the ED via EMS with altered mental status, agitation, and concern for overdose. On the way to the ED, EMS reported she was agitated, screaming, and hallucinating. She became aggressive and was given 5 mg of midazolam en route.

Upon arrival to the ED, the patient was somnolent but still intermittently thrashing on the cot. She followed 1-step commands and spoke nonsensical words. Her GCS score was 12, HR 121, BP 116/81, respiratory rate 18, oxygen saturation (SPO<sub>2</sub>)96%, and temperature 36.8°C. She eventually became violent with staff due to hallucinations and received another 5 mg of midazolam. Over the next hour, her SPO<sub>2</sub> desaturated to the upper 90% with some sonorous respirations. She responded to jaw thrusts and eventually received a nasal trumpet for airway support overnight. Throughout the night, she was intermittently agitated attending to auditory and visual hallucinations. After these episodes, she would fall back to sleep, again requiring the nasal trumpet. Labs were significant for ethyl alcohol 249 and a urine drug screen positive for THC. Head CT was negative. Her significant other reported that she ingested delta-8 with alcohol that evening.

Nine hours after she presented to the ED, she was able to be assessed. She reported that she was smoking delta-8 and drinking the previous night. After a total of 14 hours in the ED, she was discharged home at her baseline mental status. The altered mental status, hallucinations, and erratic behavior all attributed to the ingestion of delta-8 with alcohol.

### Case 5

A 25-year-old male presented to the ED for what he described as a sensation of chest tightness associated with “anxiety and a racing heart.” He stated that prior to the onset of his symptoms, he ingested a delta-8 THC oil that he had purchased that day from a dispensary. Prior to arrival, he took approximately 13 mL of a 30 mL bottle; the recommended dose was 0.5 mL.

Vital signs at presentation included HR 146, BP 172/98, respiratory rate 25. Labs were unremarkable. No urine drug screen was performed. Poison Control was contacted and recommended a 4-hour observation. He received lorazepam 1mg intravenously, as well as 1L of normal saline. At time of discharge, his heart rate was 90 beats per minute. His tachycardia and anxiety were attributed to delta-8 intoxication.

### Case 6

A 57-year-old male presented to the ED for dizziness, diaphoresis and “an odd feeling in his chest.” He stated that he took his normal regimen of morphine and methocarbamol with dinner. Approximately 30 minutes later, he took 3 delta-8 gummies,

which he had not tried previously. An hour after ingestion, he started to feel sweaty, weak, dizzy, and had chest pressure leading to the ED visit.

Vital signs at presentation were HR 87-97, BP 152/92. Electrocardiogram and cardiac markers were negative for acute coronary syndrome. Urine drug screen was positive for opioids (prescribed home medication) and THC. He was given intravenous (IV) fluids and monitored. Five hours after presentation, his chest pressure resolved and he was discharged home in stable condition. His diaphoresis, dizziness, and chest discomfort were attributed to delta-8 ingestion.

## DISCUSSION

### What is Delta-8?

Delta-8 tetrahydrocannabinol (delta-8 THC) is a cannabinoid that is a double-bond isomer of the better-known delta-9 THC. Delta-8 THC was first derived from the cyclization of cannabidiol (CBD) in the 1940s and was found to be highly psychoactive in humans. By the 1960s, it was discovered that delta-8 THC was naturally present in small amounts of cannabis and cannabis-derived products.<sup>1</sup>

Delta-8 THC occurs naturally in hemp and marijuana in very low quantities. In order to get larger quantities of delta-8 THC, additional chemicals are needed to convert other cannabinoids in hemp into delta-8 THC, hence the term “synthetic THC.” This synthesizing process is not regulated by the US Food and Drug Administration (FDA). Therefore, the manufacturing of delta-8 THC products may occur in uncontrolled or unsanitary settings, which may lead to the presence of unsafe contaminants or other potentially harmful substances.<sup>2</sup>

### Regulatory Status

There is much debate around the legality of delta-8 THC. Its regulatory status changes almost monthly and varies from state to state. The Agriculture Improvement Act of 2018<sup>3</sup> (ie, the “Farm Bill”) legalized hemp, its derivatives, and extracts. Hemp is defined as a cannabis plant containing no more than 0.3% of delta-9 THC. As previously discussed, very small quantities of delta-8 are found in synthesized hemp.<sup>4</sup> With this definition, delta-8 THC is a “legal” hemp derivative.

At authorship of this case series, delta-8 THC is legal in 29 states, including Wisconsin, and 1 district. Nine other states have rules and regulations surrounding the use of delta-8 THC.<sup>5</sup> In the states like Wisconsin where delta-8 THC is legal, it is readily accessible to patients over the counter in many vape or smoke shops, gas stations, other convenience stores, and in online retailers.

### Healthcare Burden

According to the FDA, national poison control centers received 2362 exposure cases of delta-8 THC products between January 1, 2021 through February 28, 2022.<sup>2</sup> Of the reported cases, 58%

involved adults, and 41% involved pediatric patients. Forty percent of ingestions were unintentional exposures to delta-8 THC, and 82% of these unintentional exposures affected pediatric patients.<sup>2</sup> Seventy percent required evaluation at a health care facility, and 8% of these resulted in admission to a critical care unit. Most patients requiring evaluation at a health care facility were pediatric patients, and there was 1 report of a pediatric fatality during this time frame.<sup>2</sup>

### Delivery Mechanism

Delta-8’s 2 most common forms of ingestion are oral consumption and smoking/inhalation. Delta-8 THC is available in the form of edibles, such as gummies or candy, with colorful packaging that makes them more attractive to children and in vape cartridges to be inhaled by the user. Other available products include pure delta-8 THC oil, “flower,” “crumble,” prerolled blunts, cigarettes, soft gels, capsules, drink flavorings, and sodas. As with the synthesis of delta-8 THC, there is no regulation of the products containing the chemical.

### Symptoms

Delta-8 THC has psychoactive and intoxicating effects, similar to that of delta-9 THC.<sup>1</sup> THC is known to act at a number of receptor sites. Dopaminergic, cholinergic, noradrenergic, serotonergic, and  $\gamma$ -aminobutyric acid are all receptors affected, as well as a number of neuropeptides that all play a role in the symptoms seen in patients presenting to the ED.<sup>6</sup>

In mild to moderate cases of delta-8 THC intoxication, symptoms are what one would expect to see with marijuana intoxication, including somnolence, euphoria, alterations of senses and time perception, depersonalization, loss of social inhibition, giddiness, and mood alterations.<sup>6</sup> Severe symptoms of toxicity include lethargy, uncoordinated movements and decreased psychomotor activity, slurred speech, increased heart rate progressing to slowed heart rate, hypotension, difficulty breathing, seizures, sedation, and, eventually, coma. These effects occur regardless of ingestion route.<sup>6</sup>

### Testing for Delta-8

Currently, there is not a widely available test specifically for delta-8 THC. As with the cases presented here, a urine drug screen will likely be positive for THC. A study published in 2022 determined that if someone is using delta-8-THC, the method initially developed to detect THC is able to detect it in the urine sample.<sup>7</sup> Once an immunoassay positive sample has been identified, a chromatographic method would be necessary to differentiate between delta-8 and delta-9 because they are so structurally similar.<sup>7</sup>

In the current ED practice setting, determining what strain of THC the patient ingested comes down to a good patient history and report from EMS or family. It is often helpful to ask specifically about delta-8 use versus a general question about rec-

recreational drug use, as some patients may not consider delta-8 a recreational drug.

### Treatment Options

There is no antidote or reversal for delta-8 THC like that available for acetaminophen and opioid intoxications. Management for delta-8 ingestion consists primarily of supportive care and includes benzodiazepines for agitation, tachycardia, and seizures. Fluids can be given for hypotension followed by vasopressors if necessary.<sup>6</sup>

In severe toxicity, altered mental status and obtundation may require airway support. There have also been reports of atrial fibrillation and other cardiac dysrhythmias in patients after ingesting that should receive supportive care the appropriate corresponding care. Poison control centers also have reported patients presenting with hypomagnesemia. These patients should be treated with the appropriate corresponding IV magnesium replacement for their age and current magnesium level.<sup>6</sup>

### CONCLUSIONS

With widespread access to delta-8 THC in Wisconsin and across the rest of the United States, EDs will see an increase in delta-8 THC intoxications. This case series is a snapshot of the burden experienced by EDs due to the availability of delta-8 THC. Though there is no antidote, good supportive care is effective in caring for these patients. Since delta-8 and delta-9 THC are structurally similar, a patient who has ingested delta-8 THC will test positive for THC on a urine drug screen. Clinicians should maintain a high index of suspicion for delta-8 use, especially in patients with altered mental status, anxiety, or cardiac symptoms

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