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Case Report

Cannabis-Induced Coronary Vasospasm: A Case Report of Prinzmetal's Angina in a Young Adult

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Abstract

Prinzmetal's angina, or vasospastic angina, is a rare acute coronary syndrome caused by a spasm of a coronary artery. It is characterized by severe chest pain and can lead to life-threatening complications such as ventricular arrhythmias, myocardial infarction, or sudden cardiac death. This report presents the case of a 29-year-old male with a history of epilepsy who experienced oppressive chest pain and ventricular fibrillation after intensified cannabis use. Diagnostic workup revealed ST-segment elevation, elevated troponin levels, and septoapical hypokinesia on echocardiography. Coronary angiography showed a mild lesion in the left anterior descending artery without significant stenosis, consistent with vasospasm. This case underscores the cardiovascular risks of cannabis use and the critical importance of assessing substance use in young patients with chest pain. It highlights the necessity of raising awareness among healthcare professionals and the potential for integrating substance use evaluations into routine clinical assessments, contributing to improved patient outcomes and further research into cannabis-induced cardiovascular conditions.

Keywords: Cannabis; Coronary Vasospasm; Prinzmetal's Angina; Myocardial Infarction.

Introduction

Prinzmetal's angina, or vasospastic angina, is an acute coronary syndrome characterized by a transient spasm of a coronary artery, leading to myocardial ischemia. Although primarily affecting younger individuals without traditional cardiovascular risk factors, it can result in severe complications, including ventricular arrhythmias, myocardial infarction, or sudden cardiac death. While common triggers such as tobacco and cocaine use are well-documented, the association between cannabis consumption and coronary vasospasm requires further investigation [1-3].

The global rise in cannabis use, driven in part by increasing legalization, has coincided with a growing number of reported cardiovascular complications. Cannabis-induced myocardial infarction and coronary vasospasm have been associated with mechanisms such as autonomic stimulation, vascular inflammation, and platelet dysfunction. This report highlights a rare presentation of Prinzmetal's angina in a young adult following intensified cannabis use, emphasizing the need for clinicians to consider substance use in the differential diagnosis of acute chest pain.

Case Presentation

A 29-year-old male with a history of epilepsy treated with levetiracetam was found drowsy, confused, and agitated by his parents. Emergency medical services were called home for suspected seizure activity.

Vital signs and clinical examination on arrival:

- Heart rate: 82 bpm

- Blood pressure: 125/80 mmHg

- Oxygen saturation: 98% on room air

- Capillary blood glucose: 1.2 g/L

- The patient was initially non-compliant, awake, and not showing any lateralizing signs. Cardiac and pulmonary auscultation revealed no abnormalities.

The patient reported no initial complaints but admitted to sleep deprivation due to prolonged night-time video gaming and increased cannabis use over the preceding days. He was referred to the local hospital for suspected seizure activity. During ambulance transport, he experienced vomiting and oppressive chest pain without radiation. No pre-hospital ECG was performed.

Emergency Department Findings:

- Initial ECG: ST-segment elevation in anterolateral leads with diffuse repolarization abnormalities (Figure 1).

- Cardiac Arrest few minutes after admission: Ventricular fibrillation successfully treated with a 200 J electrical shock.

- Post-resuscitation ECG (Figure 2): Persistent large T waves in V2-V3 and a non-isoelectric ST segment in V2.

- Laboratory Tests:

- Normal renal, hepatic function, and electrolytes

- Initial troponin: 0.005 ng/mL (normal < 0.014); Peak troponin: 0.462 ng/mL

Transthoracic echocardiography revealed septoapical hypokinesia with preserved left ventricular ejection fraction. The patient was administered 250 mg of salicylic acid, 5000 IU of heparin, and 2 g of magnesium sulfate. Coronary angiography identified a mild lesion (30%) in the LAD, which improved after intracoronary nitrate administration. Cardiac MRI was omitted to rule out myocarditis.

Clinical and diagnostic findings supported the hypothesis of Prinzmetal's angina secondary to cannabis use. Other potential causes, such as atherosclerosis or myocarditis, were ruled out through angiography and the absence of inflammatory markers, respectively. The patient was transferred to the cardiac intensive care unit for monitoring, during which he reported no further chest pain, his ECG normalized, and no arrhythmias were observed. He was prescribed aspirin, a vasodilating beta-blocker, and cardiovascular risk management strategies. He was strongly advised to cease all cannabis use.

Discussion

Cannabis is the most widely consumed illicit substance, particularly among young men, with recent data showing that 43% of young adults aged 18-25 reported past-year use [4]. Its active compound, tetrahydrocannabinol (THC), interacts with cannabinoid receptors in various tissues, including the cardiovascular system. Effects include dose-dependent tachycardia, transient hypertension, vascular inflammation, and coronary vasospasm. Cannabis-related angina and myocardial infarction have been linked to mechanisms such as autonomic stimulation, platelet activation, and hypoxia [5-8].

Recent reviews [5] propose several mechanisms for cannabis-induced cardiovascular events. These mechanisms involve various pathways affecting the cardiovascular system, including autonomic stimulation, platelet dysfunction, and direct vascular toxicity:

- Autonomic stimulation: Elevated heart rate and blood pressure due to catecholamine surges.

- Platelet dysfunction: Enhanced aggregation mediated by altered glycoprotein expression.

- Direct toxicity: Exposure to carbon monoxide and aromatic amines in cannabis smoke.

- Coronary vasospasm: Frequently observed in patients without significant coronary stenosis.

These mechanisms underscore the complex interplay of factors contributing to cannabis-related cardiovascular events. This case emphasizes the importance of comprehensive clinical evaluation for accurate diagnosis and management of vasospastic angina.

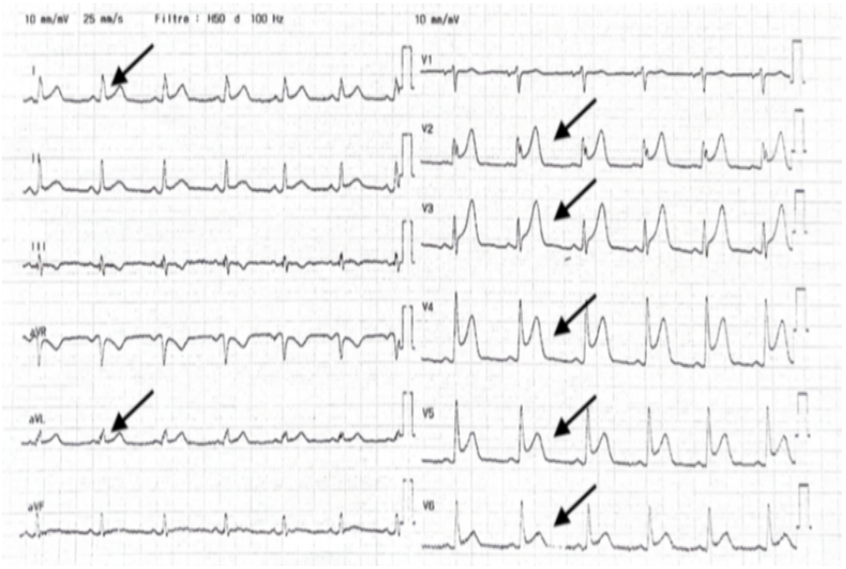

Figure 1: Initial ECG. ST-segment elevation in anterolateral leads, indicative of acute ischemia.

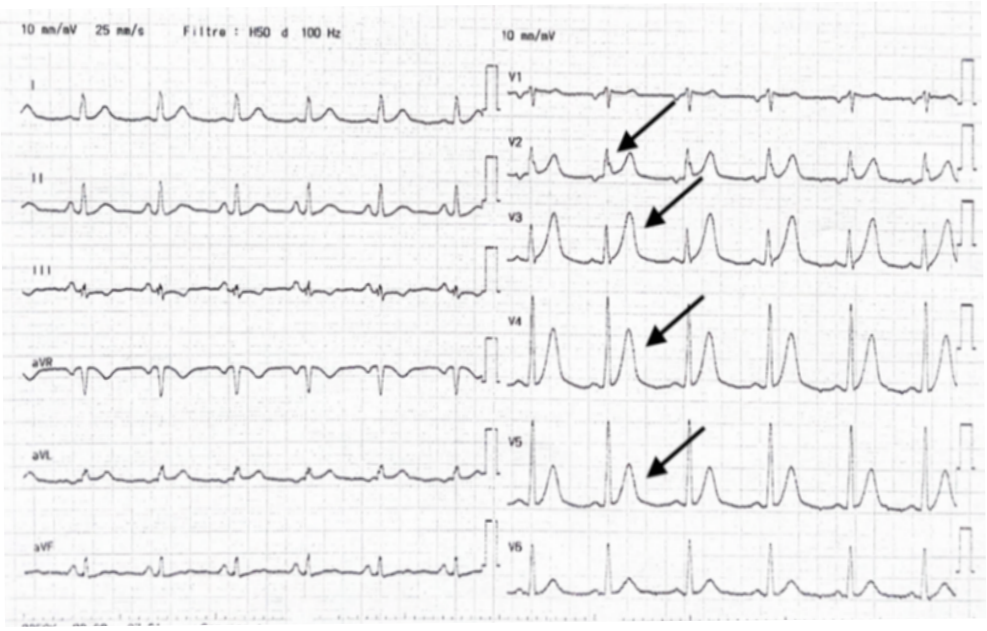

Figure 2: Post-resuscitation ECG. Persistent large T waves and a non-isoelectric ST segment. Highlighted under Emergency Department Findings.

Conclusion

Cannabis use poses significant cardiovascular risks, particularly in young individuals. This case highlights the critical need to include substance use in the differential diagnosis of chest pain in young adults. Thorough clinical assessment and advanced modalities, such coronary angiography, are essential for accurate diagnosis, risk stratification, and prevention of severe complications.

Ethical Compliance: This study complies with ethical guidelines. No patient-identifiable information is disclosed.

Conflict of Interest: The authors declare no conflicts of interest.

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