



## From Subtle to severe: The SCAD Spectrum in Action: A Case series of 5 Patients with Literature Review

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| ARTICLE INFO                                                                                                                                                        | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <b>Published Online:</b><br>28 September 2026                                                                                                                       | Spontaneous coronary artery dissection is an under-recognized cause of acute coronary syndrome, especially in middle-aged women without conventional atherosclerotic risk factors. We present a series of five patients (three women, two men; mean ages 60 and 51 years, respectively) who presented with acute chest pain or progressive angina. Electrocardiographic findings ranged from ST-segment elevation to non-ST-elevation patterns. Coronary angiography demonstrated type I, type IIB or type III spontaneous coronary artery dissection according to the Saw classification, predominantly involving the mid-to-distal left anterior descending artery; one patient had concomitant mid-right coronary artery occlusion. Four patients were managed conservatively with single antiplatelet therapy, beta-blockers and blood-pressure control; one required stenting of an occluded right coronary artery. All recovered without recurrence during short-term follow-up. The series underscores the need for a high index of suspicion, careful angiographic interpretation and individualized decisions between conservative therapy and revascularization. |
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| <b>KEYWORDS:</b> spontaneous coronary artery dissection; acute coronary syndrome; Saw classification; conservative management; case series; fibromuscular dysplasia |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### INTRODUCTION

Spontaneous Coronary Artery Dissection (SCAD) is a frequently overlooked clinical condition that involves a non-iatrogenic, non-traumatic disruption of the coronary artery wall, occurring without an identifiable secondary cause. As a non-atherosclerotic contributor to acute coronary syndrome (ACS), SCAD poses a serious risk due to its unpredictable onset, potentially rapid deterioration, and the diagnostic uncertainty it often presents.

The clinical manifestations of SCAD are diverse. In a large cohort study involving 196 patients (including 178 women), chest pain was the most common presenting symptom, occurring in 96% of cases. Other complaints included arm pain (49.5%), neck discomfort (22.1%), nausea or vomiting (23.4%), sweating (20.9%), shortness of breath (19.3%), and back pain (12.2%).

In that same cohort, ventricular arrhythmias namely ventricular tachycardia or fibrillation developed in 8.1% of cases, while cardiac arrest occurred in approximately 1%. (1) Although the symptoms resemble those seen in atherosclerotic ACS, it is notable that women with SCAD are more likely to report chest pain compared to those with atherosclerotic causes of myocardial infarction. (1)

ST-elevation myocardial infarction (STEMI) was found in 24% of the patients, with the remainder presenting with non-STEMI features. (1)

The underlying mechanisms of SCAD are still under investigation. One proposed model involves a spontaneous tear in the intima, which permits blood entry into the arterial wall, causing an intramural hematoma that obstructs the true lumen.(2)

An alternative theory suggests that spontaneous rupture of the vasa vasorum within the media layer may initiate bleeding and hematoma formation, without communication with the vessel lumen. In both scenarios, myocardial ischemia occurs secondary to compression of the arterial lumen.(3)

While a clear genetic basis remains elusive, emerging evidence suggests that sporadic cases may involve subtle hereditary components, possibly following a recessive inheritance pattern.(4)

This case series describes five patients with confirmed SCAD and emphasizes the importance of considering SCAD in the differential diagnosis of coronary artery disease (CAD), particularly in younger women with no classical cardiovascular risk factors. The variability in clinical

presentation demands a high index of suspicion to avoid misdiagnosis and delayed treatment

## CASE SERIES

### Case 1:

A 53-year-old female without any cardiac risk factor presented to our department for an acute typical chest pain. Her Electrocardiogram showed an ST segment elevation in the anteroseptal leads.

She was immediately taken to the cardiac catheterization laboratory.

The coronary angiography revealed an occlusion of the mid right coronary artery (RCA) and a tubular narrowing of the mid left anterior descending artery (LAD) within smooth coronary arteries suggesting spontaneous coronary artery dissection.

The occlusion of the mid RCA was successfully stented and a deferred reassessment of the LAD was planned. On follow-up consultation the patient exhibited clinical improvement with ECG normalization.



**Figure 1: Coronary angiography of the left coronary arteries showing a type III SCAD of the mid LAD according to the SAW classification.**

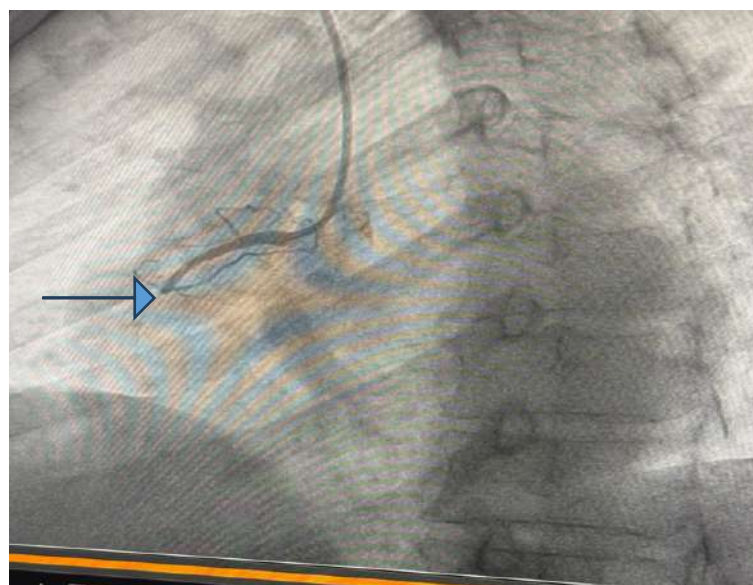


**Figure 2: Coronary angiography showing an occlusion of the mid RCA.**



**Figure 3: Coronary angiogram following wire advancement showing an aspect highly suggestive of a double lumen within the RCA.**

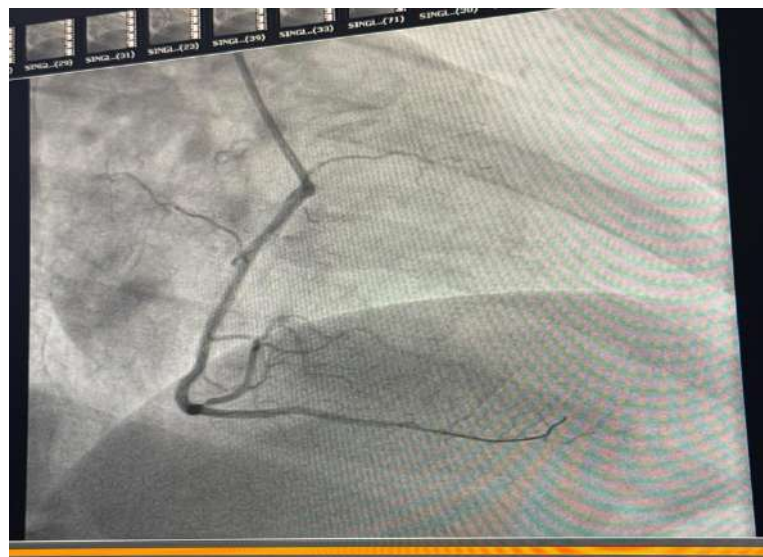


**Figure 4: Coronary angiography image showing an excellent result after the RCA stenting.**

#### **Case 2:**

A 53-year-old male without any cardiac risk factor, declared cure of nasopharyngeal carcinoma 7 years ago treated with radiotherapy and chemotherapy.

He consulted to our ED (Emergency department) for an atypical acute chest pain.

His Electrocardiogram showed a discrete ST segment elevation in the inferobasal leads.

The patient was quickly admitted to the cath lab.

His Coronary angiography revealed an intimal flap with contrast dye staining of the arterial wall in the mid LAD suggestive of type I SCAD according to the SAW classification.

Due to the stable clinical status of the patient, the decision was made to pursue medical therapy including a single antiplatelet therapy and he showed a good clinical improvement.

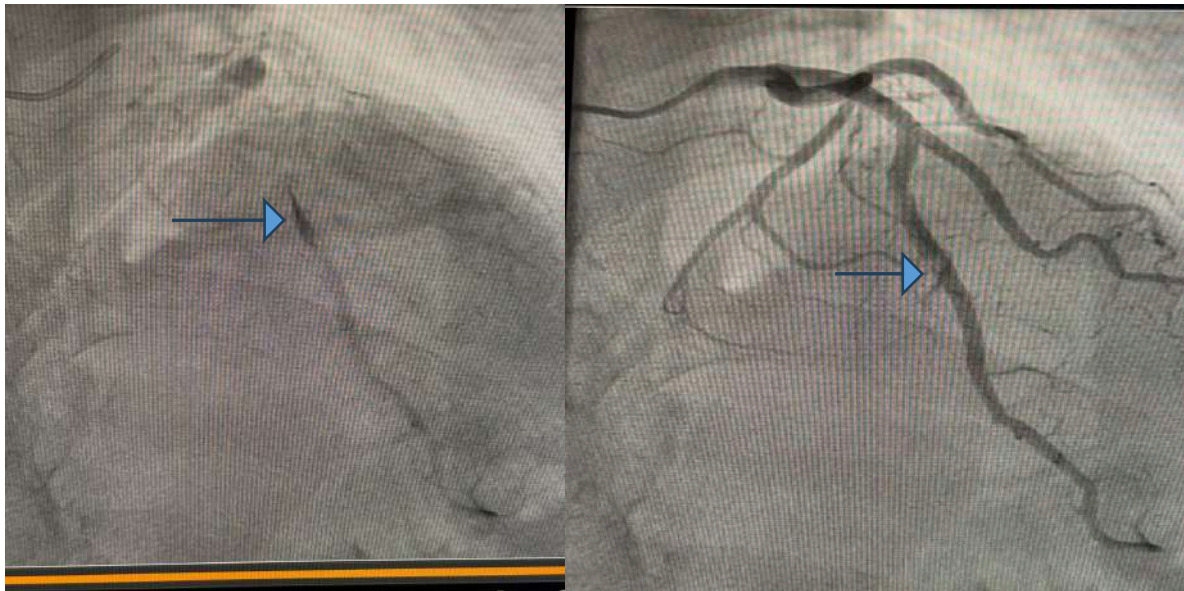


**Figure 5: Coronary angiography of the left coronary arteries showing an intimal flap appearance and a contrast dye staining of the arterial wall in the mid LAD.**

**Case 3:**

A 76-year-old female with cardiovascular risk factors including hypertension and dyslipidemia.

She was admitted to our center for exertional angina class II of CCS (Canadian Cardiovascular Society) and dyspnea class II-III of NYHA (New York Heart Association) ongoing for 4 months.

An Echocardiography was performed and showed hypokinesia of the basal and mid segments of the anteroseptal

wall with a preserved left ventricular ejection fraction (LVEF).

The patient was admitted for a coronary angiography that revealed a long diffuse smooth narrowing of the mid LAD that extends to the distal end of the artery which is suggestive of a type IIB SCAD according to the SAW classification.

The patient was started in medical treatment including single antiplatelet therapy, ACE (Angiotensin-Converting-Enzyme) inhibitors for blood pressure control and a statin with a good clinical progress

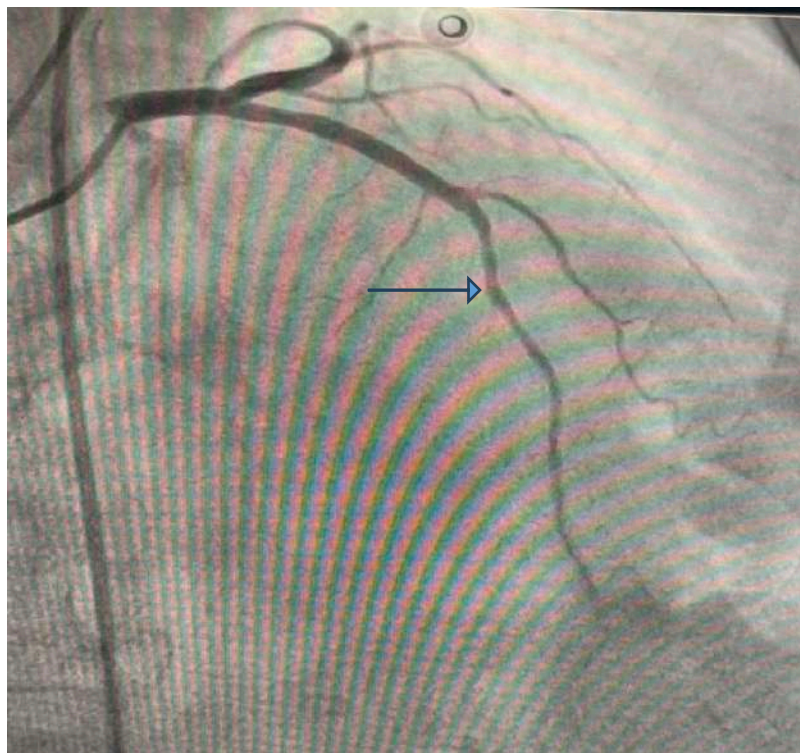


**Figure 6: Coronary angiography of the left coronary arteries showing a feature of a class IIB SCAD in the mid to distal LAD.**

**Case 4:**

A 53-year-old female who has as cardiovascular risk factor a well-controlled hypertension managed with a single antihypertensive agent.

She was admitted to our department for a typical acute chest pain accompanied by autonomic symptoms.

Her electrocardiogram showed a regular supraventricular tachycardia with a heart rate at 197 beats /minute with a ST segment depression in the inferior and lateral leads.

The patient was immediately admitted to our cath lab.

The coronary angiography found a short focal narrowing of the mid LAD within smooth coronary arteries suggestive of a Type III SCAD according to the SAW classification.

A conservative approach was chosen for this patient, involving medical treatment with single antiplatelet therapy , beta-blocker for heart rate control, statin and ACE for blood pressure control.

The patient had a favorable clinical course with a normalization of her Electrocardiogram.

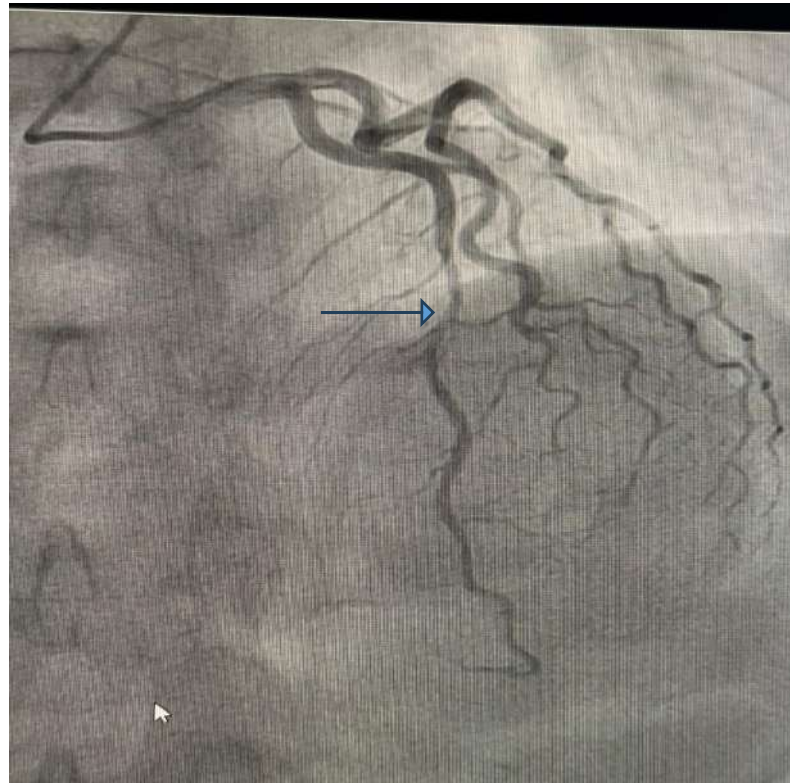


**Figure 7: Coronary angiography of left coronary arteries revealing an aspect of a type III SCAD according to the SAW classification.**

**Case 5:**

A 50-year-old Male with a well-controlled hypertension as cardiovascular risk factor.

During the anamnesis the patient stated that he engaged in weightlifting involving heavy loads.

He was admitted to the emergency department for typical acute chest pain.

His electrocardiogram found an ST segment elevation in the anteroseptal leads.

He was admitted to the cath lab for a coronary angiography that revealed a focal narrowing in the mid segment of the LAD suggestive of a class III SCAD according to the SAW classification.

The decision was to put him under optimal medical treatment including single antipatelet-therapy, a therapeutic dose of low molecular weight heparin during 7 days, and ACE inhibitors for the control of his blood pressure.

He was seen in follow-up consultation; he was clinically well with normalization of his Electrocardiogram.

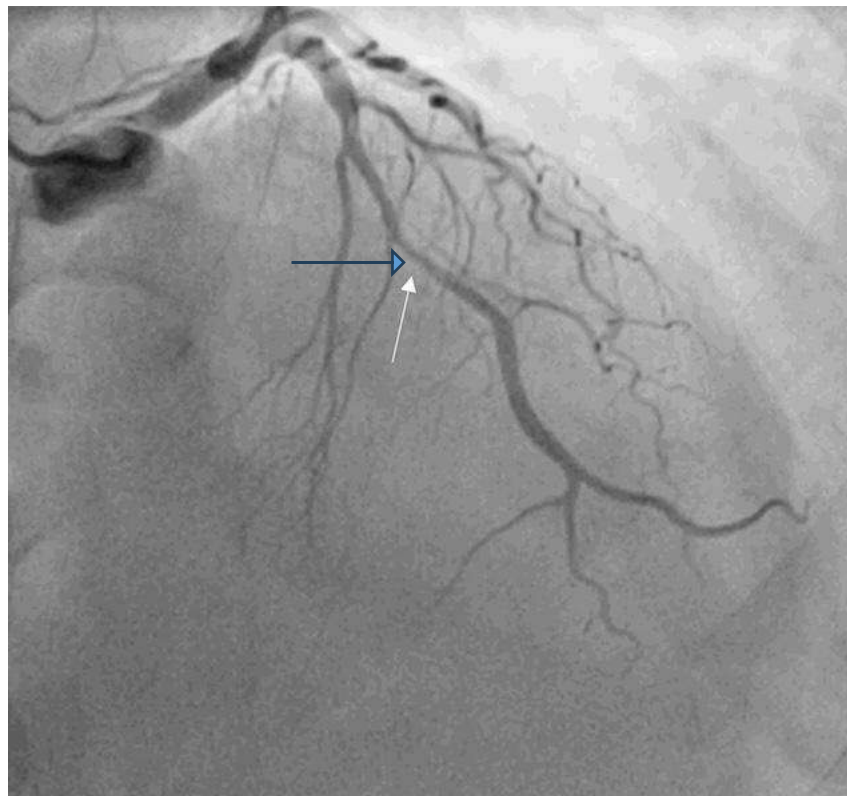


**Figure 8 : Coronary angiography of left coronary arteries revealing a type III SCAD of the mid LAD.**

## DISCUSSION

SCAD was initially reported by Pretty in 1931. (5)

Since then, numerous cases have been documented worldwide. Although SCAD is now recognized as a distinct clinical condition, its true prevalence remains unclear. Data from the Danish Heart Registry indicate an incidence of 2 cases per 1000 among patients with acute coronary syndrome (ACS). (6)

In a prospective study, SCAD was observed in 0.3% of patients with stable angina, 2.9% of those with acute myocardial infarction, and 4.2% of individuals with post-MI angina. (7)

The condition shows a strong tendency to present as ACS in young, especially healthy women. A more recent case series reported that SCAD accounted for 22% to 35% of ACS cases in women under 50, with the highest burden seen in middle-aged females. (8)

In that study, the average age among female patients was 44 years. A summary of the demographics, comorbidities, clinical features, lesion distribution, therapeutic approaches, and outcomes in our patient population is presented below.

### Table 1

**Table 1: Patient demographics, risk factors, clinical presentations, the respective involvement of coronary artery, and management in participants of the present study.**

| Patient baseline data  | Male     | Female   |
|------------------------|----------|----------|
| Mean age (years)       | 51 (n=2) | 60 (n=3) |
| Diabetes               | 0        | 0        |
| Hypertension           | 1        | 2        |
| Smoking                | 0        | 0        |
| Oral contraceptive use | NA       | 0        |
| Pregnancy              | NA       | 0        |
| FMD                    | 0        | 0        |
| Presentation           |          |          |
| STEMI                  | 2        | 1        |
| NSTEMI                 | 0        | 1        |
| Refractory chest pain  | 2        | 2        |
| Others                 | 0        | 1        |
| Distribution           |          |          |

|                     |   |   |
|---------------------|---|---|
| LAD                 | 2 | 3 |
| LM                  | 0 | 0 |
| RCA                 | 0 | 1 |
| LCx                 | 0 | 0 |
| Multivessel disease | 0 | 1 |
| Management          |   |   |
| Medical therapy     | 2 | 2 |
| PCI                 | 0 | 1 |
| CABG                | 0 | 0 |
| Clinical outcomes   |   |   |
| Recovered           | 2 | 3 |
| Died                | 0 | 0 |

Abbreviations: FMD, fibromuscular dysplasia; NA, not applicable; STEMI, ST-segment elevation myocardial infarction; NSTEMI, non-ST-segment elevation myocardial infarction; LAD, left anterior descending; LM, left main artery; RCA, right coronary artery; LCx, left circumflex; PCI, primary coronary intervention; CABG, coronary artery bypass graft.

The risk factors associated with SCAD have been the subject of recent in-depth investigation. In one study involving 327 individuals diagnosed with SCAD, fibromuscular dysplasia (FMD) was identified in 62.7% of cases. (9)

However, data from a large U.S.-based FMD registry revealed that only 3.4% of patients with FMD were also diagnosed with SCAD. (10)

Notably, up to 86% of SCAD cases are associated with either FMD or another form of arterial pathology. (11)

Despite this, FMD remains a poorly understood condition and is often diagnosed several years after symptom onset. In contrast to existing literature, our case series stands out in that none of the included patients were found to have FMD.

Additionally, all were nonsmokers, and none of the female participants were using oral contraceptives at the time of hospital admission.

Pregnancy represents a significant risk factor for SCAD, with the condition most commonly presenting as acute coronary syndrome (ACS) during the postpartum period. (12)(13)

Psychological and physical stressors have also been frequently implicated in SCAD onset. In one study, 57% of individuals experiencing either emotional or physical stress went on to develop SCAD. Both intense physical exertion and psychological distress through mechanisms involving elevated catecholamine levels have been linked to a heightened risk of dissection. (11)

Additionally, coronary artery tortuosity observed on angiography has shown a strong correlation with SCAD. A case-control analysis revealed a 61% greater prevalence of tortuous coronary arteries and an average increase of two points in tortuosity score among SCAD patients compared to controls. (14)

Other contributing factors include connective tissue disorders, multiple pregnancies, hormone therapy, systemic inflammatory conditions, and hypertension. (9)(15)(16)

In our case series, 3 out of 5 patients were women, with none of them presenting during pregnancy or the postpartum period at the time of hospital admission for SCAD.

SCAD is classified into three primary types based on angiographic appearance. Type 1 represents the classic form, featuring multiple lumens within the coronary artery and a characteristic longitudinal filling defect. Type 2, which is the most frequently observed, is defined by long, diffuse narrowing of the vessel. Type 3 presents as a localized area of stenosis, often mimicking atherosclerotic lesions. Both types 2 and 3 typically exhibit subtle changes in vessel caliber, reflecting the presence of an intramural hematoma. (17)

Because type 3 SCAD closely resembles atherosclerosis on angiography, intravascular imaging is considered essential for a definitive diagnosis. (18)

Coronary angiography remains the primary diagnostic tool for evaluating SCAD. While it typically provides sufficient information for diagnosis, certain cases can be diagnostically challenging, particularly when the clinical presentation is atypical or when interpreted by less experienced operators. In such scenarios, intravascular ultrasound (IVUS) has gained prominence due to its enhanced ability to visualize vessel structures, guide accurate wire positioning, and facilitate proper stent placement. (19)

IVUS is especially valuable in distinguishing between true and false lumens. When an intimal tear is present, it can also help assess the extent and configuration of the tear. In the absence of an intimal tear, IVUS allows for precise measurement and characterization of the intramural hematoma. (20)

Additionally, optical coherence tomography (OCT), a light-based imaging modality, offers high-resolution visualization and is useful for delineating the intramural hematoma in patients with SCAD. (21)

The medical management of SCAD is largely tailored to each individual, as robust scientific evidence remains limited due to the absence of randomized controlled trials. Nevertheless, there is general agreement on the short-term use of dual antiplatelet therapy. Beta-blockers are commonly prescribed, with recent data highlighting their potential in reducing the risk of SCAD recurrence. (9) Angiotensin-converting enzyme (ACE) inhibitors are typically reserved for patients exhibiting impaired left ventricular function. The role of statins remains controversial; some practitioners choose to avoid their use in SCAD due to ongoing debate regarding their benefit. (22)

In patients with stable presentations, SCAD often heals spontaneously within approximately three months under closely monitored conservative treatment. (23)

The approach to revascularization in SCAD remains a topic of ongoing debate. When intervention is deemed necessary, percutaneous coronary intervention (PCI) is generally favored over coronary artery bypass grafting (CABG). However, PCI in SCAD patients is associated with a higher risk of complications compared to PCI performed for atherosclerotic lesions. (24)

Patients presenting with hemodynamic instability or ongoing ischemia are more likely to require revascularization. (1)

In the context of pregnancy-related SCAD, the risk of dissection extension is observed in nearly half of the cases, while PCI achieves success in only about 25% of these patients. (16)(25)

Following PCI, especially in those who receive stents or present with elevated blood pressure, therapy may include aspirin, heparin, beta-blockers, and nitrates. Most SCAD lesions are located in the mid to distal segments of the left anterior descending (LAD) artery, whereas pregnancy-associated SCAD tends to involve the proximal LAD or left main (LM) coronary artery. Involvement of the LM or ostial LAD typically precludes PCI, making CABG the preferred revascularization strategy. (22)(26)(27)

Nonetheless, there is a potential risk of grafting into a false lumen during CABG in SCAD patients, which underscores the importance of meticulous anatomical assessment.

Recurrent SCAD significantly impacts patient morbidity. In a cohort of 327 patients from Vancouver, Canada, early survival to hospital discharge was 100%. (9)

After a median follow-up period of 3.1 years, 10.4% of these patients experienced a recurrence of SCAD. Multivariate analysis identified hypertension as a significant risk factor for recurrence, with a hazard ratio of 2.46 (95% confidence interval: 1.23–4.93) and a P value of .011. Conversely, beta-blocker therapy was associated with a 61% reduction in the risk of recurrent SCAD, reflected by a hazard ratio of 0.39 (P = .004). Female sex and lack of prompt treatment emerged as the strongest predictors of poor clinical outcomes. (28)

In our study, four patients with stable disease were managed conservatively with medical therapy, while one of them underwent PCI. All patients recovered without

complications, and no recurrences were observed during follow-up.

## CONCLUSION

SCAD is an often overlooked condition mainly affecting young women and typically presents like acute coronary syndrome. There are no established treatment guidelines. Stable patients are usually managed conservatively, while unstable cases may require PCI or CABG. Recurrence risk is high in the first few years, making regular imaging follow-up important. Further research is needed to better predict long-term outcomes and recurrence risk for improved diagnosis and care.

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