

BRIEF REPORT

Cannabinoid Hyperemesis and Compulsive Bathing: A Case Series and Paradoxical Pathophysiological Explanation

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Cannabinoid hyperemesis is a syndrome characterized by severe nausea and hyperemesis associated with chronic marijuana abuse and marked by compulsive bathing habits, which temporarily alleviate symptoms. We describe the syndrome in 4 adult patients for whom extensive gastrointestinal evaluations failed to identify another clear cause. Cessation of marijuana use resulted in the alleviation of their symptoms. Because recreational and medical use of marijuana is increasing in the United States, this condition should be considered in many patients who present with cyclical vomiting. (J Am Board Fam Med 2010;23:790–793.)

Keywords: Cannabinoid Hyperemesis, Cyclical Vomiting, Case Report, Compulsive Bathing

Cannabinoid hyperemesis was first described by Allen¹ in a 2004 case series of 9 patients in Australia, and it is defined as excessive marijuana use associated with cyclical vomiting and abdominal pain. We describe 4 cases of chronic cyclical vomiting in adults who habitually smoked marijuana. We also propose a mechanism to explain the compulsive bathing in warm water that characteristically brings temporary relief of symptoms.

Case Reports

Patient 1

A 20-year-old African-American man presented to the emergency department (ED); he had been having frequent episodes of nausea and vomiting for 8

months and indicated that warm baths provided relief of his symptoms. He denied any medical or surgical history. His only medication was promethazine. An abdominal ultrasound and computerized tomography (CT) scans of his abdomen and pelvis with and without contrast were negative; his vital signs were normal, and his abdomen was soft and was not tender. He admitted to smoking marijuana daily and smoking 5 cigars per day for at least the past 4 years. Laboratory data included a white blood cell count of 11,700 cells/ μ L with normal complete blood count (CBC), basic metabolic profile (BMP), hepatic profile, and lipase. Urine drug screen revealed only cannabinoids. The patient was admitted for rehydration, antiemetics, and evaluation. Upper endoscopy showed very mild esophagitis and gastritis with negative biopsies for *Helicobacter pylori*. During the patient's hospitalization, he took long showers multiple times each day; furthermore, it was difficult for the physicians to convince the patient to exit the shower for examination.

The physician stressed complete abstinence from marijuana, and the patient was placed on a short course of omeprazole. The patient was contacted 2 months after discharge and reported improvement in symptoms since marijuana cessation.

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However, soon after the telephone interview, he was readmitted to the hospital with a recurrence of his symptoms after resuming marijuana use.

Patient 2

A 27-year-old white man presented with a 2-day history of nausea, vomiting, and abdominal pain. He had recurrent visits to the ED and admissions to hospitals for similar symptoms since the age of 18. The patient reported that he took up to 4 baths per day during his episodes, indicating that the baths provided relief of his symptoms. His previous evaluations included 3 abdominopelvic CT scans, one abdominal ultrasound, and one upper endoscopy. All imaging tests were normal. The esophagogastroduodenoscopy showed gastritis, which was treated with omeprazole. Biopsy for *H. pylori* was negative. Medical history was significant for previous cholecystectomy. He denied taking any medications other than antiemetics. The patient admitted to daily heavy marijuana use for the past 10 years and denied any recent alcohol or tobacco use.

His vital signs were within normal limits. Physical examination was notable for dry mucous membranes and a soft, diffusely tender abdomen without guarding and normal bowel sounds. His white blood cell count was 11,100 cells/ μ L, potassium was 3.2 meq/L, blood urea nitrogen was 27 mg/dL, and creatinine was 1.4 mg/dL. His urine drug screen was positive only for cannabinoids. Liver function tests, urinalysis, lipase, and hemoglobin were unremarkable. The patient was admitted for rehydration therapy and potassium repletion. A small-bowel follow-through study was normal.

The patient was advised to discontinue all marijuana use. He had a symptom-free period with the cessation of marijuana use. However, he relapsed and his symptoms returned. The patient recognizes an association between marijuana use and his symptoms but is unable to stop smoking marijuana.

Patient 3

A 31-year-old man presented to the ED with nausea, vomiting, and diffuse crampy abdominal pain that had lasted for several days and had been present intermittently for years. The patient noted that his symptoms improved when he took multiple daily hot baths and showers. Four previous ED visits during the past 5 years with extensive workups at other hospitals had failed to reveal a source of his symptoms. He has smoked 3 to 5 “blunts”

(marijuana and tobacco cigars) per day and 8 to 9 on weekends for the past 16 years. He denied alcohol abuse. The physical examination revealed normal vital signs, dry oral mucosa, and diffuse mild tenderness of a soft abdomen. Because of the classic nature of his symptoms and his desire to control the expense of his visit, the physician did not order laboratory tests or radiologic imaging. Previous ED visits revealed normal CBC, BMP, lipase, and urinalysis. The patient was treated with intravenous hydration and antiemetics and was discharged with a diagnosis of cannabinoid hyperemesis. Phone follow-up revealed that after a brief symptom-free interval the patient resumed smoking marijuana and suffers periodic episodes of cyclical vomiting.

Patient 4

A 43-year-old white man presented to his primary physician with a 4-year history of unexplained cyclic vomiting and vague recurrent abdominal pain. He was evaluated during frequent hospitalizations and found to have normal CBC, BMP, and lipase levels. Prior CT scans and ultrasounds of the abdomen as well as esophagogastroduodenoscopy and colonoscopy were normal. The patient also had a left colectomy for presumed diverticulitis, which did not improve his symptoms. Aware of the association between chronic marijuana use and paradoxical hyperemesis, the physician questioned the patient in her office regarding the use of marijuana. The patient admitted to smoking an average of 0.5 to 1 g per day since age 15 and noted temporary relief of his symptoms with multiple hot showers. The patient recalled on one occasion spending most of 3 days in a hot shower in an attempt to alleviate the symptoms. He noted that he gradually improved over 2 to 3 weeks with cessation of marijuana use; however, when he resumed regular marijuana use his symptoms returned. When the association was suggested to the patient, he stopped using marijuana and has been symptom free for 1 year, the longest period since his cyclic vomiting began 5 years earlier.

Literature Review

A PubMed search was performed and last updated on 14 May 2010. One search was performed with the MeSH headings “marijuana abuse” and “vomiting.” A separate keyword search was performed

with the term “cannabinoid hyperemesis.” A total of 21 separate articles were found and all 11 relevant English language publications were reviewed, including 9 case series and 2 review articles. The references of these publications were also reviewed for further relevant publications. No randomized controlled trials related to our topic area were located.

Discussion

Cannabinoid hyperemesis was first described by Allen¹ in Australia. He noted that patients habitually bathed in warm showers or baths with temporary relief of symptoms. More than 30 cases have described the association of chronic heavy cannabinoid use and cyclical vomiting with abdominal pain.^{2–11} Here we described 4 cases of cannabinoid hyperemesis in which cannabis abuse was confirmed after an exhaustive medical evaluation failed to reveal another cause of symptoms.

Marijuana is frequently used for the treatment of nausea. The mechanism of action of this effect is not precisely known, but it may be related to stimulation of the cannabinoid receptors in the brain. The paradoxical association between chronic cannabinoid use and cyclic vomiting has not been explained. Proposed mechanisms include prolonged cannabinoid half-life caused by fat solubility, delayed gastric emptying, and thermoregulatory disturbances via the limbic system.¹ Cannabinoid receptor type 1 (CB1) receptors exert their neuromodulatory role in the central nervous system and the enteric plexus. Delta-9-tetrahydrocannabinol, also known as THC, acts on CB1 receptors in the brain that are also present in the gut.¹² Chronic stimulation with this lipophilic compound may produce toxicity in sensitive patients.⁸ It is known that CB1 receptor stimulation by cannabinoids slows gastric emptying and peristalsis, but the mechanism of this action is uncertain and may be mediated by both the brain and the gut, with gut activity overriding brain CB1 activity in chronic users of THC.^{8,13,14}

The most intriguing component of these cases is the compulsive bathing in hot water. Patient 1 had to be enticed to come out of his shower for evaluation; patient 4 spent 3 days standing in a warm shower while awake in an attempt to alleviate the symptoms. Compulsive hot-water bathing is present in nearly all cases of cannabinoid

hyperemesis and has no explanation. Because the CB1 receptor is near the thermoregulatory center of the hypothalamus, chronic CB1 hypothalamic stimulation might be counteracted by warm bathing.⁸

We propose an alternate explanation, which relates the compulsive bathing in hot water to chronic stimulation of vascular CB1 receptors. It is well known that cannabinoid receptors in the splanchnic circulation cause vasodilation and are activated, for example, in sepsis and late-stage cirrhosis.^{15,16} We suggest that CB1 receptor-mediated vasodilation of the gut with chronic cannabinoid use may contribute to the symptoms.

A redistribution of blood flow from the splanchnic circulation to muscle has been demonstrated during exercise.¹⁷ We theorize that a temporary relief of symptoms may be related to a redistribution of blood flow from the gut to the skin with warm bathing. Such redistribution could be characterized as a “cutaneous steal syndrome” that brings relief to the patient.

Conclusion

We report 4 cases of chronic cannabinoid use in patients, leading to a cyclic vomiting syndrome with compulsive hot-water bathing. With the recent legalization of medical marijuana in numerous states, we suspect that cannabinoid hyperemesis will become a more frequently encountered diagnosis. As these cases demonstrate, expensive and invasive diagnostic, medical, and surgical treatments could be avoided with an accurate history and knowledge of this phenomenon. Family physicians should be aware of this increasing clinical syndrome.

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