



Case Report

Coagulopathic hemorrhage with use of synthetic cannabinoids

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ABSTRACT

Synthetic cannabinoids contain many different chemicals and compounds, which pose new health risks to the population using these drugs. In May of 2018 the Center for Disease Control issued a health alert providing information on a multistate outbreak of coagulopathy from exposure to synthetic cannabinoid products containing a Vitamin K-dependent antagonistic agent such as brodifacoum. Recognizing signs, symptoms and imaging findings related to this outbreak is essential for clinicians caring for patients with a history or suspicion of using synthetic cannabinoids. To our knowledge, there are no studies that report the imaging findings demonstrating the coagulopathic complications associated with these synthetic compounds.

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1. Introduction

In March of 2018, the Illinois Department of Public Health reported cases of unexplained bleeding among patient who reported using synthetic cannabinoids [1]. Subsequent testing of drug and biological samples from patients detected the presence of brodifacoum, a long-acting vitamin K-dependent antagonist used as a rodenticide [2]. Imaging reports documenting findings associated with synthetic cannabis use include damage to the central nervous system (CNS) via embolic ischemic stroke and diffuse hypoxic and ischemic brain injury [3–6]. Associated pulmonary reports show a pattern of organizing pneumonia with or without patchy acute alveolar damage [7]. We present a case with imaging findings of a coagulopathic hemorrhage associated with using synthetic cannabinoids.

2. Case report

A 56-year-old male was brought to the Emergency Department via ambulance after an uncharacteristic violent outburst with neighbors. In the ED, he continued to be combative and was sedated with haloperidol and midazolam. Blood toxicology resulted positive for benzodiazepines and cannabinoids. Blood alcohol level was 282 mg/dL. Coagulation profile demonstrated an INR of 0.9, PT 10.4 s and PTT 38.0 s. General chemistry was unremarkable. CBC showed a hemoglobin of 11.5 g/dL, hematocrit 38.9% and platelet count of 101 K/ μ L. After an interval of resting quietly for approximately 30 min the patient was found unresponsive. Advanced cardiac life support was performed. The patient was intubated and started on levophed and epinephrine. A left femoral

arterial line was placed after multiple attempts and the patient developed a large hematoma at the insertion site. Massive transfusion protocol was activated due to persistent hypotension and bleeding findings. The patient's abdomen became distended and tense and abdominal compartment syndrome was suspected. CT abdomen pelvis showed an acute retroperitoneal/extraperitoneal hemorrhage (Figs. 1–2). Blood was noted oozing from his intravenous access sites and red urine without clots was found in the Foley catheter bag. Repeat CBC and coagulation profile showed a hemoglobin of 7.3 g/dL, hematocrit 23.5%, platelet count of 64, INR 3.1, PT 35.3 s, and PTT >100.0 s. A second round of massive transfusion was initiated due to persistent hypotension and bleeding findings. The patient was transferred to the medical intensive care unit (MICU) with presumed disseminated intravascular coagulation. The patient continued to have abdominal distension and uncontrolled bleeding. Temperature and blood pressure continued to decrease. The patient's INR continued to rise to an unregistered/abnormally high level. One day later after developing asystole the patient was unsuccessfully resuscitated and pronounced dead. Postmortem corroborative history from friends/family revealed recent use of synthetic cannabinoids.

3. Discussion

Synthetic cannabinoids are widely available and contain various formulations. Adverse effects from synthetic cannabinoids vary and can include neurological (e.g., agitation, confusion), psychiatric (e.g., hallucinations, delusions), and other physical (e.g., tachypnea, tachycardia, gastrointestinal distress) signs and symptoms [8–10]. An additional complication is consequence of ingredients containing long-acting Vitamin K-antagonists predisposing consumers to bleeding.

As of May 2018 the CDC began coordinating national surveillance activities for possible cases of vitamin K-dependent antagonist

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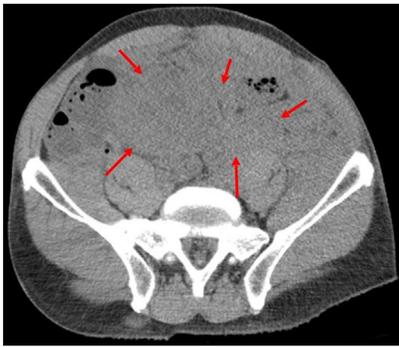


Fig. 1. Non-contrast CT axial image of the abdomen and pelvis demonstrating hazy fluid tracking through the retro- and extra- peritoneum with extension into the left groin (arrows demarcating generalized area) The fluid has CT values of 34–40 Hounsfield units and is compatible with acute hemorrhage.

coagulopathy associated with synthetic cannabinoids use [1]. Since the index case was identified in Illinois on March 3, 2018, state health departments have reported 202 cases, including five deaths, to the CDC [1]. Case-patients from this outbreak have presented with a variety of signs and symptoms of coagulopathy (e.g., bruising, nosebleeds, excessively heavy menstrual bleeding, hematemesis, hemoptysis, hematuria, flank pain, abdominal pain, and bleeding gums or mouth) [8–10].



Fig. 2. Non-contrast CT coronal image of the abdomen and pelvis demonstrating hazy fluid tracking through the retro- and extra- peritoneum with extension into the left groin (red arrows demarcating generalized area). The fluid has CT values of 34–40 Hounsfield units and is compatible with acute hemorrhage.

Some patients may have asymptomatic or subclinical coagulopathy and present with complaints unrelated to bleeding. These patients have an increased risk of bleeding as a complication of invasive or surgical procedures as the coagulopathy can go undetected. Patients should be considered high-risk for coagulopathy if they have reported or suspected use of synthetic cannabinoids. Screening for synthetic cannabinoid metabolites is not routinely performed due to a lack of effective detection methods. The most helpful and commonly available laboratory test to help identify patients with potential coagulopathy after synthetic cannabinoid use is the International Normalized Ratio (INR).

Imaging findings of hemorrhage may be the initial finding that suggests a coagulopathic state from associated use of synthetic cannabinoids. Hemoperitoneum secondary to spontaneous bleeding from a coagulopathy is a rare imaging finding [11]. The density of abdominal fluid can be measured and help determine acuity of hemorrhage. CT values of 30–45 HU correlates with recent hemorrhage or acute bleed, clotted blood measures 45–70 HU, old blood products or anemic blood may measure <30 HU [12]. The presented case demonstrates hemorrhage out of proportion to the iatrogenic insult that can be suggestive of a coagulopathic state.

4. Conclusion

It is recommended that clinicians seeing patients in an urgent/emergent setting maintain a high index of suspicion for coagulopathy in patients with history or suspicion of using synthetic cannabinoids. Radiologists should consider a differential diagnosis of synthetic cannabinoid coagulopathy in patients with imaging findings of bleeding unrelated to the injury, bleeding out of proportion to the insult, or other unexplained bleeding. Additionally, proceduralists (e.g., trauma/general/orthopedic/oral/OB-GYN/cosmetic surgeons, dentists, interventional cardiologists/radiologists, and nephrologists) should be screening patient's history for use of synthetic cannabinoids prior to intervention as these compounds may increase risk of procedural bleeding [1].

The authors declare that they have no conflict of interest.

References

- [1] Centers for Disease Control and Prevention (CDC). HAN Archive 0410-05/25/2018 Outbreak of Life-threatening Coagulopathy Associated with Synthetic Cannabinoids Use; 2018.
- [2] King N, Tran MH. Long acting anticoagulant rodenticide (superwarfarin) poisoning: a review of its historical development, epidemiology, and clinical management. *Transfus Med Rev* 2015;29:250–8.
- [3] Korya D, Kapoor A, Labiner D. Ischemic stroke in a 28-year-old woman after smoking synthetic THC. *Neurology* 2013;80 [(Meeting Abstracts 1):P06.250].
- [4] Bernson-Leung ME, Leung LY, Kumar S. Synthetic cannabis and acute ischemic stroke. *J Stroke Cerebrovasc Dis* 2014;23(5):1239–41.
- [5] Freeman MJ, Rose DZ, Myers MA, et al. Ischemic stroke after use of the synthetic marijuana "spice". *Neurology* 2013;81(24):2090–3.
- [6] Sherwani Afshien, Zhou Yihua. A New Pattern of Imaging Findings of the Brain in Synthetic Cannabis Toxicity. *Neurological Cases*, 2; 2015; 7–10.
- [7] *Am J Roentgenol* 2015;204:750–7. <https://doi.org/10.2214/AJR.14.13138>.
- [8] Castaneto MS, Gorelick DA, Desrosiers NA, Hartman RL, Pirard S, Huestis MA. Synthetic cannabinoids: epidemiology, pharmacodynamics, and clinical implications. *Drug Alcohol Depend* 2014;144:12–41.
- [9] Gurney SM, Scott KS, Kacinko SL, Presley BC, Logan BK. Pharmacology, toxicology, and adverse effects of synthetic cannabinoid drugs. *Forensic Sci Rev* 2014;26:53–78.
- [10] Tai S, Fantegrossi WE. Pharmacological and toxicological effects of synthetic cannabinoids and their metabolites. *Curr Top Behav Neurosci* 2017;32:249–62.
- [11] Lubner M, Menias C, Rucker C, et al. Blood in the belly: CT findings of hemoperitoneum. *Radiographics* 2007;27(1):109–25.
- [12] *Computed Body Tomography With MRI Correlation*. Lippincott Williams & Wilkins 0781745268; 2003.