CATHALOGUE

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CASE REPORT

Spontaneous Coronary Artery Dissection: A Challenge for an Interventional Cardiologist

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Abstract

Background: Spontaneous Coronary Artery Dissection (SCAD) is a rare cause of acute coronary syndrome primarily affecting younger women, distinct from traditional coronary artery disease as it is not associated with atherosclerosis or conventional risk factors. Its etiology is multifactorial, encompassing hormonal, genetic, and mechanical factors. Timely diagnosis and intervention are critical due to the risk of severe complications, including cardiac arrest.

Case Presentation: A 32-year-old female with an unremarkable medical history, who had given birth 24 months prior, presented with a sudden choking sensation in the neck, chest heaviness, and diaphoresis while at work, followed by sudden cardiac arrest. Cardiopulmonary resuscitation (CPR) was initiated promptly, achieving return of spontaneous circulation within two minutes. Post-resuscitation electrocardiogram (ECG) revealed extensive anterior wall myocardial infarction (MI). Coronary angiography confirmed a type 2 SCAD in the mid-left anterior descending artery (LAD).

Results: Due to hemodynamic instability, the patient underwent percutaneous coronary intervention (PCI) with drug-eluting stent (DES) placement, successfully restoring TIMI III flow in the affected artery. The patient's recovery was smooth, and follow-up echocardiogram at three months demonstrated normalization of left ventricular function, indicating a positive response to the intervention.

Conclusion: This case highlights the critical importance of early recognition and intervention in SCAD, especially in hemodynamically unstable patients, to facilitate favorable outcomes.

Keywords

Spontaneous, Dissection, Coronary, Revascularization, Follow-Up.

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Introduction

Spontaneous Coronary Artery Dissection (SCAD) is a rare yet serious condition characterized by a tear in one of the coronary arteries, leading to the separation of the arterial wall layers. This can result in the formation of a false lumen, which may compress the true lumen, thereby reducing or obstructing blood flow to the myocardium[1]. The condition primarily affects relatively young individuals, particularly women, many of whom are peripartum or postpartum[2]. Notably, SCAD can occur up to 16 months postpartum, especially in breastfeeding women[3]. Unlike traditional coronary artery disease, which is linked to atherosclerosis and common risk factors such as hyperlipidemia and smoking, SCAD's etiology remains poorly understood, thought to involve hormonal, genetic, and mechanical factors.

Symptoms of SCAD often mimic those of acute coronary syndrome, including chest pain, shortness of breath, sweating, nausea, and dizziness. Due to its rarity and symptom overlap with more common cardiac conditions, SCAD poses a diagnostic challenge[4]. Coronary angiography, often complemented by intravascular imaging, serves as the primary diagnostic modality, revealing characteristic arterial dissection.

Management of SCAD diverges from conventional approaches for heart disease. While percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) are standard for traditional coronary artery disease, these interventions carry additional risks in SCAD. Conservative management with medication and monitoring is often preferred in stable patients. However, in cases of TIMI 0 flow, ventricular arrhythmias, left main involvement, hemodynamic instability, or ongoing ischemia, revascularization via PCI or CABG is indicated.[5]
We present a rare case of SCAD leading to sudden cardiac arrest in a patient 24 months postpartum, managed successfully with percutaneous coronary intervention.

Case Presentation

A 32-year-old female nurse, married with three children, the youngest being two years old and still breastfeeding, experienced a sudden choking sensation in her neck accompanied by central chest heaviness and diaphoresis while on duty. Within a minute, she suffered a cardiac arrest. Cardiopulmonary resuscitation (CPR) was promptly initiated by her colleagues, following advanced cardiovascular life support (ACLS) protocols. Emergency medical services were alerted, and the hospital's rapid response team was mobilized. Within two minutes of initiating CPR, return of spontaneous circulation (ROSC) was achieved. Once stabilized, the patient was transported to the catheterization lab for further evaluation and management.

Diagnostic Assessment

Post-resuscitation, an ECG revealed ST elevations in the anterior precordial leads (V1 to V6). Her vital signs were concerning: BP 80/50 mmHg, pulse 100 bpm, respiratory rate 20 breaths/min, and SpO2 95% on room air. A thorough systemic examination yielded no additional findings. She received aspirin, clopidogrel, and intravenous heparin and was urgently transported to the catheterization lab with inotropic support.

Coronary angiography via right femoral access demonstrated a smooth, long diffuse lesion in the mid-segment of the left anterior descending artery (LAD) with TIMI II flow, while the left circumflex (LCx) and right coronary artery (RCA) appeared normal. This lesion correlated with Type 2 SCAD.

Therapeutic Intervention

Although conservative management is often the first choice for stable SCAD patients, this patient's hemodynamic instability and history of cardiac arrest warranted immediate intervention. The decision for PCI and stenting was made to restore coronary perfusion. A 0.014-inch workhorse coronary wire was advanced distally in the LAD, and a 3.5 x 31mm drug-eluting stent (DES) was deployed at 10 atm, covering both the proximal and distal ends of the dissection. A proximal

extension of intramural hematoma was observed post-stenting, which was addressed with an overlapping 3.5 x 13mm stent, also deployed at 10 atm. TIMI III flow was achieved in the LAD without complications.

Follow-Up and Outcomes

The patient's post-procedural recovery was uneventful, and she achieved hemodynamic stability as inotropic support was gradually tapered off. An echocardiogram post-PCI revealed left ventricular dysfunction with an ejection fraction (EF) of 35%, indicating significant myocardial involvement but no life-threatening complications. Remarkably, a follow-up echocardiogram at three months showed normalization of left ventricular function, reflecting the effectiveness of the revascularization and subsequent medical therapy. The patient remains asymptomatic and is on guideline-directed medical therapy (GDMT), highlighting the importance of long-term management in preventing recurrence and optimizing cardiac health.

Discussion

SCAD represents a critical cause of acute coronary syndrome (ACS), particularly in young to middle-aged women devoid of traditional cardiovascular risk factors. This case emphasizes the need to consider SCAD in the differential diagnosis of young patients presenting with ACS symptoms, particularly those with a history of pregnancy or breastfeeding[5]. The case illustrates the complexities of managing SCAD, balancing conservative and invasive approaches effectively. The normalization of cardiac function post-intervention underscores that with appropriate management, SCAD patients can achieve excellent recovery and maintain a good quality of life. Ongoing research should focus on optimal management strategies and long-term outcomes for SCAD, thereby enhancing evidence-based practice for this unique condition.

Conclusion

This case highlights the significance of rapid diagnosis and tailored management in patients with SCAD. While conservative management is generally preferred for stable patients, the decision to proceed with stenting was justified in this case due to hemodynamic instability and a history of cardiac arrest, resulting in improved outcomes. Continued research and clinical awareness are vital for understanding SCAD's pathophysiology, improving diagnostic accuracy, and refining management protocols to enhance patient outcomes in this rare yet significant condition.

Learning points

- Early recognition and differentiation of SCAD from other causes of acute coronary syndrome are essential.
- Individualized treatment strategies should be based on the patient's clinical stability and unique circumstances.
- Timely intervention can lead to positive outcomes in hemodynamically unstable SCAD patients.

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Figure/Video

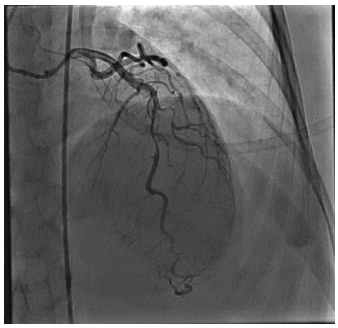

Figure 1: Angiogram illustrating Type 2 Spontaneous Coronary Artery Dissection

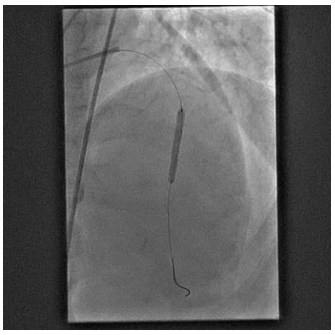

Figure 2: Deployment of a 3.5 x 31 mm drug-eluting stent in the mid-segment of the left anterior descending artery (LAD)

Figure 3: Visualization of the extension of the dissection seen proximally following initial stenting

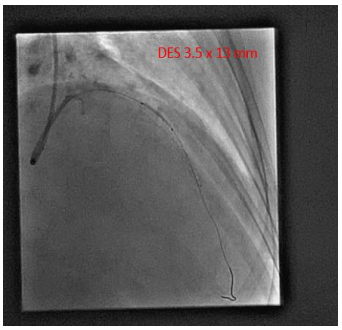

Figure 4: Coverage of the proximal dissection extension with a 3.5 x 13 mm stent.

Figure 5: Final angiographic result.