

CASE REPORT

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Spontaneous coronary artery dissection: An unusual case of myocarditis mimicry with delayed apical thrombus

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ABSTRACT

Introduction: We discuss the occurrence of a unique triad of spontaneous coronary artery dissection (SCAD), myocarditis, and thrombus in a patient without risk factors.

Case Report: A 26-year-old male referred to our facility for invasive intervention after presenting with sudden onset chest pain for which an initial electrocardiogram (ECG) showed an anterolateral ST-segment elevation myocardial infarction and a troponin-I level of 425,923 ng/dL. Upon arrival, an urgent coronary angiography revealed a type II spontaneous SCAD of the left anterior descending artery with extensive myocarditis on cardiac magnetic resonance imaging with a subsequent development of an apical thrombus. He was medically optimized and discharged in a stable state.

Conclusion: The complex interplay between SCAD, myocarditis, and thrombus development remains unclear and though rare, it serves as a relevant hypothesis-generating basis for future inquiry. Awareness of the concomitant occurrence of these entities is paramount to facilitating tailored management of affected patients.

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INTRODUCTION

Spontaneous coronary artery dissection (SCAD) is a less recognized but important cause of acute coronary syndrome. The condition is particularly prone to delayed or inaccurate diagnoses given its rarity and diverse clinical features, especially in males, who do not fit the typical epidemiologic profile of most SCAD cases [1].

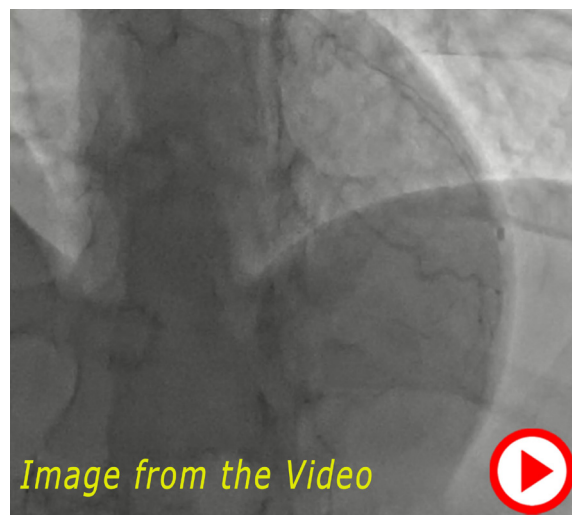
Spontaneous coronary artery dissection remains an evolving clinical entity with constant new insights and clinical correlates; however, the association between SCAD and the concomitant occurrence of myocarditis with thrombus development has not been previously reported in the literature. We herein describe this association in an otherwise healthy young man with no known risk or precipitating factors. We present the pathological data and clinical imaging of this patient and discussed these vis-à-vis current literature.

CASE REPORT

A 26-year-old male presented to an outside facility with sudden onset, non-radiating central chest pain. He had no relevant past medical history, no routine medications, no history of recent illness or exposure to sick persons, and no recent travel history out of the United States. He did not smoke, use alcohol, or illicit substances. An initial ECG at the outside facility showed findings consistent with anterolateral ST-segment elevation myocardial infarction (STEMI) and his troponin-I level was significantly elevated at 425,923 ng/dL. He was given intravenous tenecteplase, loading doses of aspirin 325 mg and clopidogrel 300 mg, and transferred to our tertiary care center for coronary angiography and possible percutaneous coronary intervention (PCI).

Upon arrival, urgent coronary angiography revealed a type II SCAD of the mid to distal left anterior descending artery (LAD) with minimal epicardial coronary artery disease (Figure 1B, Videos 1 and 2). No percutaneous interventions were performed. Subsequent transthoracic echocardiography showed a left ventricular ejection fraction (LVEF) of 31%, elevated filling pressures, and an akinetic septum, apex, and apical anterior-lateral wall. To further characterize the extent of the injury, a cardiac magnetic resonance imaging (CMRI) was performed which estimated the LVEF to be 33%, with acute myocardial infarction and elevated native myocardial T1 (1243 ms ShMOLLI sequence) and native T2 (62 ms) along with presence of extensive late gadolinium enhancement (LGE) with presence of microvascular obstruction (MVO) in the mid to distal anterior and antero-septal walls (Figure 1C and D). There was also evidence of multiple foci of subepicardial and mid-wall LGE. At this index presentation, concomitant myocarditis secondary to inflammatory or vasculitic process was also considered in the differential diagnosis. An endomyocardial biopsy was deemed high-risk in the acute phase of myocardial injury (MI). The rest of his serologic workup, including infectious studies, were unremarkable. On hospital admission day 3, he was discharged on low-dose aspirin, metoprolol, lisinopril, and life vest in situ for primary prevention of sudden death given extensive MI.

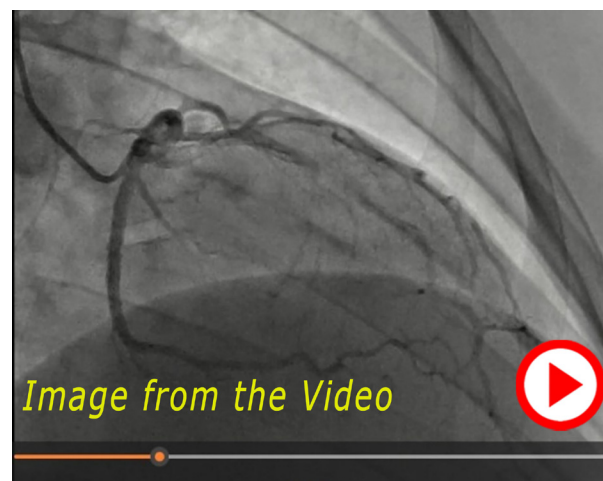
At routine outpatient follow-up five days after discharge, he denied any chest pain or heart failure symptoms. Further up-titration and optimization of his guideline-directed medical therapy (GDMT) was performed. He was also seen in the rheumatology clinic where vasculitis and fibromuscular dysplasia workup were negative. A repeat CMRI on day 109 after index hospitalization showed features of sequential resolution of myocarditis pattern with the presence of an apical thrombus (Figure 1E) for which he was started on warfarin.



Video 1: Angiographic image at right cranial view shows Type 2B SCAD of the left anterior descending artery distal and third diagonal branch which involves abrupt narrowing of the coronary artery with a diffuse tubular stenosis, either for a section of the artery.

Video 1 URL: <https://www.ijcasereportsandimages.com/archive/article-full-text/101430Z01CS2023#video1>

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Video 2: Angiographic image at AP cranial view shows Type 2B SCAD of the left anterior descending artery distal and third diagonal branch which involves abrupt narrowing of the coronary artery with a diffuse tubular stenosis, either for a section of the artery.

Video 2 URL: <https://www.ijcasereportsandimages.com/archive/article-full-text/101430Z01CS2023#video2>

**Access Video
on other devices**



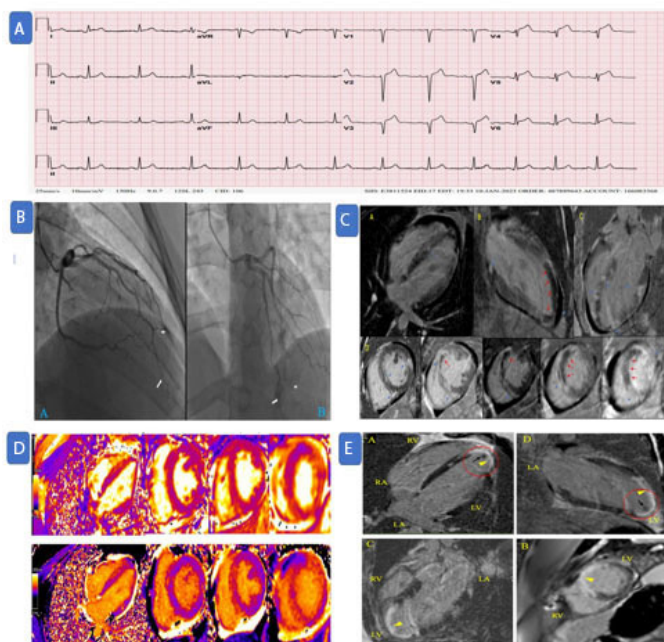


Figure 1: (A) anterolateral STEMI on initial ECG; (B) Coronary angiography shows Type 2B SCAD of the LAD distal (white arrow) and third diagonal branch (asterisk); (C) and (D) Cardiac MRI shows presence of average myocardial native T1 1243 ms, T2 of 62 ms and presence of subepicardial, mid myocardial, subendocardial and transmural LGE (blue arrows) with evidence of MVO (red arrows); (E) A cardiac MRI at 109 days follow-up showed resolution of extensive MVO but now almost transmural LGE in the mid to apical anterior and septal walls as well as LV apex (yellow arrowhead) along with presence of an apical thrombus (black arrow in red circle).

DISCUSSION

Spontaneous coronary artery dissection has been linked to a number of predisposing clinical conditions that render the coronary artery wall more prone to dissection, including but not limited to non-inflammatory arteriopathies, vascular collagen disorders, chronic inflammatory systemic diseases, gender (>90% occurs in females), and hormonal influences (peripartum period) [1]. Furthermore, up to two-thirds of patients report potential triggers prior to the onset of acute SCAD such as extreme emotional stressors including bereavement or major personal crisis (most frequent in women), or physical stressors including isometric exercise and heavy weightlifting (most frequent in men) [2]. Other less common triggers include valsalva-like maneuvers (cough and retching), oral contraceptives, postmenopausal hormone therapy, stimulating recreational drugs, and high-dose corticosteroid administration [1]. This case is unique in that it is not typical of the demographic and clinical context for SCAD since the patient lacked traditional SCAD risk factors, predisposing conditions, or classic triggers. In the setting of a negative infectious, inflammatory, and vasculitic workup, this dramatic acute presentation of simultaneous SCAD and extensive myocarditis masquerading as STEMI complicated by the

development of apical thrombus has not been previously reported.

The preferred management strategy in stable SCAD patients is conservative as most lesions have been shown to spontaneously heal overtime with low rates of early urgent revascularization [3]. When high-risk features are present (persistent or recurrent ischemia, hemodynamic/electrical instability, total vessel occlusion, or high-risk anatomies where a great territory is at risk), revascularization with PCI or emergent coronary artery bypass graft surgery (reserved for patients where PCI has failed or deemed too complex) [1] may be considered. However, these carry significant procedural risk and have been associated with adverse clinical outcomes in several series [4]. In patients for whom medical therapy is pursued, the goal is to alleviate symptoms, improve short- and long-term outcomes, and to prevent recurrence. This includes aspirin, P2Y12 inhibitors, Angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs), and beta-blockers advocated by consensus expert opinion [1, 5]. Overall, the prognosis is generally favorable in SCAD. However, this favorable natural history may not generalize to this unique presentation in a young male patient with initial myocarditis complicated by apical thrombus.

CONCLUSION

A high index of SCAD suspicion must be maintained in anyone with ACS-like features (regardless of age, gender, peripartum period, or underlying medical conditions). The complex interplay between myocarditis, SCAD, and thrombus development remains unclear and though rare, serves as a relevant hypothesis-generating basis for future inquiry. Awareness of the concomitant occurrence of these entities is paramount to facilitating tailored management of affected patients.

REFERENCES

1. Adlam D, Alfonso F, Maas A, Vrints C; Writing Committee. European Society of Cardiology, acute cardiovascular care association, SCAD study group: A position paper on spontaneous coronary artery dissection. *Eur Heart J* 2018;39(36):3353–68.
2. Fahmy P, Prakash R, Starovoytov A, Boone R, Saw J. Pre-disposing and precipitating factors in men with spontaneous coronary artery dissection. *JACC Cardiovasc Interv* 2016;9(8):866–8.
3. Hassan S, Prakash R, Starovoytov A, Saw J. Natural history of spontaneous coronary artery dissection with spontaneous angiographic healing. *JACC Cardiovasc Interv* 2019;12(6):518–27.
4. Hayes SN, Kim ESH, Saw J, et al. Spontaneous coronary artery dissection: Current state of the science: A scientific statement from the American Heart Association. *Circulation* 2018;137(19):e523–57.

5. Lewey J, El Hajj SC, Hayes SN. Spontaneous coronary artery dissection: New insights into this not-so-rare condition. *Annu Rev Med* 2022;73:339–54.

Author Contributions

Carlson Sama – Conception of the work, Design of the work, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Vikrant Jagadeesan – Conception of the work, Design of the work, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Ramesh Daggubati – Conception of the work, Design of the work, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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