Cannabinoid Hyperemesis Syndrome: A Case Report and Literature Review

Robert A. Beech, DDS, * *David R. Sterrett, DMD,* † *James Babiuk, DDS,* ‡ *and Henry Fung, DDS* §

Purpose: As society has seen an increase in rates of cannabis abuse, largely related to an increase in legalization of the substance, a new clinical condition deemed *cannabinoid hyperemesis syndrome* has been recognized. This syndrome of idiopathic etiology is stimulated from chronic marijuana usage and produces cyclic episodes of nausea, vomiting, and epigastric pain often alleviated with compulsive hot water bathing.

Patient and Methods: A 42-year-old woman with a medical history of hypertension and myasthenia gravis was admitted to the authors' institution with a mandibular fracture.

Results: Her laboratory work showed her to be extremely hypokalemic and with slight metabolic alkalosis. This was attributed to her reports of chronic vomiting, multiple times daily, over several weeks' duration. After her medical workup, cannabinoid hyperemesis syndrome was diagnosed and treated by fluid resuscitation, antiemetic medications, and marijuana cessation. After correction of her clinical symptoms and laboratory work, she was able to undergo open reduction and internal fixation of her mandibular fracture.

Conclusions: The dental community is well aware of the positive antiemetic and appetite-stimulating effects of marijuana, but they might be unaware of some of the paradoxical effects it can produce as shown in this newly documented clinical condition. As society is seeing an increase in the legalization of marijuana for medical and recreational usage in the United States, the dental community should be aware of this condition and its implications.

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Marijuana use has been a popular recreational drug for thousands of years and is currently the third most common drug of abuse after alcohol and tobacco.[1] It is the most commonly used illicit drug in the United States, with more than 16 million users, and is most prevalent in the 18- to 25-year-old group.[2] Epidemiologic risk factors for abuse include male gender, low economic status, residing in the Western hemisphere, and patients with strained relationship statuses.

In 2004, Allen et al[3] discussed a new disorder associated with marijuana use that displayed signs and symptoms of episodic and recurrent vomiting, abdominal pain, and learned behavior of compulsory hot water bathing. These symptoms are contrary to the well-known positive effects of marijuana, such as antiemesis and appetite stimulation.[1,2,4] This syndrome is commonly broken down into 3 phases: prodromal, hyperemetic, and recovery. The prodromal and recovery phases occur with varying duration, whereas the more seriously symptomatic hyperemetic phase will commonly resolve within 48 hours if treated with appropriate supportive therapy. This report describes a case in which the patient's treatment of a routine mandibular fracture was complicated by this syndrome. The authors discuss a clinical description of the symptoms associated with cannabinoid hyperemesis syndrome (CHS), the differential diagnosis, pharmacologic factors that can

Received from the Department of Oral and Maxillofacial Surgery, John H. Stroger Hospital of Cook County, Chicago, IL.

*Resident.

†Resident.

‡Attending Physician.

§Chairman, Residency Program Director.

Address correspondence and reprint requests to Dr Beech: Department of Oral and Maxillofacial Surgery, John H. Stroger Hospital of Cook County, 1900 W Polk Street, Suite 611, Chicago, IL 60612; e-mail: robeech@gmail.com

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contribute to the condition, and a proposed algorithm for treatment.

Report of Case

A 42-year-old woman presented to the emergency department at John H. Stroger Hospital of Cook County (Chicago, IL) 1 month after blunt head trauma. She denied loss of consciousness, but noted having a malocclusion and pain during function. A maxillofacial computed tomographic (CT) scan without contrast showed a partially healed right mandibular parasymphysis fracture.

Her medical history was noteworthy for myasthenia gravis and hypertension. Initially, her social history was noteworthy for regular tobacco and marijuana use and infrequent alcohol consumption. She was admitted and placed on appropriate medications, including carvedilol and pyridostigmine. During her workup, it was noted she was hypokalemic at 2.9 mEq/L, with a slight metabolic alkalosis showing a CO_2 value of 32 mEq/L. Electrocardiogram showed a sinus bradycardia at 57 beats/minute with otherwise normal rhythm and normal waveform. When the patient was questioned further about her medical history, she noted that she had vomited 6 times during the past 24 hours. Then, the pyridostigmine was discontinued, because she was asymptomatic to her myasthenia gravis and its ability to cause emesis. Her electrolytes were corrected and re-evaluated the next day.

The following day, the patient's nausea and vomiting continued. Her potassium level was still 2.9 mEq/L and a repeat electrocardiogram was found to be normal. The patient was questioned further and admitted to smoking 6 to 7 marijuana cigarettes a day and that she had intractable vomiting periodically during the past 8 years. Her nausea and vomiting had worsened with the patient subjectively stating 5/10 epigastric pain, and she noted taking habitual frequent hot showers that relieved her nausea. With this new history, the authors consulted the medicine service to assist in their medical management of this patient.

According to their recommendations, she underwent multiple tests to identify a possible organic cause to explain this cyclic vomiting pattern. Esophagogastroduodenoscopy (EGD) and CT scanning with and without contrast of the head, abdomen, and pelvis were performed. All findings were unremarkable. With the assistance of their medical colleagues, through a process of exclusion, the authors came to a diagnosis of CHS. This was supported by her symptomatic improvement with hot water bathing and eventual recovery after cessation of marijuana. Once stabilized with supportive therapy, she underwent open reduction and internal fixation of her right mandibular symphysis fracture. Because frequent emesis is a contraindication to a closed reduction, this treatment allowed her to have immediate mobilization and function in case of another acute episode.

Discussion

CHS was first documented during this past decade. The first article describing this syndrome was by Allen et al[3] in 2004. They noticed a correlation with chronic cannabis use causing a paradoxical effect of intractable vomiting that was relieved with compulsory hot water bathing. With cessation of marijuana use, the patient's symptoms resolved. Since then, other case studies and reports have been published supporting the syndrome.

In 2012, Simonetto et al[4] performed a case series of 98 patients, in which they expanded on the original findings for a diagnosis of CHS. From their findings, they broke down the criteria for diagnosis into 3 categories. These categories included essential, major, and supportive features (Table 1), which included the main features that Allen et al[3] and others had discussed previously.[1-10] The timeframe that was most commonly attributed to a diagnosis of chronic cannabis use was 1 to 5 years, with 32% of patients having less than 1 year of use.[4] Ninety-one percent of patients reported that hot water baths alleviated the symptoms during the acute phase.[4] No other vomiting syndrome shares this unique characteristic.[4]

Cannabis is traditionally associated with antiemetic effects in relation to acute ingestion.

Any documented cases of hyperemesis related to tetrahydrocannabinol (THC) had traditionally been associated with acute toxicity in the face of

Table 1. PROPOSED CLINICAL CRITERIA FOR CANNABINOID HYPEREMESIS SYNDROME

Essential for diagnosis
Long-term cannabis use
Major features
Severe cyclic nausea and vomiting
Resolution with cannabis cessation
Relief of symptoms with hot showers or baths
Abdominal pain, epigastric or periumbilical
Weekly use of marijuana
Supportive features
Age <50 yr
Weight loss >5 kg
Morning predominance of symptoms
Normal bowel habits
Negative laboratory, radiographic, and endoscopic test results

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