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A Comprehensive Analysis of 50 Spontaneous Coronary Artery Dissection Patients: Clinical Presentations, Management Approaches, and Outcomes

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Abstract

Background: Spontaneous Coronary Artery Dissection (SCAD) is a rare but increasingly recognized cause of acute coronary syndrome (ACS), predominantly affecting young to middle-aged women without traditional cardiovascular risk factors. This study aims to analyze the clinical characteristics, diagnostic approaches, management strategies, and outcomes in a cohort of 50 SCAD patients.

Methods: A retrospective case series of 50 consecutive SCAD patients diagnosed between 2021 and 2023 at a single tertiary care center was conducted. Data on demographics, clinical presentation, imaging findings, management strategies, and outcomes were collected.

Results: The cohort comprised 94% women with a mean age of 44 ± 7 years. Clinical presentations included STEMI (60%) and NSTEMI (40%). Conservative management was utilized in 76% of cases, with a high rate of spontaneous healing. In-hospital survival was 100%, with a 12% incidence of major adverse cardiac events (MACE) during follow-up.

Conclusion: This study emphasizes the importance of recognizing SCAD in ACS, particularly among young women. Conservative management proves effective, but psychological support is crucial for long-term outcomes.

Keywords: Spontaneous Coronary Artery Dissection (SCAD), Acute Coronary Syndrome (ACS), Myocardial Infarction, Coronary Angiography, Intravascular Imaging, Percutaneous Coronary Intervention (PCI), Case Series.

Introduction

Spontaneous Coronary Artery Dissection (SCAD) is an underdiagnosed cause of acute coronary syndrome (ACS), particularly affecting young and otherwise healthy individuals without traditional cardiovascular risk factors. SCAD involves a spontaneous tear in the coronary artery wall that leads to the formation of a false lumen. This condition can result in myocardial ischemia, myocardial infarction, or sudden cardiac death. SCAD accounts for 1-4% of all ACS cases, but in women under 50 years of age, the incidence may rise to as high as 35%(1, 2). The precise pathophysiology of SCAD remains unclear, although it is believed to involve underlying connective tissue disorders, hormonal influences, and stress(3, 4).

Clinical presentation can vary significantly, with patients experiencing symptoms similar to those of atherosclerotic coronary artery disease. This overlap often leads to misdiagnosis, delaying appropriate management(5, 6). Recent advances in imaging techniques, including intravascular ultrasound (IVUS) and optical coherence tomography (OCT), have improved the diagnosis of SCAD by visualizing the characteristics of the dissection(7, 8).

Management strategies for SCAD are typically conservative, as most patients are hemodynamically stable and exhibit a high rate of spontaneous healing(9, 10). However, some cases may necessitate invasive interventions such as percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG)(11). Given the growing recognition of SCAD, this study aims to analyze the clinical presentations, management approaches, and outcomes in a cohort of 50 patients diagnosed with SCAD.

Methods

Study Design and Patient Population

A retrospective analysis of 50 consecutive SCAD patients was performed at a single tertiary care center between January 2021 and December 2023. All patients presented with acute coronary syndrome and were diagnosed with SCAD through coronary angiography, supplemented by intravascular imaging (IVUS or OCT) in select cases. Exclusion criteria included patients with atherosclerotic coronary artery disease or iatrogenic dissection.

Data Collection

The following data were collected:

1. **Demographic and Clinical Information:** Age, sex, cardiovascular risk factors, and presenting symptoms.
2. **Imaging Findings:** Angiographic and intravascular imaging details, including the type of SCAD (types 1, 2, or 3) and the location of dissection.
3. **Management Approaches:** Conservative management (medical therapy), PCI, and CABG.
4. **Outcomes:** In-hospital outcomes, recurrence of SCAD, major adverse cardiac events (MACE), and psychosocial outcomes during the 12-month follow-up.

Statistical Analysis

Descriptive statistics were used to summarize data. Continuous variables were expressed as mean ± standard deviation, and categorical variables as percentages. Outcomes were compared between patients managed conservatively versus those undergoing invasive procedures (PCI or CABG).

Results

Demographics

The study included a total of 50 patients diagnosed with SCAD. The demographic details of the patients are summarized in Table 1.

Table 1: Demographic Characteristics of SCAD Patients

Characteristic	Value
Total Patients	50
Mean Age (years)	44 ± 7
Gender Distribution	
Female (%)	94%
Male (%)	6%
Cardiovascular Risk Factors	

Hypertension (%)	18%
Diabetes Mellitus (%)	10%
Hyperlipidemia (%)	12%
Smoking (%)	8%
Family History of CAD (%)	16%
Pregnancy/Postpartum (%)	20%

Clinical Presentation

All patients presented with symptoms consistent with acute coronary syndrome. The clinical presentation of patients is shown in Table 2.

Table 2: Clinical Presentation of SCAD Patients

Symptoms	Percentage
Chest Pain	92%
Dyspnea	10%
Syncope	6%
Nausea	4%
Palpitations	8%

Electrocardiographic Findings

The electrocardiographic (ECG) findings at presentation are detailed in Table 3.

Table 3: Electrocardiographic Findings

ECG Findings	Percentage
ST-Elevation Myocardial Infarction (STEMI)	60%
Non-ST-Elevation Myocardial Infarction (NSTEMI)	40%
Normal ECG	0%
Atrial Fibrillation	2%

Biomarkers

Biochemical markers were evaluated in all patients, revealing elevated levels of cardiac troponins. The findings are summarized in Table 4.

Table 4: Biomarker Analysis

Biomarker	Percentage of Patients with Elevation
Troponin I	100%
Creatine Kinase-MB (CK-MB)	88%
B-type Natriuretic Peptide (BNP)	50%

Imaging Findings

Coronary angiography was performed in all patients, and findings are presented in Table 5.

Table 5: Angiographic and Intravascular Imaging Findings

Findings	Value
Most Affected Artery	
Left Anterior Descending Artery	60%
Right Coronary Artery	24%
Left Circumflex Artery	16%
Type of SCAD	
Type 1 (Intramural Hematoma)	18%
Type 2 (Classic Dissection)	74%
Type 3 (Less Common)	8%
Intravascular Imaging (IVUS/OCT)	Performed in 40% of cases

Management Strategies

Management approaches varied among patients, as illustrated in Table 6.

Table 6: Management Strategies for SCAD Patients

Management Strategy	Percentage
Conservative Management	76%
- Medical Therapy Only	64%
- Observation	12%
Percutaneous Coronary Intervention (PCI)	18%
Coronary Artery Bypass Grafting (CABG)	6%

Outcomes

Outcomes of the management strategies employed in this cohort are summarized in Table 7.

Table 7: Clinical Outcomes at Follow-Up

Outcome	Value
In-Hospital Survival	100%
Major Adverse Cardiac Events (MACE)	12%
Psychological Distress	20%
Quality of Life Assessment (measured by EQ-5D scale)	Mean score: 0.85 ± 0.12
Hospital Readmissions	10%

Recurrence and Long-Term Follow-Up

Of the patients followed for 12 months, 6% experienced a recurrence of SCAD. The management strategies employed at the time of recurrence are noted in Table 8.

Table 8: Management of Recurrent SCAD

Management for Recurrence	Percentage
Conservative Management	67%
PCI	33%
CABG	0%

Discussion

This study highlights the unique clinical profile of SCAD patients, who are predominantly young women presenting with symptoms of ACS. The high incidence of STEMI among these patients underscores the need for heightened awareness of SCAD as a potential diagnosis in this demographic(1, 2). The predominance of conservative management strategies aligns with current guidelines, reflecting the favorable prognosis often associated with SCAD(12).

The findings also emphasize the importance of psychological support for SCAD patients. With a notable percentage experiencing psychological distress, integrating mental health resources into the management plan may improve overall outcomes(13).

Conclusion

In conclusion, SCAD is a significant cause of myocardial infarction, particularly in young women. The clinical presentation is often indistinguishable from atherosclerotic coronary artery disease, necessitating a high index of suspicion for timely diagnosis. Our findings support the efficacy of conservative management strategies in most cases, though the incidence of psychological distress highlights the need for comprehensive care approaches. Continued research is necessary to better understand the pathophysiology of SCAD and optimize management strategies, including psychological support and follow-up care.

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