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**Extraortdinary cause of acute-gastric-dilatation and hepatic-portal-venous-gas: Chronic use of synthetic cannabinoid**

Sevinc MM *et al.*AGD-HPVG in chronic use of synthetic cannabinoid

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**Abstract**

Addiction to synthetic cannabinoids (SC) is a growing social and health problem worldwide. Chronic use of SCs may cause side effects to the gastrointestinal system. We describe a very rare case of acute gastric dilatation (AGD) and hepatic portal venous gas (HPVG) with the findings of acute abdomen due to chronic use of a SC, Bonzai. AGD and HPVG were detected by computerized tomography examination. Patchy mucosal ischemia was seen in endoscopic examination. Despite the findings of acute abdomen, a non-surgical approach with nasogastric decompression, antibiotic therapy and close radiologic and endoscopic follow-up was preferred in the presented case. Clinical and radiologic findings decreased dramatically in first day, and endoscopic findings gradually disappeared over seven days. In conclusion, this case shows that chronic use of a SC may cause AGD and accompanying HPVG, which can be managed non-surgically despite the findings of acute abdomen.

**Key words:** Acute abdomen; Acute gastric dilatation; Bonzai; Hepatic portal venous gas; Synthetic cannabinoid

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**Core tip:** This is the first case of acute gastric dilatation and accompanying hepatic portal venous gas presented as acute abdomen due to chronic use of a synthetic cannabinoids, Bonzai. Despite the findings of acute abdomen, this type of patient can be managed non-surgically with a wide spectrum antibiotic therapy and close radiologic and endoscopic follow-up.

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**INTRODUCTION**

Despite the presence of some therapeutic effects of cannabinoids (also called cannabis), addiction to these substances has been known for many decades, and it is a common health problem worldwide[1]. Chronic use of cannabinoids or synthetic derivatives have many negative effects on human health, such as pulmonary, endocrine and cardiovascular pathologies as well as cognitive and behavioral disorders[1,2]. The gastrointestinal tract is another target of cannabinoids. The effects on the gastrointestinal system are mediated by specific receptors in the brain and intestinal tract[3]. Delayed gastric emptying and hyperemesis are defined gastric pathologies of chronic cannabinoid use[2,4], but the extent of gastric effects of cannabinoids are not predictable. We describe an extraordinary case of a young man and his interesting clinical course after being admitted to emergency services with the signs of acute abdomen.

**CASE REPORT**

A 29-year-old man was admitted to emergency services with the compliant of abdominal distension and gradually increasing pain for the last two days. In his history, he had been using Bonzai regularly over the last five years and undergoing treatment for addiction. Physical examination revealed abdominal distension, tenderness, defense, rebound, nausea and vomiting. At admission, the laboratory findings were as follows: white blood cell count of 18200/mm3, hemoglobin of 14.2 g/dL, platelet count of 208000/mm3, glucose of 240 mg/dL, amylase of 382 U/L, aspartate transaminase of 25 IU/L, alanine transaminase of 17 IU/L, lactate dehydrogenase of 224 U/L, C-reactive protein of 27.7 mg/L. Abdominal x-rays showed a very large amount of gas in the fundus. Nasogastric decompression was applied and approximately 6 L of brownish black fluid was discharged. Computerized tomography (CT) examination revealed a huge stomach, elongated towards the pelvis and accompanying hepatic portal venous gas (HPVG) was detected (Figure 1). There was no evidence of perforation of luminal organs. Emergency upper gastrointestinal endoscopy was performed immediately. Endoscopic examination showed severe mucosal edema and patchy ischemic areas all around the stomach (Figure 2). The patient was hospitalized and we decided to follow up with close radiologic and endoscopic surveillance under a wide spectrum antibiotic therapy, despite the presence of findings of acute abdomen.

After 24 h, endoscopic findings were nearly similar, but clinical findings and HPVG in CT examination were dramatically decreased (Figure 3). There was a small amount of free peritoneal fluid. A sample was taken from this fluid, with the guidance of ultrasonography, and there was no growth in culture.

Nasogastric decompression, antibiotic therapy and serial upper gastrointestinal endoscopy were continued, and all of the clinical, radiological and endoscopic findings were regressed completely by the seventh day. The patient was discharged on the eighth day.

**DISCUSSION**

Although cannabinoids have some therapeutic features, chronic use of them can cause addiction and many deleterious effects [1]. More than ten different products are available containing SCs, such as Bonzai aromatic potpourri, Bonzai plant growth regulator, Bonzai Cuba, Bonzai black diamond, Spice, K2, Jamaican gold, Yucatan fire and so on[5]. Addiction to this type of product has been growing in young adults. According to the World Drug Report from the United Nations Office on Drugs and Crime, SCs have been leading new psychoactive substances worldwide[6]. Turkey was introduced with SCs in 2010, and after that these products have becoming increasingly common [5].

SCs mimic the effects of natural cannabinoids by binding to the cannabinoid binding (CB) receptors. Although CB1 and CB2 receptors are found mainly in neurons and immune cells, respectively, there is evidence for the presence of these receptors along the gastrointestinal tract[3]. The inhibitory effect of cannabinoids and CB1 receptor agonists on gastric motility and contractility has been shown in animal studies[7,8]. Clinically, cannabinoids have been used to treat hyperemesis in patient undergoing chemotherapy, and this effect is mediated by CB1 receptors[9]. Paradoxically, Choung *et al*[10] and Allen *et al*[4] have reported an association between chronic cannabinoid use and cyclical hyperemesis. Additionally, cannabinoids can affect the lower esophageal sphincter by binding to CB1 receptors within the nucleus tractus solitarius[11]. As shown, there are different aspects of the effects of cannabinoids on the stomach. In the present case, we saw an extraordinary presentation of chronic SC use. According to our knowledge, this is the first case of acute gastric dilatation and hepatic portal venous gas resulting from SC use. Although, the pathogenesis of AGD is generally not clear, we thought that, in our case, this process should be mediated by the binding of CB1 receptors.

HPVG is recognized not as a specific disease entity but rather as a diagnostic clue in patients with underlying acute abdominal pathology. The diagnostic features of HPVG on CT imaging include: branching lucencies extending to within 2 cm of the liver capsule, predominantly in the anterior-superior aspect of the left lobe[12,13]. Association of AGD and HPVG is extremely rare; there are few cases reported in the literature. In 1985, Radin *et al*[13] reviewed very early reported three cases in their case report. Of these four AGD–HPVG cases, conservative treatment with nasogastric decompression was successful in three cases[13]. In the more recent reports, surgical exploration was associated with successful results[14-16]. The pathogenesis of HPVG is also not clear. There are two hypotheses regarding its cause, microbe-derived gas production and absorbed intraluminal air[17]. We cannot understand the precise cause of the presence of HPVG in our case. In the literature, necrotizing enterocolitis, bowel necrosis, digestive tract dilatation, inflammatory bowel disease, gastric ulcer, cholangitis, pancreatitis and endoscopic interventions have been reported as a cause of HPVG[18,19]. Whatever the mechanism, it is now clearly known that the prognosis is related to the primary pathology and is not influenced by the presence of HPVG[19].

The stomach is resistant to ischemia and necrosis due to the rich collateral blood flow. However, if a sudden increase in gastric pressure occurs, gastric ischemia, necrosis and perforation can occur[20]. In our case, we have endoscopically detected mucosal ischemia, which was an indicator of impaired perfusion of the stomach. However, there was no evidence of vascular pathology (thrombus or embolus) or obstruction of the tract. There are some challenges in deciding to perform surgery or follow-up due to the chronic use of SC, which has deleterious effects on other organs[1,21]. Finally, we preferred the close clinical, radiologic and endoscopic follow-up.

In conclusion, this is an extraordinary case of AGD with gastric mucosal ischemia and HPVG due to chronic use of a SC. Although the patient’s clinical diagnosis included acute abdomen, which is a precise indication for surgical exploration, a conservative approach of nasogastric decompression, wide spectrum antibiotic therapy and daily endoscopic follow-up were successful. In patients with AGD without vascular or obstructive pathologies, the presence of HPVG and even gastric mucosal ischemia should not be considered as a precise indication for emergency surgery.

**COMMENTS**

***Case characteristics***

A 29 years old male patient presented with severe abdominal pain; the most striking feature in his medical history was chronic use of a synthetic cannabinoid, Bonazi.

***Clinical diagnosis***

Upon physical examination, there were findings of acute abdomen.

***Differential diagnosis***

Perforation of hollow organs, acute pancreatitis.

***Laboratory diagnosis***

The first patient had elevated hematological values for White blood cell count of 18200/mm3, glucose of 240 mg/dL, amylase of 382 U/L, C-reactive protein of 27.7 mg/L.

***Imaging diagnosis***

Abdominal x-rays showed a very large amount of gas in the gastric fundus. Computerized tomography (CT) examination revealed a huge stomach, elongated towards the pelvis and accompanying hepatic portal venous gas (HPVG) was detected. Endoscopic examination showed severe mucosal edema and patchy ischemic areas all around the stomach.

***Treatment***

Nasogastric decompression, antibiotic therapy and serial upper gastrointestinal endoscopy were performed, and all of the clinical, radiological and endoscopic findings were regressed completely by the seventh day.

***Related reports***

The effect of Cannabinoids on gastrointestinal system has great variation. The combination of acute gastric dilatation (AGD) and HPVG is very rare entitiy. HPVG is not a sign of poor prognosis.

***Term explanation***

Bonzai is a trademark of a synthetic cannabinoid which is commercially available in Turkey.

***Experiences and lessons***

This case report presents an extraordinary result of chronic use of synthetic cannabinoid. AGD and hepatic portal venous gas can be seen in such situation. The authors recommend that abdominal CT and upper GI endoscopy should be first line modalities for diagnosis and conservative therapy with close endoscopic follow up should be considered as first choice for treatment.

***Peer-review***

The case is very interesting for the readers. In the manuscript they describe a rare case of AGD accompanying by the HPVG presented as acute abdomen in 29-years-old man due to chronic use of synthetic cannabinoids. The clinical history and diagnostic test are well described and it is easy to follow the flow of the case.

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**Figure 1** **Abdominal computerized tomography shows massive gastric dilatation and hepatic portal venous gas at presentation.** A: Coronal section; B: Transverse section.

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**Figure 2** **Patchy ischemia of gastric mucosa in emergency upper gastrointestinal endoscopy at presentation.** A: Entry to stomach; B: Pylorus; C: Corpus, view of retroflexion; D: Cardia, view of retroflexion.

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**Figure 3** **Transverse section of abdominal computerized tomography after 24 h.** Hepatic portal venous gas and gastric dilatation regressed dramatically.