

Case Report

Spontaneously Reduced Focal Atrial Tachycardia after Cannabis Overdose

Boudar Aicha^{1*}, Cheikh Bay Ahmed¹, Haboub Mariem² and Habbal Rachida²

¹Department of Cardiology, Ibn Rochd University Hospital, Casablanca, Morocco

²Faculty of Medicine and Pharmacy of Casablanca, Hassan II University of Casablanca, Morocco

Abstract

Cardiac arrhythmias are frequent complications of the consumption of toxic substances, including cannabis, which can be fatal.

We report in this case a patient who developed a cardiac arrhythmia-type focal atrial tachycardia a few moments after the consumption of an important dose of cannabis but which reduced spontaneously and without having administered any medication or an external electric shock.

All the rest of the etiological assessment of this arrhythmia was negative and the arrhythmia was linked to the consumption of cannabis which is known to cause these complications.

Introduction

Several epidemiological studies show the increase in drug use in Morocco in all social classes. The simultaneous or alternating use of several drugs (polydrug addiction) has also become more frequent. Due to its easy access its availability, cannabis is currently the most consumed illicit substance [1].

Several cardiovascular complications can result from the consumption of cannabis regardless of the dose which can be life-threatening for the patient.

In this case report, we present the case of focal atrial tachycardia occurring after consumption of a large dose of Cannabis.

Presentation of case

This is a 46-year-old patient, known to be a chronic smoker for years.

Presents to the cardiology emergency department on November 12, 2024, for sudden onset of palpitations associated with sweating.

During questioning: it was found that the patient had just consumed a large dose of cannabis a few hours before the onset of palpitations.

Note that he is a taxi driver and had conflicts at work that pushed him to this unusual drug use, moreover, the patient

had no other cardiovascular risk factors or history of cardiac disease.

During clinical examination: conscious patient BP = 110/70 mmHg, HR at 200 bpm, SpO₂ = 96%, with cardiopulmonary auscultation revealing no abnormalities and absence of OMI.

On the ECG we found a focal atrial tachycardia at 200 bpm, then after 2 hours and spontaneously the patient was reduced to sinus rhythm with a resting frequency at 85 bpm, with no delta waves or other abnormalities indicating another junctional arrhythmia (Figures 1,2).

We completed with a transthoracic echocardiogram which did not reveal any abnormalities, with preserved left ventricular function without segmental kinetic disorders.

We also completed a biological assessment, in particular troponins high-sensitivity which were at 100 ng/l slightly increased with the tachycardia, as well as the TSH us level was at 1.478 µUI/ml, and a correct Kalemia at 4.07 mEq/l, the rest of the assessment was normal, in particular the blood count and the hydro electrolytic assessment.

The patient was placed under continuous monitoring in the cardiology emergency department with disappearance of palpitations and subsequent ECGs were redone without abnormalities.

A small dose of beta blocker, bisoprolol 2.5 mg/day, was prescribed to prevent a recurrence of his tachycardia

More Information

*Address for correspondence: Boudar Aicha, Department of Cardiology, Ibn Rochd University Hospital, Casablanca, Morocco, Email: aichaboudar1996@gmail.com

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Keywords: Cannabis; Focal atrial tachycardia



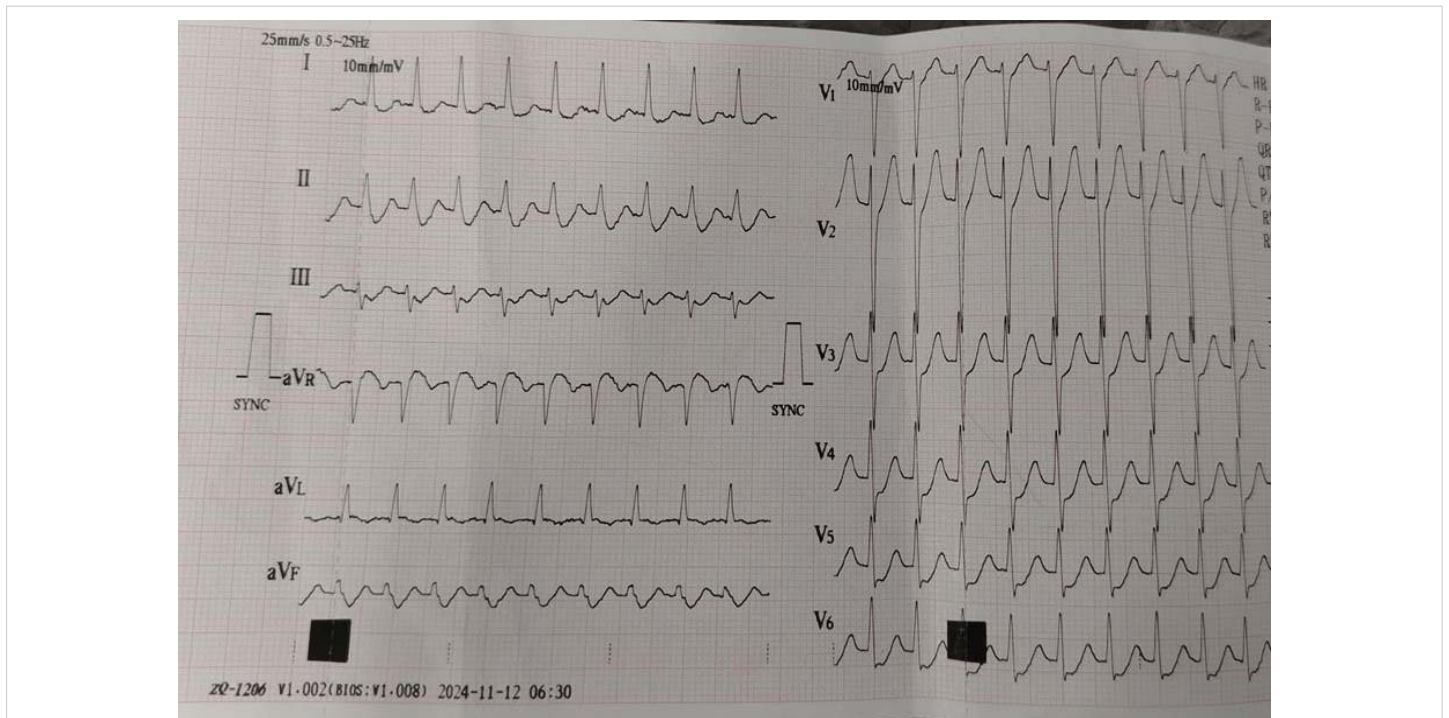


Figure 1: Initial ECG of the patient during the episodes of palpitations in the cardiac emergency unit.

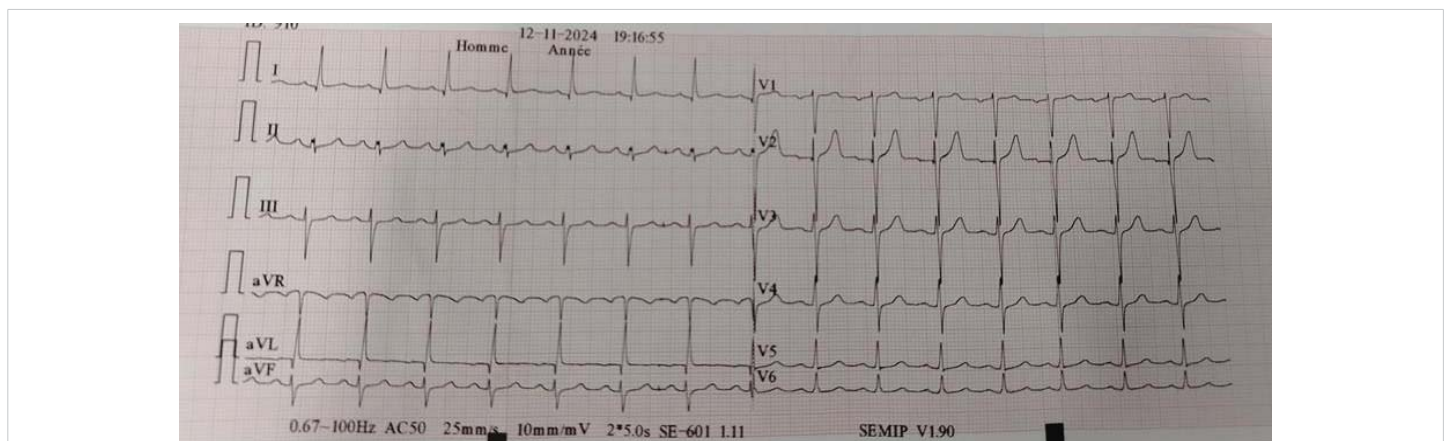


Figure 2: ECG of the patient a few hours later, showing the spontaneous reduction of his heart rate to sinus rhythm without any medication or external electric shock.

with regular monitoring in cardiology consultation, good hemodynamic tolerance, and a sinus rhythm at around 60-75 beats per minute.

The emphasis was on weaning off cannabis and tobacco and the patient was referred to an addiction unit to help him stop consuming toxic substances.

Discussion

The biologically active ingredient in cannabis is a group of cannabinoids and the main psychoactive constituent is 9-tetrahydrocannabinol (THC) which binds to 2 types of receptors including CB1 and CB2.

CB1 receptors are mainly located in the cardiovascular

system, the central nervous system, and peripheral vasculature. THC causes an acute, dose-dependent increase in blood pressure and heart rate that increases the risk of cardiac arrhythmias and myocardial infarction [2].

In younger patients without a history of acute coronary syndrome, cannabis use was shown to be associated with an increased risk of ventricular fibrillation, atrial fibrillation, atrial flutter, pre-excitation syndromes, and long-QT syndrome [3].

Among reviewed case reports, sinus tachycardia was the third-most commonly occurring rhythm abnormality after marijuana exposure, with 8 of 54 patients indicating some form of elevated heart rate within the study parameters [4].

Atrial arrhythmias occurred in 5 of the 54 patients

reviewed, with the most common being atrial fibrillation. One purported mechanism for overactivation of the atria may be related to vagal stimulation that reduces action potential durations and shortens atrial refractory periods to produce cellular hyperpolarization resulting in a predisposition to re-entrant pathways [5,6].

In 2 separate case reports by Charbonney, et al. [7]. and Singh, et al. [8] marijuana appeared to be the only identifiable inciting factor for atrial fibrillation in young adults (ages 22 and 18, respectively) with structurally normal hearts, perhaps lending further support to the effect of vagal stimulation.

Ventricular tachycardia was described in 2 separate case reports by Diffley, et al. [9] and Rezkalla, et al. [10] respectively. In Diffley, the patient presented to the emergency department with ventricular tachycardia immediately after smoking marijuana, which ultimately resulted in the detection of ryanodine receptor-2 mutation causing catecholaminergic polymorphic ventricular tachycardia [9]. In the case of Rezkalla, et al. a coronary angiogram did not show any evidence of coronary artery disease [10].

Casier, et al. [11] also reported a case of fatal ventricular fibrillation in a chronic cannabis user following recent use of it. In another case, ventricular fibrillation occurred after consuming more than the usual dose of marijuana in a patient with CAD on two separate occasions. The authors speculated that excessive catecholamine release could be responsible for the arrhythmia [12]. Brugada-like ST segment abnormalities have also been reported after heavy consumption of cannabis [13,14]. This adverse effect of cannabis is thought to be due to its effect on shortening of action potential and hyperstimulation of vagal tone [13].

Cannabis-related arrhythmia can be multiform regarding their presentation. Therefore, ambiguous combinations of arrhythmia should raise suspicion of underlying cannabis abuse, where clinically appropriate. Although the causality of cannabis use cannot be proven definitively in these cases, the temporal relationship between drug use and the onset of symptoms suggests a strong association.

Compared with our reported case, cannabis is indeed a provider of a heterogeneous set of cardiac arrhythmias which is consistent with our presentation, except that in the literature we have not found any precision concerning the specific type of rhythm disorder that can be triggered by cannabis, thus our study has highlighted in a targeted manner an arrhythmia which is the focal atrial tachycardia induced by the consumption of this substance, and this is the interest of publishing this reported case.

Conclusion

Several cardiovascular complications have been reported following cannabis use.

Our reported case illustrates the rhythm disorders that appeared in a patient who had consumed an important dose of cannabis.

More precisely, in our case, it is a focal atrial tachycardia that spontaneously reduces after a few moments of drug use.

We therefore conclude that the use of this substance harms the heart and that patients should be made aware of the cardiovascular complications secondary to cannabis use.

Consent

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

Ethical declarations

This article was published after obtaining the patient's consent and the patient's personal information was not mentioned so the case report was published anonymously.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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