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Shower power: a case report of cannabinoid hyperemesis syndrome

Abstract

Cannabis use is becoming more common globally, making it important for physicians to be aware of cannabinoid hyperemesis syndrome (CHS). CHS presents in chronic cannabis users, typically under the age of 50, and entails a severe cyclic nausea and vomiting pattern with abdominal pain but normal bowel habits. Symptoms typically predominate in the morning, are relieved by hot baths or showers, and resolve with discontinuation of cannabis use. This report details a case of a 32-year-old woman who presented to the emergency department at a large Canadian hospital with severe nausea, vomiting and a history of regular use of marijuana cigarettes. In an attempt to alleviate her symptoms she reported taking frequent hot baths and using as many as five marijuana cigarettes per day. The patient's clinical presentation, chronic daily use of marijuana and relief of symptoms with hot baths led to the diagnosis of CHS. The antiemetic properties of cannabis are widely known in the community, meaning patients may not associate marijuana use with their symptoms. Additionally, cyclic vomiting syndrome is present in many different conditions, making physician awareness of this syndrome crucial. Recognition and diagnosis of this condition can prevent unnecessary, costly diagnostic tests, and provide an opportunity to initiate counselling on cessation.

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Introduction

Cannabis is the most commonly used recreational drug in the US.¹ There is a global trend towards increased medicinal use of cannabis as well as a political trend towards decriminalisation or legalisation, which is likely to result in higher overall cannabis use. In Ireland between 2006 and 2011, lifetime use of cannabis increased from 21.9% to 25.3% and the proportion of young adults (15 to 34 years) who reported using cannabis increased from 28.6% to 33.4%.² There are reports of an association between chronic cannabis use and hyperemesis: cannabinoid hyperemesis syndrome (CHS).³ As availability and social acceptance of cannabis use increases, patients may be more comfortable disclosing use to healthcare providers. Cannabis is viewed as an effective antiemetic and CHS is in contrast to this, possibly making it difficult for patients to accept the diagnosis. Physician awareness and knowledge of this syndrome can lead to a higher index of suspicion for CHS and potentially

avoid unnecessary tests while providing an opportunity to initiate counselling on cessation. In this article we present a case of hyperemesis secondary to chronic cannabis use.

Pharmacology of cannabinoids

The principal active compound in cannabis is delta-9-tetrahydrocannabinol (THC). Most of the effects of THC are mediated through agonistic actions at cannabinoid receptors.⁴ Two cannabinoid receptors have been identified: CB₁ and CB₂.⁵ Activation of the CB₁ receptors by THC results in the psychoactive effects (euphoria, relaxation, perceptual disturbance, intensified sensory experiences and memory impairment) associated with marijuana use.⁶ Selective CB₂ receptor agonists can have therapeutic use as analgesic and anti-inflammatory agents.^{5,7} THC has antiemetic properties and has been used as a treatment for nausea. This effect is mediated through CB₁ receptor activation in the

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Table 1: Laboratory investigations on admission.

Investigation	Result (normal values)
Haemoglobin	167g/L (130-180g/L)
White blood cell count	16.1 x 10 ⁹ /L (4.0-11.0 x 10 ⁹ /L)
Creatinine	197µmol/L (64-111µmol/L)
Lactate	2.4mmol/L (0.5-2.2mmol/L)

brainstem in animal models.⁶ Stimulation and blockade of CB₁ receptors can inhibit and induce vomiting in a dose-dependent manner.⁸ This paradoxical effect whereby chronic cannabis use leads to hyperemesis is poorly understood, but it may be explained by downregulation of CB₁ receptors.^{5,7} Hyperemesis with chronic cannabis use may also be related to the central effects on the hypothalamic-pituitary-adrenal axis.^{5,7,8}

Case report

A 32-year-old female presented to the emergency department at a large urban hospital in Ontario, Canada, with severe nausea and occasional vomiting for seven days, which progressed to vomiting up to seven times daily for two days prior to presentation. Her nausea and vomiting were alleviated with frequent hot baths. Notably, she denied fever, anorexia, weight loss, dysphagia, changes in bowel habit, haematemesis or rectal bleeding. There were no recent lifestyle or dietary changes and she denied any new social stresses, significant family or past medical history, drug or food allergies, and tobacco use or alcohol misuse. She was not taking any medications. She was a regular user of two to three marijuana cigarettes daily but in an attempt to alleviate the nausea had been smoking up to five marijuana cigarettes daily for the past several days. Over the past year she had been admitted to hospital on three occasions with similar symptoms. During these admissions abdominal x-ray, ultrasound and CT scans, as well as blood and urine tests, were all normal. During each admission, treatment consisted of intravenous fluids and ondansetron resulting in symptom improvement. On examination she was afebrile but hypertensive (168/97) and tachycardic (118bpm). She was clinically dehydrated with a flat jugular venous pulse and a decrease in systolic blood pressure of 28 and diastolic blood pressure of 17 with standing. Her abdomen was non-distended and diffusely tender without any peritoneal findings. The cardiovascular, respiratory, neurological, musculoskeletal and skin examinations were normal. The laboratory investigations were consistent with dehydration (**Table 1**). Urine toxicology was positive for THC confirming marijuana use. Liver enzyme tests, serum glucose, and extended electrolytes and abdominal x-ray were normal. A pregnancy test was negative. As with previous admissions, the presentation was consistent with cyclic vomiting syndrome (CVS). The additional chronic daily use of marijuana and relief

Table 2: Causes of cyclic vomiting.

Factor	Example
Medications	Chemotherapy, non-steroidal anti-inflammatory drugs, antibiotics/antivirals, narcotics
Gastrointestinal	Bowel obstruction, gastroparesis, irritable bowel syndrome, malignancy, functional disorders, infection
Neurological	Raised intracranial pressure, seizures and labyrinthine disorders
Psychiatric	Anorexia nervosa, bulimia, psychogenic vomiting, anxiety, depression
Urologic/gynaecologic	Pregnancy, ovarian cysts/malignancy, urolithiasis
Metabolic	Uraemia, parathyroid disorders, hyperthyroidism, Addison's disease, acute intermittent porphyria

of symptoms with a hot bath raised suspicion for a diagnosis of CHS. The absence of a more probable alternate diagnosis and normal investigations supported this diagnosis.

Discussion

CHS was first described in 2004.³ This syndrome is typically seen in patients less than 50 years old who report normal bowel habits and a morning predominance of symptoms. Clinical features include chronic marijuana use, severe cyclic nausea and vomiting, abdominal pain, and resolution of symptoms within days of discontinuing use. The symptoms and signs usually return within weeks of resuming marijuana use. Characteristic of CHS are paroxysms of intense and persistent nausea and vomiting, often relieved by a hot shower or bath. The mechanism for this phenomenon is unclear, but hot showers may reset the hypothalamic thermoregulatory centre and transiently overcome the disequilibrium caused by chronic cannabis use.^{3,9} It may be related to dose-dependent hypothermic effects of THC, or direct effects on CB₁ receptors in the hypothalamus.⁹ The effect may also be due to the action of THC on cannabinoid receptors in the limbic system of the brain.^{3,6} The "cutaneous steal syndrome" hypothesis is that hot showers cause peripheral vasodilation and preferential blood flow to the skin and away from the gut, providing temporary relief from nausea and vomiting.⁹ CHS is often undiagnosed, and associated with recurrent emergency room visits and unnecessary diagnostic tests or even surgical intervention.^{3,10} The diagnosis is often delayed or missed because patients may not readily disclose marijuana use and physicians may fail to obtain an adequate history of substance use. Finally, the symptoms often resolve with symptomatic treatment, resulting in discharge without a definitive diagnosis. CHS is most often confused with cyclic vomiting syndrome (CVS). The

Rome III criteria for the diagnosis of CVS require a minimum of three discrete episodes in the preceding year of stereotypical acute-onset vomiting lasting less than one week, with absence of nausea and vomiting between episodes, and no metabolic, gastrointestinal, central nervous system, structural or biochemical disorders.¹¹ A personal or family history of migraine headaches is supportive of a diagnosis of CVS. The differential diagnosis of CVS is broad (**Table 2**), so the assessment of a patient with cyclical vomiting should include a detailed history, as it is imperative to exclude organic causes of CVS prior to making a diagnosis of CHS, irritable bowel syndrome or psychiatric disease.

The characteristic alleviation of symptoms with compulsive hot showering is unique and potentially pathognomonic of CHS. Focused investigations will depend on the history and examination, particularly when there is a high pretest probability for an organic cause of cyclic vomiting. Even when a diagnosis of CHS is most probable, it is imperative to undertake laboratory testing to assess the extent of dehydration and electrolyte and acid-base abnormalities caused by hyperemesis. A pregnancy test should be done in all women of childbearing age to exclude morning sickness or hyperemesis gravidarum. A urine toxicology screen can be helpful when the diagnosis is suspected but a history of marijuana use is not forthcoming. The management of CHS includes fluid resuscitation and correction of electrolyte and acid base abnormalities. Typical antiemetics (e.g., diphenhydramine, ondansetron, metoclopramide, or prochlorperazine),

although commonly used for symptomatic relief, are often ineffective.¹² There are reports of successful symptom relief with intravenous haloperidol¹² and lorazepam.¹³ Cessation of cannabis use is essential in the treatment of CHS, and long-term management should include counselling on the diagnosis and treatment options for abstinence. Resolution of CHS symptoms generally occurs within days of discontinuing marijuana use; however, symptoms may also persist for several weeks after last use.

Conclusion

The patient, despite multiple admissions and no alternate diagnosis, refused to acknowledge the association between her symptoms and cannabis use. She was a regular user of cannabis for over 15 years and had no interest in counselling or entering a rehabilitation programme. As the antiemetic properties of cannabis are a common stereotype, patients may not associate their marijuana use with their symptoms. Physician awareness of the diagnosis will result in more active search for the condition and can facilitate patient education. Additional research into treatments for CHS is required and the physicians prescribing medical marijuana should be fully aware of possible side effects. Ultimately, there is a growing need for evidence-based patient and healthcare provider education on this condition; it should include both the benefits and risks of medicinal and recreational cannabis use, and available community resources for cessation of use.

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