Case report

Severe Ischemic Cardiomyopathy in a Young Smoker: A Rare Case of Apical Thrombus and Ventricular Tachycardia

ABSTRACT

Introduction: Ischemic cardiomyopathy, though rare in young adults, can lead to severe complications such as left ventricular dysfunction, intracardiac thrombi, and arrhythmias. This case highlights the significance of early recognition and management strategies in preventing life-threatening outcomes in young patients with ischemic heart disease.

Case Presentation: We present the case of a 36-year-old male smoker who presented with acute dyspnea and palpitations. Clinical evaluation revealed severe left ventricular dysfunction (ejection fraction 20%), an apical thrombus (1.5 cm), and sustained ventricular tachycardia, successfully terminated with lidocaine and amiodarone. Coronary angiography showed tortuosity of the left anterior descending artery (LAD) without significant stenosis. The patient was treated with anticoagulation and optimized heart failure therapy, including ACE inhibitors and beta-blockers.

Conclusion: This case underscores the complexity of ischemic cardiomyopathy in young smokers. A comprehensive, multidisciplinary approach, including early detection, anticoagulation, antiarrhythmic therapy, and heart failure management, is crucial for improving outcomes in these patients.

Keywords: Severe Ischemic Cardiomyopathy; A Rare Case; Apical Thrombus; Ventricular Tachycardia.

1. INTRODUCTION

Ischemic cardiomyopathy is a leading cause of morbidity and mortality worldwide, predominantly affecting middle-aged and elderly populations with established coronary artery disease (CAD). However, in young adults, it represents a rare but severe clinical entity often linked to atypical etiologies, including smoking, congenital abnormalities, and hypercoagulable states. Smoking, in particular, is a well-documented risk factor for accelerated atherosclerosis, endothelial dysfunction, and coronary microvascular disease, all of which contribute to myocardial ischemia and its complications.

In cases of severe ischemic cardiomyopathy, left ventricular (LV) dysfunction predisposes patients to serious complications such as intracardiac thrombus formation and arrhythmias, including ventricular tachycardia (VT). These conditions significantly increase the risk of systemic embolism and sudden cardiac death, underscoring the need for early diagnosis and targeted management strategies.

Herein, we report a rare case of severe ischemic cardiomyopathy in a 36-year-old male smoker presenting with acute dyspnea, ventricular tachycardia, and an apical thrombus. This case highlights the importance of comprehensive diagnostic evaluation and multidisciplinary therapeutic approaches in young patients with ischemic cardiomyopathy to improve clinical outcomes.

2. CASE PRESENTATION

A 36-year-old male smoker with a history of hypertension was admitted to the emergency department with acute dyspnea and palpitations. The clinical presentation was marked by significant hemodynamic compromise: resting dyspnea (NYHA class IV), hypotension (90/60 mmHg), and signs of hypoperfusion.

Investigations included an electrocardiogram (ECG) that demonstrated sustained monomorphic ventricular tachycardia at 160 bpm (Figure 1), and transthoracic echocardiography (TTE) revealing severe left ventricular dysfunction with an ejection fraction (LVEF) reduced to 20%, significant left ventricular dilatation, and a well-defined 1.5 cm apical thrombus (Figure 2). Elevated biomarkers, including troponin T (150 ng/L) and NT-proBNP (12,000 pg/mL), were noted, while thrombophilia screening was negative. Cardiac magnetic resonance imaging (MRI) confirmed the presence of the thrombus and revealed late gadolinium enhancement consistent with prior infarction in the LAD territory. Coronary angiography demonstrated tortuous LAD segments without significant stenosis (Figure 3).

The patient was managed acutely with intravenous lidocaine followed by an amiodarone infusion, which effectively terminated the ventricular tachycardia. Low molecular weight heparin (LMWH) was initiated for thrombus management, alongside optimized medical therapy for heart failure, including ACE inhibitors, beta-blockers, and spironolactone.

3. DISCUSSION

Ischemic cardiomyopathy in young adults, particularly smokers, is often attributed to subclinical atherosclerosis, vasospasm, or microvascular dysfunction. Despite the lack of significant stenosis on coronary angiography, prior ischemic insults likely

contributed to the patient's severe left ventricular dysfunction and thrombus formation. Reduced ejection fraction and left ventricular dilatation predispose patients to thrombus formation due to blood stasis. Apical thrombi, like in this case, carry a high risk of systemic embolization, thus necessitating prompt anticoagulation (Collet et al., 2021) [1].

Sustained ventricular tachycardia is a common and life-threatening complication in patients with severe ischemic cardiomyopathy. Acute termination with lidocaine and amiodarone, as employed in this case, is consistent with current guidelines (Al-Khatib et al., 2022) [2]. Long-term management may include implantable cardioverter-defibrillators (ICD) in patients with persistently reduced LVEF despite optimal medical therapy (Priori et al., 2022) [3].

Coronary tortuosity, as seen in this patient, has been associated with impaired coronary blood flow and ischemia, even in the absence of significant stenosis (Turgut et al., 2020) [4]. This emphasizes the importance of individualized treatment strategies focused on symptom relief and prevention of further ischemic events. The prognosis of ischemic cardiomyopathy in young patients depends on the degree of myocardial recovery and prevention of complications. Echocardiographic follow-up is essential to monitor thrombus resolution and left ventricular function (Gheorghiade et al., 2020) [5].

Figures:

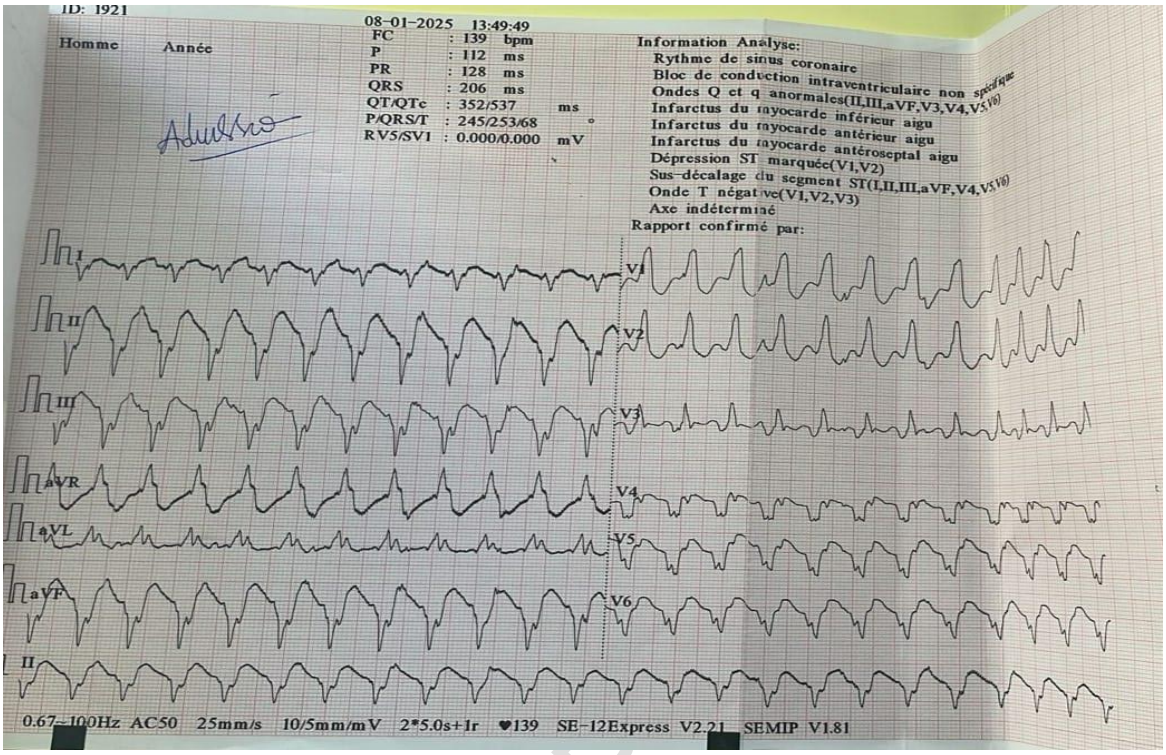

Figure 1: Electrocardiogram showing sustained monomorphic ventricular tachycardia.

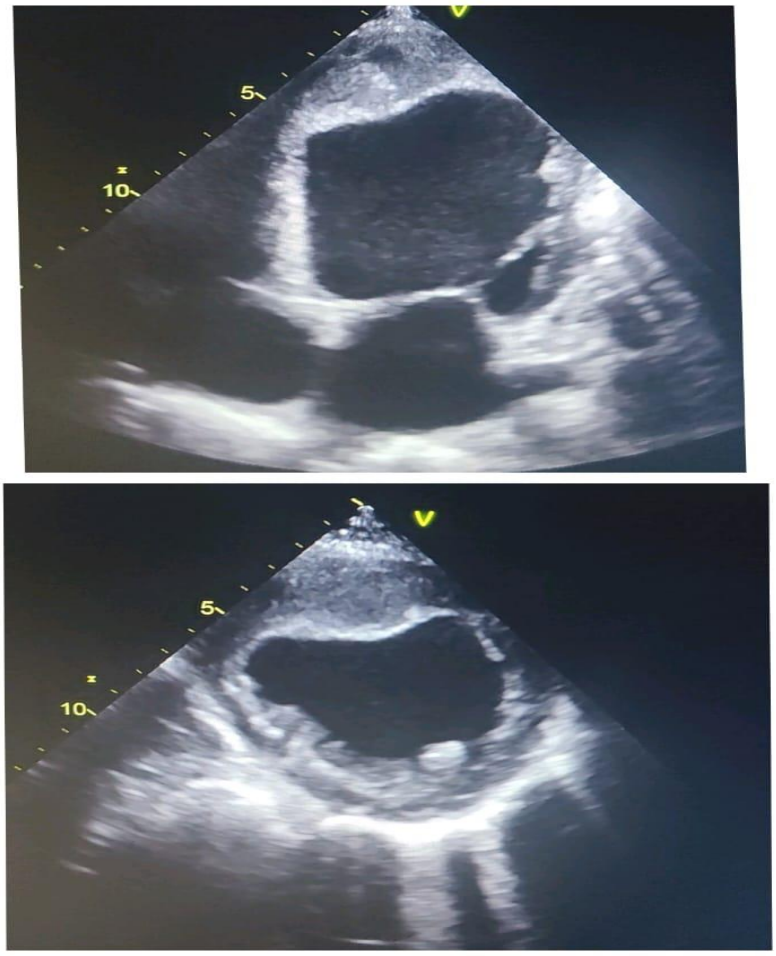

Figure 2: Transthoracic echocardiography demonstrating a 1.5 cm apical thrombus.

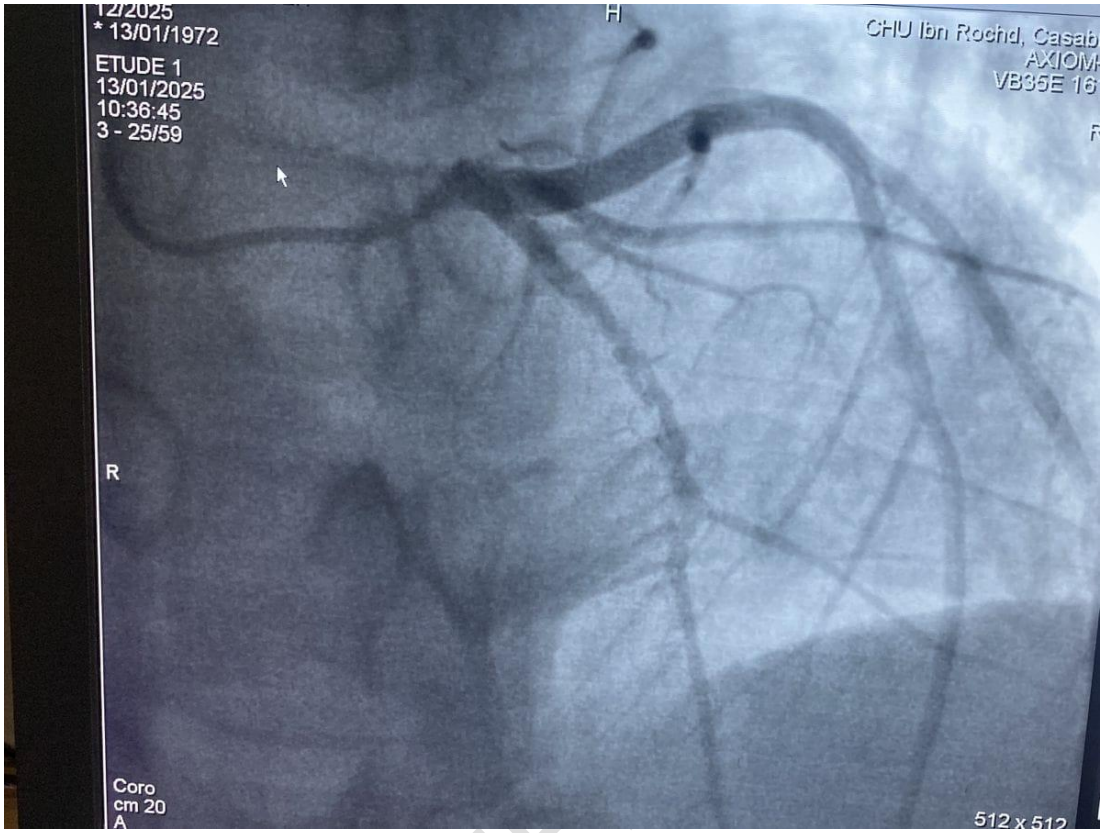

Figure 3: Coronary angiography revealing tortuous LAD segments without significant stenosis.

4. CONCLUSION

This case emphasizes the complexity of ischemic cardiomyopathy in young adults, particularly smokers. Early diagnosis and tailored management strategies are crucial in preventing life-threatening complications such as thromboembolic events and arrhythmias. A multidisciplinary approach that includes anticoagulation, antiarrhythmic therapy, and guideline-directed heart failure management is essential for improving patient outcomes (Bonderman et al., 2021) [6].

Disclaimer (Artificial intelligence)
Option 1:
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.
Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

REFERENCES

1. Danchin N, Puymirat E. Infarctus du myocarde du sujet jeune : spécificités épidémiologiques et facteurs de risque. Presse Med. (2019), https://doi.org/10.1016/j.lpm.2019.06.001

2. He J, Liu D, Zhao L, Zhou D, Rong J, Zhang L, Xia Z. Myocardial ischemia/reperfusion injury: Mechanisms of injury and implications for management (Review). Exp Ther Med. 2022 Jun;23(6):430. doi: 10.3892/etm.2022.11357. Epub 2022 May 6. PMID: 35607376; PMCID: PMC9121204.

3. Zhang S, Yan F, Luan F, Chai Y, Li N, Wang YW, Chen ZL, Xu DQ, Tang YP.The pathological mechanisms and potential therapeutic drugs for myocardial ischemia reperfusion injury. Phytomedicine. 2024 Jul;129:155649. doi: 10.1016/j.phymed.2024.155649. Epub 2024 Apr 16. PMID: 38653154.

4. Roger VL, Go AS, Lloyd-Jones DM, Adams RJ, Berry JD, Brown TM, Carnethon MR, Dai S, de Simone G, Ford ES, et al. Heart disease and stroke statistics-2011 update: A report from the American Heart Association. Circulation. 2011;123:e18–e209. doi: 10.1161/CIR.0b013e3182009701.

5. Yang CF. Clinical manifestations and basic mechanisms of myocardial ischemia/reperfusion injury. Tzu Chi Med J. 2018 Oct-Dec;30(4):209-215. doi: 10.4103/tcmj.tcmj_33_18. PMID: 30305783; PMCID: PMC6172894.

6. Toya T, Nagatomo Y, Ikegami Y, Masaki N, Adachi T. Coronary microvascular dysfunction in heart failure patients. Front Cardiovasc Med. 2023 Jun 2;10:1153994. doi: 10.3389/fcvm.2023.1153994. PMID: 37332583; PMCID: PMC10272355.