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## Marijuana Induced Pericarditis: An Emerging Crisis

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# Marijuana Induced Pericarditis: An Emerging Crisis

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## Abstract

**Background:** The use of marijuana, derived from the Cannabis plant, has a lengthy history dating back thousands of years. With the recent legalization of marijuana in many US states, concerns about its health effects have grown. Despite traditional beliefs in its cardioprotective properties, there is a rising incidence of marijuana-induced pericarditis. This article presents a case that highlights the potential connection between marijuana use and cardiac complications. We herein present a case of a 30-year-old male with habitual marijuana use coming in with pericarditis.

**Case:** A 30-year-old male, a habitual marijuana user, presented to the emergency department with recurrent chest pain and shortness of breath. Notably, similar episodes were resolved when he abstained from marijuana. Diagnostic findings upon admission included elevated inflammatory markers, EKG showing diffuse ST segment elevations and PR depressions, echocardiographic evidence of pericardial effusion and EKG consistent with pericarditis. After excluding other causes, marijuana was identified as the likely trigger for his cardiac symptoms.

**Decision making:** NSAIDs and colchicine were started at therapeutic doses for the patient. Cardiology and Cardiothoracic Surgery were consulted. No drainage was planned as patient was clinically stable and improved with medical management alone.

**Conclusion:** The emerging link between marijuana use and pericarditis presents a unique clinical challenge. Comprehensive population-based studies are needed to understand the cardiovascular implications of marijuana use and to develop appropriate management guidelines. Clinicians should approach marijuana use cautiously, considering potential cardiovascular risks, and remain vigilant for pericarditis as a potential consequence of marijuana use during patient evaluations.

## 1. Introduction

Cannabis and its derivatives have been used for the last twelve thousand years going back to the neolithic period when it was first colonized. Marijuana refers to the dried leaves, flowers, stems, and seeds from the *Cannabis sativa* or *Cannabis indica* plant. Marijuana is the most commonly used federally illegal drug in the United States; 48.2 million people, or about 18% of Americans, used it at least once in 2019.<sup>1</sup> What makes marijuana particularly relevant in the present is the fact that legalization has been the forefront of legislation of many states leading to increased use and abuse of this drug in recent times. Despite the widespread belief that marijuana has cardioprotective properties, there is a lack of evidence to support this theory; nevertheless, an increase in cases of marijuana-induced

myopericarditis is being observed in the general population. The literature is sparse but an increased incidence of young males in their 20s–30s have been found to have this disease. Whether it is an effect of the cannabis itself or the multitudes of contaminants within it is a source of great debate. Vasospasm, arteritis and other pathological causes have been implicated. Herein we discuss one such unique case where a 30-year-old male presented with chest pain, elevated inflammatory markers and echo proven pericarditis with classic EKG changes and after ruling out all other causes, marijuana was found to be the instigator of his cardiac presentation.

## 2. Case presentation

An obese 30-year-old male with PMH of juvenile asthma, presented to the ED complaining of epigastric pain and shortness of breath for 4 days. The pain was

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9/10, severe, non-radiating and worsened by bending forward. Patient was seen previously 3 months ago for similar symptoms that were concerning for acute pericarditis given diffuse ST segment elevations and PR depressions. Patient was advised he likely had acute pericarditis and discharged from the ED with Motrin and outpatient follow-up. Patient admitted to smoking marijuana 4–5 joints daily and he denied any tobacco or illicit drug use. He denied any recent flu-like symptoms or sick contacts. The last known use was 3 days prior to presentation. The patient had 3 similar episodes of pain in the last 6 months which self-resolved when the patient stopped smoking marijuana during these episodes.

Vitals on admission were: Temp 98.7, HR 105 bpm, RR 20, BP of 144/88, O<sub>2</sub> sat 98% on room air. Physical exam was unremarkable except for the findings detailed above. A pericardial rub could not be auscultated. ED Labs were significant for WBC 21.9, ESR 48, CRP >20, HS-Trop 5, and EKG showed diffuse ST elevations with PR depression in V<sub>2</sub>–V<sub>6</sub> and ST depression in AVR. COVID-19, influenza A and B and RSV, Coxsackie virus, Hepatitis C, ACE levels, HIV, and ANA were all negative.

CXR showed cardiomegaly and a small left sided pleural effusion. Echo showed EF of 65–70 percent with concentric LVH and small to moderate pericardial effusion.

Cardiology were consulted who recommended medical management and cardiothoracic surgery consult. Cardiothoracic surgery were consulted for possible pericardial effusion drainage and window but recommended medical management with frequent reassessment.

The patient was admitted to telemetry floor and started on Ibuprofen 600 mg thrice daily and Colchicine 0.6 mg twice daily (after loading dose of 1.2 mg). Repeat echo completed the following day showed no change in the findings. The patient was clinically stable and was discharged with Ibuprofen and Colchicine and advised to follow-up with Cardiology outpatient.

### 3. Discussion

While the literature is sparse related to the cardiac effects of marijuana use, we have seen an increased rate of arrhythmias, strokes, orthostatic hypotension, hypertension and myocardial infarct in these young populations.<sup>2</sup> The two most abundant cannabinoids in marijuana are delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD).<sup>3</sup> THC is responsible for mind alteration while CBD is useful for pain relief. The exact mechanism is still unknown for its effects. Some have implicated G-protein-coupled cannabinoid receptors

1 and 2 (CB1R and CB2R) for these deleterious effects.<sup>4</sup> Others have implicated the effects on the coronary microcirculation to cause MI.<sup>5</sup> Initial thinking and testing revealed the recommendation against marijuana in populations with pre-existing coronary artery disease however newer studies have shown the effects of marijuana to be deleterious even in younger patients with no pre-existing morbidities.<sup>6</sup> Cannabis has an impact on the cardiovascular system through irregular heart rate and rhythm, changes in coronary blood flow, and vasospasm.<sup>7</sup> The occurrence of coronary artery spasms in myocarditis could be attributed to the release of vasoactive substances such as thromboxane A<sub>2</sub>. These compounds are generated as a result of platelet aggregation brought on by coronary arteritis, which causes the coronary arteries to spasm.<sup>8</sup> One of the more challenging aspects in treating marijuana induced cardiac symptoms is the presence of more than six hundred active compounds in the drug and the existence of marijuana not as a single entity but rather a conglomerate of mixed substances such as pesticides, glass, amphetamines etc.

Pericarditis is also one of the diseases associated with marijuana use. The presentation of the case is usually quite similar to the usual pericardial effusion of other causes. Patients typically present with chest pain, widespread ST-segment elevation and PR depression and elevated inflammatory markers including ESR and CRP. What made this case decidedly unique is that this was the patient's second presentation with pericarditis in the last six months with association with marijuana use and improvement of symptoms cessation of use and initiation of medical therapy as previously noted. He had a negative HIV, Hep C coronavirus, influenza, parainfluenza, respiratory syncytial virus. Echocardiography remains the primary modality with cardiac MRI and coronary angiography also being available however. European Society of Cardiology guidelines currently do not recommend routinely performing these in cases of clear-cut pericarditis on echo. Despite the patient having a moderate pericardial effusion, the decision was made not to drain it as the patient had a rapid clinical improvement with medical therapy. A similar case of a patient with the same age and an effusion had a nearly parallel course with improvement with NSAIDs and colchicine alone.<sup>9</sup> Treatment thus remains a clinical conundrum but following the guidelines by the American College of Cardiology for pericarditis remains effective. This patient was started on Ibuprofen, colchicine and improved on this therapy. Steroids can also be used for refractory cases. Much more research needs to be done to develop guidelines for this fascinating clinical quagmire.

#### 4. Conclusion

Marijuana induced pericarditis remains a decidedly unique and rapidly emerging cause of pericarditis in the developed world. As this drug becomes more and more common, cardiologists and general practitioners are bound to see more cases emerge. Population based studies need to be done to evaluate the effects and dangers of such a drug with stratification of groups based on co-morbidities to truly develop comprehensive guidelines around its use. However, recommending this drug for pain relief should always be a team based decision. The astute practitioner should also be wary of it in the office setting when other etiologies have been ruled out as this is a cause that cannot be ignored at this time. As for now, we will defer to the guidelines for pericarditis in the clinical literature.

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#### Conflict of interest

The authors have no conflicts of interest to declare. All co-authors have seen and agree with the

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#### References

1. Substance Abuse and Mental Health Services Administration. *Key substance use and mental health indicators in the United States: results from the 2019 national survey on drug use and health*. Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration; 2020.
2. Jouanjs E, Leymarie F, Tubery M, Lapeyre-Mestre M. Cannabis-related hospitalizations: unexpected serious events identified through hospital databases. *Br J Clin Pharmacol*. 2011 May;71(5):758–765. <https://doi.org/10.1111/j.1365-2125.2010.03897.x>. PMID: 21204913; PMCID: PMC3093081.
3. Phytochemistry of Cannabis sativa L, ElSohly MA, Radwan MM, Gul W, Chandra S, Galal A. *Prog Chem Org Nat Prod*. 2017;103:1–36.
4. Pachter P, Steffens S, Haskó G, et al. Cardiovascular effects of marijuana and synthetic cannabinoids: the good, the bad, and the ugly. *Nat Rev Cardiol*. 2018;15:151–166. <https://doi.org/10.1038/nrcardio.2017.130>.
5. Coronary no-flow and ventricular tachycardia associated with habitual marijuana use. *Ann Emerg Med*. 2003;42:365–369. [https://doi.org/10.1016/S0196-0644\(03\)00426-8](https://doi.org/10.1016/S0196-0644(03)00426-8).
6. Tait RJ, Caldicott D, Mountain D, Hill SL, Lenton S. A systematic review of adverse events arising from the use of synthetic cannabinoids and their associated treatment. *Clin Toxicol*. 2016;54(1):1–13. <https://doi.org/10.3109/15563650.2015.1110590>.
7. Alirezai T, Mohammadi MKA, Irilouzadian R, Zarinparsa H. Marijuana-induced myocarditis in a 24-year-old man. *Arch Clin Cases*. 2022 Jul 7;9(2):69–74. <https://doi.org/10.22551/2022.35.0902.10206>. PMID: 35813492; PMCID: PMC9262081.
8. Lampejo T, Durkin SM, Bhatt N, Guttman O. Acute myocarditis: aetiology, diagnosis and management. *Clin Med*. 2021 Sep;21(5):e505–e510. <https://doi.org/10.7861/clinmed.2021-0121>. PMID: 34507935; PMCID: PMC8439515.
9. Maharaj N, Swarath S, Seecheran R, Seecheran V, Seecheran NA. Suspected cannabis vaping-induced pericardial effusion. *J Invest Med High Impact Case Rep*. 2022;10. <https://doi.org/10.1177/23247096221140251>.