CASE REPORT

HEART CARE TEAM/MULTIDISCIPLINARY TEAM LIVE

Peripartum Spontaneous Coronary Artery Dissection

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ABSTRACT

Spontaneous coronary artery dissection is a rare but potentially life-threatening condition that predominantly affects women, particularly during pregnancy or postpartum period. We present a case of peripartum spontaneous coronary artery dissection in a 41-year-old African woman, highlighting the clinical presentation, diagnostic challenges, and management strategies. (J Am Coll Cardiol Case Rep 2023;27:102099) © 2023 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

CASE PRESENTATION

A 41-year-old Black female patient presented to the emergency department of Abidjan Heart Institute on March, 31, 2023, with acute chest pain and shortness of breath 1 week after her fourth uncomplicated spontaneous vaginal delivery of a healthy baby. She complained of 6 hours of crushing central chest pain with posterior radiation, 7 of 10 (visual analog scale). She had no significant past medical history or cardiovascular risk factors except for gestational hypertension. On exam, heart rate was 104 beats/min, blood pressure 165/100 mm Hg, and saturation 98% on room air. Pulmonary and cardiac auscultation was

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LEARNING OBJECTIVES

- To be able to make a differential diagnosis of chest pain syndromes during pregnancy and peripartum period.
- To plan and decide on the management strategies for peripartum SCAD.

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unremarkable. No pain or edema was found in her lower extremities.

QUESTION 1: WHAT IS THE DIFFERENTIAL DIAGNOSIS OF AN ACUTE CHEST PAIN IN PERIPARTUM?

- Pulmonary embolism
- Type 1 myocardial infarction
- Spontaneous coronary artery dissection
- Aortic dissection
- Other

There is a wide range of chest pain syndromes during pregnancy or puerperium, including pulmonary embolism (PE), amniotic fluid embolism, acute myocardial infarction, and aortic dissection.[1] Acute high-risk chest pain diseases are the leading causes of maternal death in developed countries.[2] Thus, early recognition and management of these threatening conditions are essential for reducing mortality in pregnancy and puerperium. Recent comprehensive data from the Nationwide Inpatient Sample showed

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From the [a]Interventional Cardiology Department, Abidjan Heart Institute, Abidjan, Côte d'Ivoire; [b]Intensive Care Unit, Abidjan Heart Institute, Abidjan, Côte d'Ivoire; and the [c]Emergency Department, Abidjan Heart Institute, Abidjan, Côte d'Ivoire.

ABBREVIATIONS AND ACRONYMS

PCI = percutaneous coronary intervention

PE = pulmonary embolism

SCAD = spontaneous coronary artery dissection

that the most frequent acute high-risk chest pain disease is PE (86.5%),[3] which is significantly ahead of acute myocardial infarction (9.6%) and aortic dissection (3.3%). D-dimer testing to rule out PE during pregnancy and puerperium remains debated,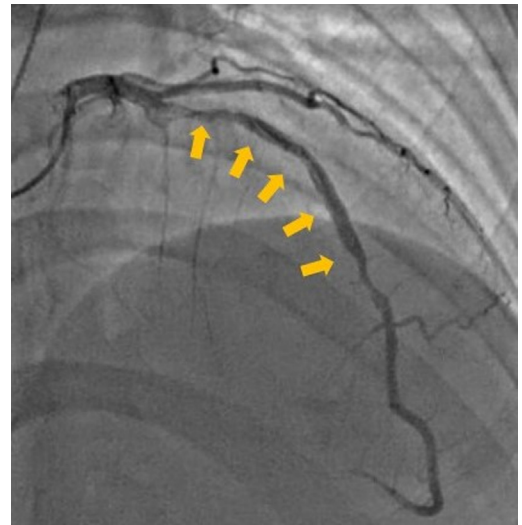 because it is physiologically elevated in these situations. Identification of deep vein thrombosis of the lower limbs may be useful, with sensitivity >90% and specificity of ∼95% for proximal localization. Finally, definitive diagnosis of PE requires imaging, and, in our case, PE was excluded after computed tomography pulmonary angiography, as well as aortic dissection.

Peripartum spontaneous coronary artery dissection (SCAD) is an uncommon presentation of acute myocardial infarction and can be challenging to diagnose due to its overlapping clinical presentation with other cardiac conditions. In the presented case, electrocardiogram showed, and T-wave inversion in inferior and anterior leads, and slight ST-segment elevation in V_2-V_3 leads. Blood sampling showed high levels of troponin I (5,338 ng/L), creatine kinase (528 IU/L) and creatine kinase-myocardial band (48 IU). After loading doses of 300 mg aspirin and 300 mg clopidogrel, immediate coronary angiography revealed a type 1 SCAD with long dissection flap involving the proximal and mid segments of the left anterior descending artery, and TIMI flow grade 3 (**Figure 1**, Video 1). Intracoronary imaging with intravascular ultrasound or optical coherence tomography allows better identification of intimal tears and flap and confirmation of guidewire position in the true lumen during percutaneous coronary intervention (PCI) procedure. These advanced tools are not available in our practice.

FIGURE 1   Coronary Angiography at Admission

Left coronary angiogram showing type 1 spontaneous coronary artery dissection of the left anterior descending artery. LAO 10°, CRA 40°. Yellow arrows indicate the intimal flap. CRA = cranial; LAO = left anterior oblique.

QUESTION 2: WHAT ARE THE PREDISPOSING FACTORS FOR PERIPARTUM SCAD?

The pathophysiology of peripartum SCAD is not fully understood, but hormonal and mechanical factors associated with pregnancy may be incriminated. Hormonal changes, such as increased levels of estrogen and progesterone and decreased collagen synthesis lead to weakening of the media.[4] Additionally, some investigators suggested that hemodynamic changes that occur during pregnancy, including higher plasma volume and cardiac output, lead to increased shear forces on intima and may contribute to the development of dissections.

Fibromuscular dysplasia was the most commonly reported associated pathology. Fibromuscular dysplasia affects younger women and is currently underdiagnosed.[5] Other patients with peripartum SCAD have inherited connective tissue disorders, such as Marfan, Ehlers-Danlos, and Loeys-Dietz syndromes, whose prevalence in peripartum SCAD patients is estimated to be <2.5% or pre-existing conditions that may predispose to peripartum SCAD including abnormalities of the coronary arteries, vasculitis such as Kawasaki disease, hypereosinophilic syndrome, ulcerative colitis, and systemic lupus erythematosus.[5]

In this case, the patient had no known pre-existing cardiovascular risk factors, apart from gestational hypertension, which further highlights the importance of considering peripartum SCAD in the differential diagnosis of chest pain in young individuals, even in the absence of traditional risk factors.

QUESTION 3: HOW TO MANAGE PERIPARTUM CORONARY ARTERY DISSECTION?

Clinical presentation, hemodynamic parameters, and angiographic and/or imaging features of the dissection are the main factors for the choice of the treatment, resulting in individualized management for each patient. A multidisciplinary team approach should be implemented involving at least a cardiologist, obstetrician, and anesthetist, as well as additional experts when needed.[2] Currently, the treatment approach is largely conservative (>80%), as

FIGURE 2 Coronary Angiography of the Left Coronary Artery After Percutaneous Coronary Intervention
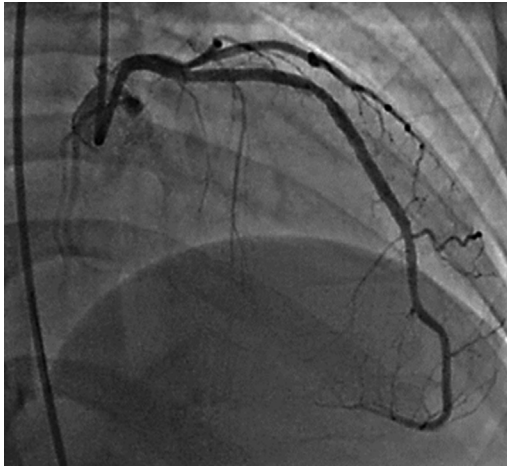
Favorable outcomes after percutaneous coronary intervention of the left anterior descending artery. LAO 10°, CRA 40°.
CRA = cranial; LAO = left anterior oblique.

most segments involved in the dissection heal spontaneously.[6] In clinically unstable patients (ongoing ischemia, cardiogenic shock, ventricular arrythmias) with persistent or recurrent dissection, PCI is preferred.[6] Coronary artery bypass graft surgery artery revascularization procedure may be considered in some uncommon cases: left main/multivessel SCAD or PCI failure. In our case, the patient was managed medically with close observation, given she was asymptomatic without hemodynamic compromise and with single-epicardic vessel disease. She received dual antiplatelet therapy (aspirin 100 mg once daily, clopidogrel 75 mg once daily), beta blocker (bisoprolol 1.25 mg once daily), statin (atorvastatin 40 mg once daily), and angiotensin converting enzyme inhibitor (perindopril 5 mg once daily).

One day after, the patient's clinical course deteriorated, and she developed recurrent chest pain and electrocardiogram changes, probably as a result of extent of the coronary artery dissection. Subsequently, the decision was made to perform PCI on the left anterior descending artery. Two drug-eluting stents were successfully implanted in the left anterior descending coronary artery, resulting in rapid symptom relief (**Figure 2**, Video 2). It should be pointed out that PCI is sometimes a challenging task in daily clinical practice, with 20% to 60% of PCIs having complications, especially extension of the dissection.[7]

QUESTION 4: WHAT ARE THE LONG-TERM OUTCOMES AND/OR RECURRENT PERIPARTUM?

Peripartum SCAD has a variable prognosis, with outcomes ranging from complete recovery to significant morbidity and mortality. In the case we describe, the patient responded well to PCI with favorable outcomes. Left ventricular ejection fraction was 60%, without regional wall motion abnormalities. However, long-term follow-up is crucial for reassessing cardiac function, identifying recurrent SCAD events and major adverse cardiac events, and managing potential cardiovascular risk factors. Recurrence rates range between 17% and 50%, being more frequent between 30 and 60 days after the first episode.[7] In a recent study carried among 750 consecutive SCAD with long-term follow-up, peripartum SCAD was an independent predictor of a 3-year occurrence of major adverse cardiac events, as well as genetic disorders and extracoronary fibromuscular dysplasia.[8] Patients who underwent PCI at index hospitalization had similar postdischarge major adverse cardiac events compared with no PCI.[8] Collaboration between obstetric and cardiology teams can facilitate appropriate counseling and support for subsequent pregnancies, ensuring optimal outcomes for both mother and child.

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KEY WORDS myocardial infarction, Peripartum, spontaneous coronary artery dissection, Sub-Saharan Africa

APPENDIX For supplemental videos, please see the online version of this paper.