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Spontaneous Coronary Dissection Revealed by Ventricular Tachycardia in a Female Patient: A Case Report and Review of Literature

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Spontaneous coronary artery dissection is an uncommon cause of acute coronary syndrome or sudden death, typically observed in patients with minimal atherosclerotic risk factors. A 53-year-old female patient presented to the emergency department with episodes of palpitations and sudden, intense chest pain radiating to the back. Following the chest pain, she experienced a brief loss of consciousness. The initial electrocardiogram (EKG) revealed a self-resolving episode of ventricular tachycardia. A transthoracic echocardiogram displayed enlarged ventricles with significant regional wall motion abnormalities and reduced left ventricular ejection fraction. Cardiac catheterization revealed an intimal dissection in the middle segment of the left anterior descending artery. The patient was managed conservatively and exhibited stable angiographic findings during a follow-up evaluation one month later.

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1. INTRODUCTION

Spontaneous coronary artery dissection (SCAD) is a cause of acute coronary syndrome that is unrelated to atherosclerosis, commonly observed in younger women. The diagnosis of SCAD is typically established through invasive coronary angiography. This case study focuses on a female patient who presented with ventricular tachycardia, revealing a spontaneous coronary dissection.

2. CASE PRESENTATION

A 53-years-old female patient presented to the emergency department complaining of spontaneous severe retrosternal chest pain occurring 6 hours previously followed by lipothymia. Those symptoms appeared while the patient was climbing stairs. There was no history of hypertension, diabetes mellitus, dyslipidemia or smoking. However, the patient was menopaused a year ago with no hormonal therapy, and obese with a body mass index of 35. She had no significant family history of premature coronary artery disease. The patient had an orthostatic hypotension for twenty years with no actual treatment and a podagra under allopurinol. The review of symptoms was otherwise negative.

Upon admission, the patient did not exhibit any acute distress. Vital signs indicated a regular and spontaneous pulse rate of 75 beats per minute, with a blood pressure reading of 117/67. Carotid impulses were within the normal range, and there was no elevation in jugular venous pressure. The cardiac examination revealed normal heart sounds, without any noticeable murmurs, rubs, or gallops. The lungs were clear upon auscultation.

2.1 Differential Diagnosis

1. Acute coronary syndrom
2. MINOCA
3. Coronary dissection

2.2 Investigations

The ECG (Fig. 1) performed right while the episode of palpitations showed a regular wide QRS tachycardia with a TV score of 6 (initial r wave in V1> 40ms, absence of RS complex, atrioventricular dissociation and lead II RWPT > 50ms) suggesting a ventricular tachycardia with right axis. This arrythmia had spontaneously resolved, and the next ECG (Fig. 2) showed a complete left bundle branch with a left axis and a premature ventricular complex.

Serial troponin level drawn on admission were 617 times the normal amount. Other biological examinations were performed showing a normal lipid profile and no diabetes.

A transthoracic echocardiogram (Fig. 3a and b) demonstrated dilated ventricles with severe regional wall motion abnormality over the apex and adjacent walls, anteroseptal and anterior walls with a severe left ventricle dysfunction (left ventricle ejectional fraction of 25%). A moderate mitral regurgitation was noted.

A cardiac MRI (Fig. 5) was performed 7 days later to explore further the left ventricular dysfunction and showed an ischemic cardiomyopathy with dilated left ventricle with severe left ventricular dysfunction. A non-viable necrosis focus in the left anterior descending artery's territory was noted.

2.3 Medical Management and Interventions

The patient was given 300mg of clopidogrel and 320 of aspirin orally. Low molecular weight heparin at a curative dose and the patient was taken to the cath lab.

Cardiac catheterization with coronary angiography was performed using a right radial artery approach. Coronary angiography (Fig. 4) showed a radiolucent linear defect suggestive of an intimal dissection involving the mid segment of the left anterior descending artery with Thrombolysis in Myocardial Infarction (TIMI) grade 2 flow.

A conservative treatment was opted and the patient was maintained on medical management, including clopidogrel, aspirin, betablocker, amiodarone, spironolactone and sacubitril/ valsartan association with close outpatient follow-up. Advice on lifestyle modifications were provided to the patient, physical exercise and body weight loss.

Follow-up coronary angiography at 1 month demonstrated a stable appearance of the coronary angiography with a persistent TIMI grade 2 flow. Echocardiographic aspects remain the same.

3. DISCUSSION

The first instance of SCAD was documented in 1931 during the postmortem examination of a 42-year-old woman [1]. The exact prevalence of SCAD remains uncertain, although it can affect individuals of both genders. However, it is worth noting that around 90% of patients diagnosed with SCAD are women between the ages of 47 and 53 [2], which aligns with the demographic profile of our case.

The weakening of the blood vessel wall plays a crucial role in the development of spontaneous coronary artery dissection. Additionally, this condition may be associated with autoimmune and collagen vascular diseases or vigorous physical exercise [3]. Consequently, we conducted further biological tests in our case to investigate the possibility of an underlying systemic disease, such as anti-nuclear and anti-DNA antibodies. It is important to mention that all test results came back within the normal range.

SCAD typically presents as a myocardial infarction in over 90% of patients. Among these individuals, approximately 20 to 50% exhibit ST-segment elevation myocardial infarction (STEMI) [4-8], while 3 to 5% experience ventricular arrhythmias [9,10] and 2% present with cardiogenic shock.

Clinical characteristics such as patient demographics, particularly younger age, female sex, and limited cardiovascular risk factors, can raise suspicion of SCAD. Conventional coronary angiography is the recommended initial diagnostic imaging method, as it is readily available and supports early invasive management of acute coronary syndrome. Notably, the left anterior descending artery is the most commonly affected vessel, as observed in our patient's case.

In the diagnosis of this condition, intracoronary imaging methods play a crucial role. Specifically, intravascular ultrasonography (IVUS) and optical coherence tomography (OCT) provide detailed visualization of the arterial wall. However, neither IVUS nor OCT was utilized in our case, and the diagnosis was solely based on the findings from coronary angiography.

Currently, there are no established guidelines regarding the optimal treatment approach for this condition. The course of treatment is determined by various factors, including the patient's clinical symptoms, the extent and location of the dissection, and the patient's hemodynamic status. In cases of acute proximal dissection and arterial occlusion, percutaneous coronary strategies are employed to restore coronary perfusion and achieve hemodynamic stability. However, performing percutaneous coronary intervention (PCI) in the presence of a coronary dissection presents unique challenge due to difficulties in accurately identifying the true arterial lumen and ensuring proper guidewire placement [1].

For cases involving distal dissection with preserved coronary flow, a conservative medical therapy approach is generally preferred. One reasonable therapeutic option is the use of beta-blockers to reduce vessel wall sheer stress. The administration of heparin, thrombolysis, and glycoprotein IIb–IIIa inhibitors during the acute phase remains a topic of debate. In our case, a conservative medical therapy approach was chosen as the preferred course of action [11,12].

4. CONCLUSION

Recognizing SCAD as a potential alternative diagnosis to atherosclerotic forms of coronary artery disease is crucial because the management and investigation approaches differ significantly. When faced with this rare angiographic finding, it is essential to consider the challenges and potential complications associated with manipulating dissecting coronary arteries. This consideration will assist in assessing the risks and benefits and making informed therapeutic decisions.

Learning points

- The prevalence of SCAD can be underestimated because patients may receive alternative diagnoses
- Recognition of SCAD as a differential diagnosis of ACS is important because management and investigation are different
- No guidelines concerning the optimal treatment of this condition are available

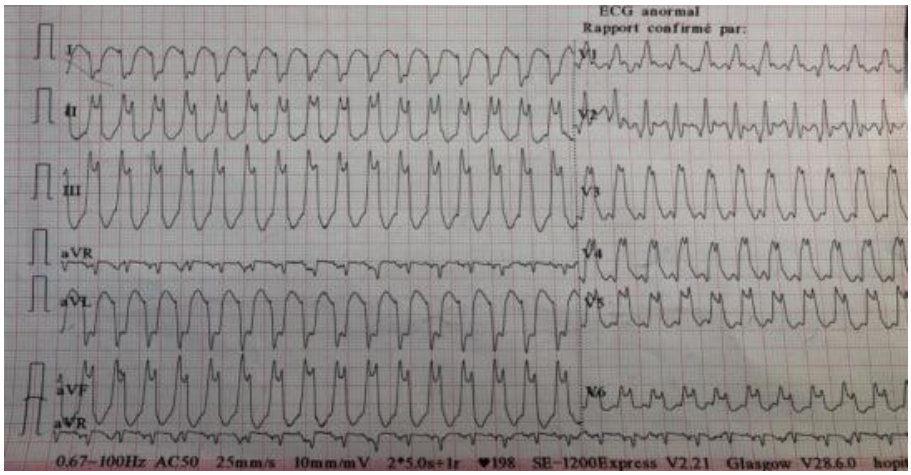

Fig. 1. EKG showing a regular wide QRS tachycardia

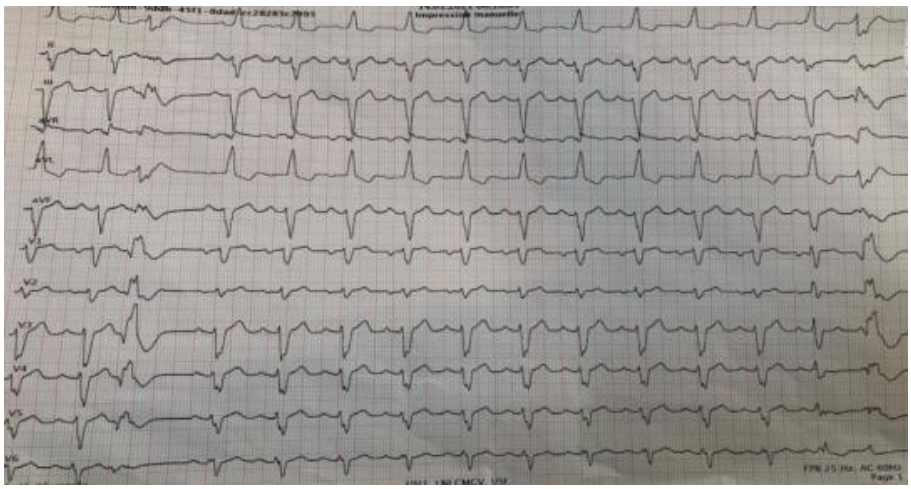

Fig. 2. EKG showing a complete left bundle branch

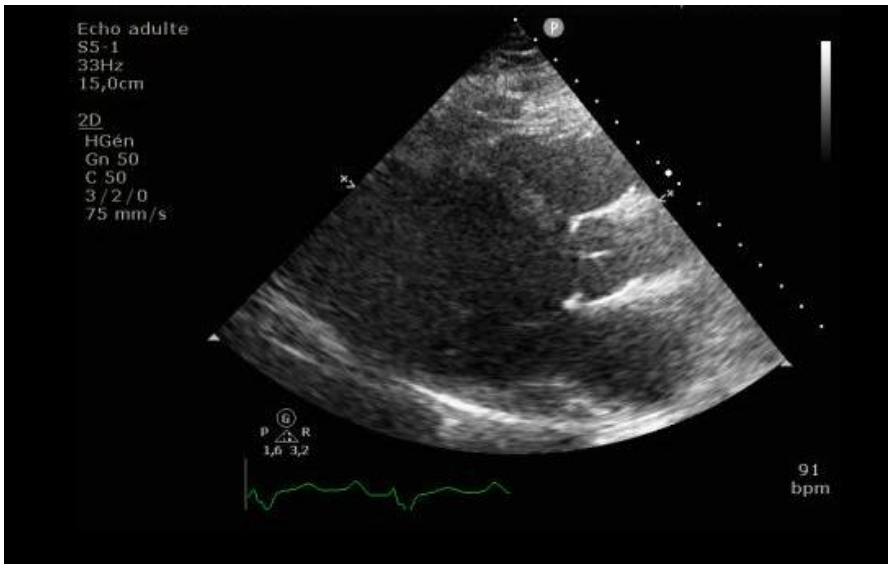

Fig. 3a. Parasternal long axis showing dilated left ventricle

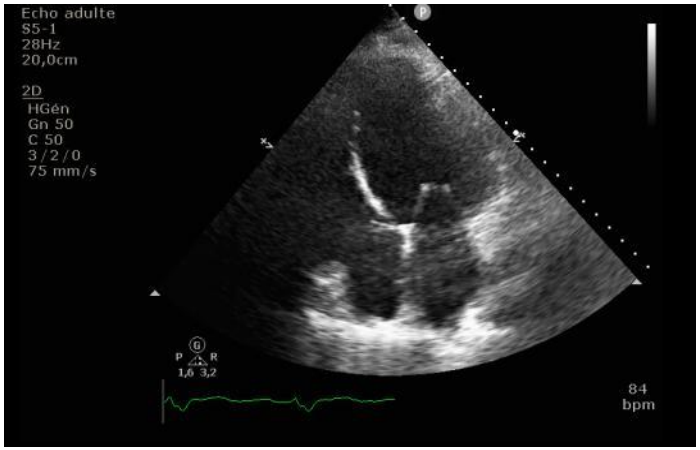

Fig. 3b. Apical-4-chamber view showing globular shape of left ventricle

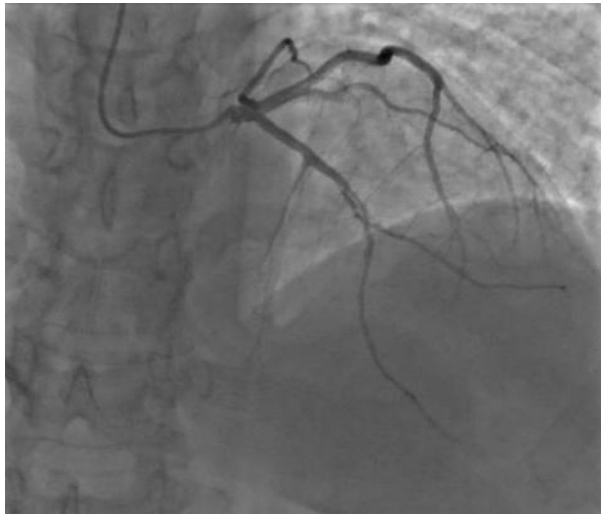

Fig. 4. Coronary angiography demonstrating an intimal dissection involving the mid segment of the left anterior descending artery

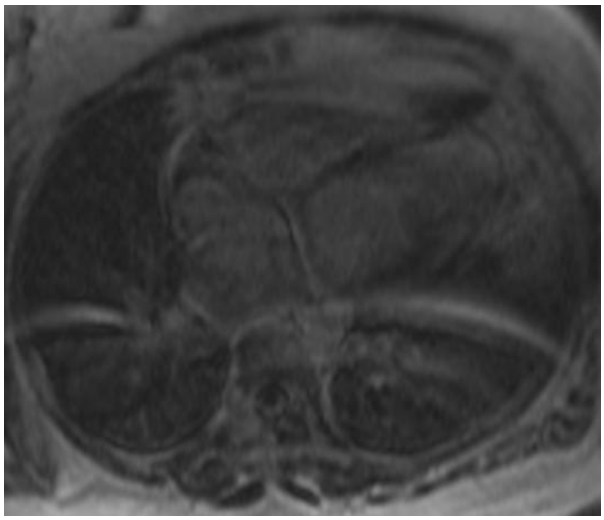

Fig. 5. Cardiac MRI showing a non-viable necrosis focus in the left anterior descending artery's territory

CONSENT

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

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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