

Clinical Characteristics of Spontaneous Coronary Artery Dissection in Middle-Aged Men

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Abstract

Objectives: Spontaneous coronary artery dissection (SCAD) is a rare non-traumatic coronary event that can manifest as acute coronary syndrome, although it is most commonly described in younger women, particularly in pregnancy or postpartum. The aim of this study is to review SCAD in middle-aged males, with particular emphasis on clinical presentation, angiographic features, and patient-specific therapeutic approaches. **Methods:** A case series of 6 patients presenting to the hospital with SCAD is presented. Clinical assessment included evaluation of basic characteristics, electrocardiogram, echocardiographic findings, and angiographic imaging for determination of arterial involvement. **Results:** ST elevation was a common finding in this study. Angiography most frequently demonstrated involvement of the right coronary artery with dissections predominantly involving distal arterial segments. In two patients, evidence of a previously healed dissection was identified. **Conclusion:** This case series highlights the rarity and complexity of SCAD in males, especially with concomitant involvement of multiple coronary arteries and different vascular territories.

Key words: Acute coronary syndrome, coronary dissection, spontaneous coronary artery dissection

INTRODUCTION

Spontaneous coronary artery dissection (SCAD) represents an uncommon, not related to trauma and non-procedure-related mechanism of acute coronary syndrome (ACS), characterized by the splitting within the layers of the coronary arterial wall. It is an uncommon but important contributor to myocardial infarction (MI), particularly affecting young women and those in the peripartum or postpartum period.^[1] SCAD has important differences from ACS caused by atherosclerosis, as it poses distinct diagnostic and therapeutic challenges. Due to its relatively low incidence and the lack of large-scale, evidence-based studies, the optimal management of SCAD remains uncertain, often relying on individualized care based on patient presentation and vessel involvement.^[2-4]

Since SCAD was first reported in 1931 in an autopsy study, understanding of the condition has evolved considerably. Previously thought to

be universally fatal, particularly in pregnant or peripartum women, it is now recognized that clinical outcomes vary widely depending on the extent of coronary involvement, how many coronary vessels are involved, and the patient's hemodynamic condition at initial presentation.^[5-8] There is an improvement in diagnostic techniques, such as intracoronary imaging modalities, especially optical coherence tomography and intravascular ultrasound, which allow better identification and classification of SCAD lesions.^[9] Moreover, a heightened awareness of healthcare providers and increased patient advocacy on social media have broadened our knowledge of the actual prevalence of SCAD, especially in younger women with no traditional cardiovascular risk factors.^[9,10]

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Received: 24-05-2026

Revised: 20-06-2026

Accepted: 28-06-2026

The reported incidence of SCAD as a cause of ACS has been 1.1–4%.^[11,12] SCAD can happen in men as well, just not as often. Men have been reported to have different risk factors for SCAD than women, including vigorous physical activity, drugs, and underlying connective tissue disorders. Interestingly, one study demonstrated that men with SCAD tended to present slightly younger than women with SCAD.^[8,13–15] The unique pathophysiology, risk factors, and clinical presentation of SCAD, along with its unpredictable course, require careful diagnosis and a multidisciplinary management approach.

In this article, we seek to provide a comprehensive analysis of SCAD in middle-aged men, including the clinical presentation, angiographic features, and treatment strategies specific to this demographic.

METHODS

The present study is a case series of 6 men who presented to the hospital with a diagnosis of SCAD. Patient data included demographic characteristics, medical history, and cardiovascular risk factors. Electrocardiographic (ECG) and echocardiographic evaluations were performed to assess cardiac electrical activity, cardiac function, regional wall-motion changes, and left ventricular (LV) systolic function. All cases had coronary angiography to define the distribution, severity, and site of arterial involvement with particular emphasis on dissected segments, vessel occlusion, and evidence of chronic healed dissections. The goal of the study was to describe SCAD in men, who have been understudied, including their clinical presentation, angiographic patterns, and therapeutic management.

RESULTS

Details of case reports

Case-1

A 49-year-old male presented with sudden-onset severe retrosternal chest pain associated with dyspnea. His past medical history included 18 years of diabetes mellitus, a 7-year history of seizure disorder, and recent peripheral arterial disease. On physical examination, the only notable finding was a weak bilateral pulse in the dorsalis pedis and posterior tibial arteries.

Initial blood tests were unremarkable. ECG revealed acute ST-segment elevation MI (STEMI) involving the anterior wall. A 2D echocardiogram showed hypokinesia of the entire septum, LV apex, and anterior wall involving the left ventricle, along with mild LV systolic impairment and an ejection fraction (EF) of 45% and Grade I LV diastolic dysfunction. Coronary angiography identified double-vessel

disease with spontaneous spiral dissection extending from the proximal to mid-segment of the type III left anterior descending (LAD) coronary artery causing 90% stenosis, as well as a 90% stenosis due to spiral dissection in the proximal and mid-segments within the dominant right coronary artery (RCA), while the left circumflex artery (LCX) was normal.

Additional investigations revealed further vascular complications. A computed tomography (CT) angiogram of the lower limbs revealed a complete occlusion of distal right superficial femoral and proximal right popliteal arteries [Figure 1]. A CT abdominal angiogram demonstrated diffuse atherosclerotic mural thickening of the aorta and 40% luminal narrowing with distal dilation of the left renal artery. Magnetic resonance angiography of the brain was unremarkable.

The patient was managed medically with a combination of heparin, aspirin, clopidogrel, atorvastatin, metoprolol, and nitroglycerin. The patient improved symptomatically. After stabilization, he was discharged with instructions to continue medication and return for regular follow-ups.

Case-2

A 52-year-old male presented at the emergency department with sudden-onset left-sided chest pain for 5 h. According to the patient, the pain was intermittent and pressure-like, centrally situated, and radiated toward his left arm and jaw. The chest pain was associated with dyspnea and palpitations. He was laborer by occupation and had no significant comorbidities reported. Vitals were heart rate of 93 beats/min, respiratory rate of 19 breaths/min, and peripheral oxygen saturation (SpO₂): 98% while breathing room air. Systemic assessment specifically cardiovascular showed a regular pulse and rhythm, normal S1 and S2, without murmurs or any other additional heart sounds. Respiratory assessment was unremarkable, with normal vesicular breath sounds present bilaterally. The remaining physical examination showed no abnormal findings.

ECG demonstrated ST-T changes in the inferior leads, and echocardiography showed inferior wall hypokinesia with an EF of 50%. High-sensitivity troponin levels were raised [Figure 2]. Due to the presentation, coronary angiography



Figure 1: Coronary angiography showing spontaneous spiral dissection of the proximal-to-mid left anterior descending and dominant right coronary artery, each causing ~90% stenosis

was advised. In coronary angiography, the right dominant system and distal RCA showed spontaneous dissection with thrombolysis in MI (TIMI) III flow, indicating normal blood flow. Posterior descending artery (PDA)/posterolateral branch (PLB) both were normal.

Case-3

A 51-year-old male arrived at the emergency department following a fainting episode accompanied by intense chest pain localized to the left and central chest area. The patient, a chronic smoker with a long history of chronic obstructive pulmonary disease managed with inhalation therapy, reported that the chest pain increased after the fainting and radiated to the left jaw. On examination, he was stable hemodynamically with blood pressure (BP) 110/70 mmHg, pulse rate 90/min, respiratory rate 22/min, and oxygen saturation level of 95%.

Given the symptom presentation consistent with ACS, an ECG and cardiac biomarkers were assessed, revealing Anterior wall STEMI. Echocardiography revealed hypokinesia of the LV apex, mild impairment of LV systolic function, with an EF of 44% [Figure 3]. Due to continued symptoms despite initial emergency management, coronary angiography was undertaken. The angiogram indicated that the left main coronary artery (LMCA) was without significant abnormality. However, spontaneous dissection was identified affecting the LAD, which was 100% occluded at its distal end. The LCX appeared normal, whereas the RCA was dominant with approximately 30% narrowing in the proximal segment. The PDA and PLB were patent. Retrograde filling of the LAD was noted from RCA via collateral circulation.

The patient remained hemodynamically stable in the catheterization laboratory and was managed medically per protocol. Coronary artery bypass grafting was recommended, and the treatment plan was explained to the patient.



Figure 2: Coronary angiography demonstrating a right-dominant coronary system with spontaneous dissection of the distal right coronary artery and preserved thrombolysis in myocardial infarction III flow. The posterior descending artery and posterolateral branch appear angiographically normal

Case-4

A 50-year-old male presented to the cardiology emergency unit with right-sided chest pain, associated with vomiting and dizziness for 6 h. The pain was described as a heavy pressure sensation over the chest, which worsened with walking and was not completely relieved by rest. The patient had a history of similar episode 4 months back, but the patient did not seek medical advice as symptoms resolved spontaneously. On arrival, his vital parameters were stable, with a BP of 120/70 mmHg, pulse rate of 78/min, and a respiratory rate of 17 breaths/min.

Given the concerning symptoms, an immediate cardiac workup was initiated. The ECG demonstrated ST-segment elevation in leads II, III, and aVF. Echocardiography showed moderate LV systolic dysfunction, with an EF of 47% with hypokinesia of the inferior wall and posterior wall, Grade 1 LV diastolic dysfunction, indicative of an inferior wall MI [Figure 4].

Coronary angiography was carried out without complications. Angiography showed a right-dominant system with a normal LMCA and a type III vessel anatomy for the LAD with slow flow from the proximal segment to distal. The LCX appeared normal. The RCA was dominant, with chronic dissection extending into the PDA and PLB with a TIMI III distal flow, indicating good blood flow despite the dissection.

The patient was managed appropriately in the cath lab and remained hemodynamically stable. Further management involved optimizing medical therapy, given the chronic nature of the dissection and stable flow in the RCA.

Case-5

A 50-year-old man presented with symptoms of uneasiness along with chest pain radiating toward his left upper arm,



Figure 3: Coronary angiography revealing spontaneous left anterior descending dissection progressing to distal total occlusion, with distal vessel opacification via retrograde collateral flow

accompanied by difficulty breathing. He described the chest pain as a squeezing sensation and experienced discomfort lying down. He reported similar, less intense episodes in the past. Due to symptoms consistent with ACS, an ECG was done which showed sinus rhythm with Q waves in the inferior leads, and echocardiography was performed. Echocardiography showed hypokinesia of the basal inferoseptum and inferior wall, with preserved LV systolic function and an EF of 55%. The patient had a history of systemic hypertension, managed with medication. His vital signs on admission included a BP of 148/90 mmHg, a pulse of 64 bpm, a respiratory rate of 24 bpm, and an oxygen saturation of 98%.

Coronary angiography showed a normal LMCA and slow flow from the proximal-to-distal LAD, as well as in the diagonal and septal branches [Figure 5]. The LCX was non-dominant and normal. In the RCA, chronic healed dissection was identified in the mid-to-distal segments, along with chronic healed dissections in the PDA and PLB. Following an uncomplicated angiography, he was managed with conservative medical therapy.

Case-6

A 55-year-old male, a shopkeeper by occupation, with a 15-year history of hypertension on antihypertensive medication, presented to the emergency department with sudden-onset severe retrosternal chest pain lasting 4 h. ECG demonstrated ST-segment elevation in the inferior leads, confirming STEMI. At admission, his vitals were BP 144/74 mmHg, pulse 89/min, and SpO₂ 97%. Routine investigations were conducted and informed consent was obtained for coronary angiography [Figure 6]. Angiography revealed mid-LAD minor distal plaque; LCX was non-dominant and normal. The RCA showed non-flow-limiting coronary artery dissection in the mid segment. Given these findings, the patient was managed with optimal medical therapy.



Figure 4: Coronary angiography revealing a dominant right coronary artery with chronic distal dissection propagating into the posterior descending artery and posterolateral branch, with maintained thrombolysis in myocardial infarction III distal flow

DISCUSSION

Prevalence

In the present study, six isolated cases of SCAD were reported and studied. Conventionally, SCAD is a disease observed in postpartum females, but a large-scale study on 1173 patients revealed that around 10% of patients were males that too younger than females.^[16-18] This large-scale study highlights the importance of high degree of suspicion among both genders without discretion.

Presentation and ECG and echocardiographic findings

In the present study, chest pain and dyspnea were the predominant presenting complaints, aligning with symptoms typically observed in ACS. Notably, none of the patients presented with cardiogenic shock, a finding consistent



Figure 5: In the right coronary artery, a chronic healed dissection was identified in the mid-to-distal segments, along with chronic healed dissections in the posterior descending artery and posterolateral branch



Figure 6: Coronary angiography revealing a non-flow-limiting dissection of the mid segment of right coronary artery, with preserved distal flow

with previous studies from Italy and Japan, which reported cardiogenic shock in only 2–5% of SCAD patients.^[19-21] ST-segment elevation was a common finding in the present study, although this feature is variable across other studies. For instance, data from multicenter studies in Canada and Australia report that 26–87% of SCAD cases are associated with STEMI, while 13–69% present with non- STEMI.^[22-24] Such wide variability underscores the heterogeneity of SCAD presentation across the various population and study cohorts.

Angiographic findings

The angiographic findings in this study revealed consistent involvement of the RCA in most of the cases with dissections mainly in the distal segments. Two of the six cases demonstrated chronic healed dissections, indicating that some patients had a subclinical course of the disease. In addition, one case revealed a chronic healed dissection of the PDA. The results here underscore the need to appreciate the RCA as a common location of dissection in SCAD, especially the mid and distal segments.^[25-27] The finding of healed dissections further highlights the importance of considering SCAD in the differential diagnosis, even in patients with stable or subtle symptoms, because silent dissections may have important clinical consequences over time.

Although SCAD can affect any segment of the coronary arteries, the LAD artery is the most common vessel involved in the general literature, with rates of 32–46% reported.^[28-30] However, the predominance of involvement of the RCA in this study differs from these reports which may be due to the small sample size of the present study. This variability underscores the need for larger studies to define the coronary distribution patterns of SCAD in different populations.

Limitations

The main limitation of this study is the selective inclusion of male participants although the condition is more prevalent in females. This leads to a gender bias and limits the generalizability of the findings to the wider affected population. Therefore, the findings of the study may not be generalized to the broad clinical and demographic characteristics of the entire patient population, and future research involving a more representative sample is needed.

CONCLUSION

This case series underscores the clinical challenge and infrequent presentation of SCAD in males, especially with concurrent dissection of various coronary arteries and engagement of different vascular territories.

Case-1 illustrates the unusual presentation of SCAD in men, especially when two coronary arteries are involved

simultaneously, underscoring the unpredictable nature of SCAD pathophysiology.

Cases 2 and 3 highlight the importance of early diagnosis and timely management of ACS, which has hallmark manifestations such as chest pain or dyspnea. Early coronary angiography and cardiology follow-up are essential to reduce adverse outcomes and guide long-term therapeutic strategies in patients with underlying coronary disease.

Case-4 highlights the importance of a complete diagnostic work-up, especially if the history suggests previous less severe but recurrent episodes. The diagnosis of a chronic, healed RCA dissection further demonstrates the possibility of subclinical SCAD in patients with recurrent unexplained chest pain and the importance of coronary imaging and advanced diagnostics.

Case-5 highlights the importance of broadening the differential diagnosis in patients who present with recurrent clinical symptoms after resolution of the acute event. The diagnosis of healed dissection underscores the diversity of clinical presentations of coronary artery disease and the need for continued careful cardiovascular evaluation to ascertain the correct diagnosis and appropriate management of such challenging clinical scenarios.

In Case-6, the patient was diagnosed with inferior STEMI, with angiogram suggestive of mid RCA SCAD. Following angiographic assessment, the patient was managed with conservative medical therapy.

In the present study, RCA was consistently involved in all cases with varying degrees of dissection. Dissection was more common in the distal segments of RCA than in other segments. Two of the five cases interestingly demonstrated chronic healed dissections, suggesting that a previous coronary event had gone undetected and healed spontaneously without immediate intervention. In addition, in one case, a chronic healed dissection was also seen within the PDA. This finding highlights the need for complete evaluation and long-term follow-up of patients with SCAD because healed dissections may have implications for the diagnosis and treatment strategies for future coronary events. Overall, the series underscores the importance of SCAD in men, its heterogeneity of presentation, and the importance of a complete and prompt evaluation and follow-up to guide appropriate therapy and prevent future adverse events. The presence of healed dissections highlights the variable nature of SCAD and the importance of vigilant clinical and imaging follow-up to optimize patient outcomes.

ETHICAL APPROVAL

Not applicable.

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Source of Support: Nil. **Conflicts of Interest:** None declared.