American Journal of Case Reports

e-ISSN 1941-5923
© Am J Case Rep, 2021; 22: e930380
DOI: 10.12659/AJCR.930380

Received: 2020.12.09
Accepted: 2021.07.13
Available online: 2021.08.06
Published: 2021.09.18

Spontaneous Coronary Artery Dissection with Sudden Cardiac Arrest in a Female Patient During Her Postpartum Period: A Case Report and Review

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABEF Moath A. Binhomaid
ABCEF Faisal Alhusain
ABCEF Mohammad Al Deeb

Department of Emergency Medicine, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

Corresponding Author: Faisal Alhusain, e-mail: Faisalaalhusain@gmail.com
Conflict of interest: None declared

Patient: Female, 29-year-old
Final Diagnosis: Spontaneous coronary artery dissection
Symptoms: Cardiac arrest
Medication: —
Clinical Procedure: —
Specialty: Critical Care Medicine

Objective: Unknown etiology

Background: Spontaneous coronary artery dissection (SCAD) is a rare cause of acute myocardial infarction, and the literature is undecided on the etiology, predisposing factors, and susceptible populations involved. SCAD is a disease that is under-recognized, underdiagnosed, and mainly affects young women of reproductive age. It has the highest incidence in the third trimester and postpartum period.

Case Report: We present a case of a 29-year-old woman who was brought by family members to our Emergency Department (ED) in Riyadh, Saudi Arabia with sudden cardiac arrest due to SCAD in the right coronary artery 13 days after normal spontaneous vaginal delivery. The patient was brought in with no cardiopulmonary resuscitation for 20 min. She was resuscitated successfully in the ED. Her initial rhythm was ventricular fibrillation (VF). Point-of-care ultrasound (PoCUS) was performed during pulse checks, which revealed no signs of right ventricular strain nor signs of deep vein thrombosis (DVT). After that, she underwent primary percutaneous coronary intervention, which confirmed the diagnosis of right coronary artery dissection. The patient was successfully managed and discharged from the hospital after 18 days. She was independent and in good health after 4 months of follow-up.

Conclusions: A high index of suspicion, familiarity with predisposing factors for SCAD, and PoCUS may play a critical role in detecting and managing SCAD patients.

Keywords: Chest Pain • Dissection • Heart Arrest • Postpartum Period

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/930380

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

Background

Spontaneous coronary artery dissection (SCAD) is a rare cause of acute myocardial infarction [1]. SCAD occurs more frequently among females [1]. In a series of 62 autopsies, the left anterior descending (LAD) artery was predominantly the culprit [1]. In a case series of 21 antepartum patients diagnosed with SCAD, of which more than half were females, the LAD was the culprit artery, more among females, while the right coronary artery (RCA) was the most common culprit among male patients [1]. SCAD is more prevalent in pregnant women and in the postpartum period and they usually have more acute presentations [1,2]. This paper presents a case of a SCAD of the RCA in a female patient during her postpartum period. A review of the literature is also provided.

Case Report

We present a case of a 29-year-old woman who was brought by family members to our Emergency Department (ED) in Riyadh, Saudi Arabia due to loss of consciousness (LOC), where she was found to be in cardiac arrest. According to family members, they witnessed that the patient had a brief episode of chest pain (for seconds) followed immediately with LOC 20 min prior to her arrival to our ED. The patient had an uncomplicated spontaneous vaginal delivery 10 days prior to her presentation and did not have any known medical illness. She did not suffer from any emotional or physical stresses at that time.

Upon presentation there was no pulse and CPR was immediately started according to the advanced cardiac life support (ACLS) protocol. The initial rhythm was ventricular fibrillation (VF). The foremost differential diagnosis at that time was pulmonary embolism (PE). Thus, point-of-care ultrasound (PoCUS) was performed during pulse checks, which revealed no signs of right ventricular strain nor any signs of deep vein thrombosis (DVT). However, sings of retained products of conception was discovered during PoCUS. PE was ruled out as a cause of the arrest based on the initial rhythm and the PoCUS findings. Return of spontaneous circulation (ROSC) was achieved after 11 min of CPR. She was intubated with minimal sedation requirements.

After ROSC, she was hypotensive and required intravenous norepinephrine to maintain good perfusion (4 doses, each dose 16 mg i.v., 0.05 mcg/kg/min). The first electrocardiogram (ECG) did not meet the ST-elevation myocardial infarction (STEMI) diagnostic criteria (**Figure 1**), so the cardiology on-call was involved due to the possibility of SCAD. The patient underwent official echocardiography at the bed side, read by a cardiology imaging consultant, which revealed reduced ejection fraction of 30-35% with septal akinesia. The patient then underwent a CT angiography to rule out PE and a CT of the brain to rule out intracranial pathology, which was negative for PE and intracranial insult. She was then taken to the cardiac catheterization lab.

A primary percutaneous coronary intervention (PPCI) of our patient showed clear RCA dissection, successfully treated with 2

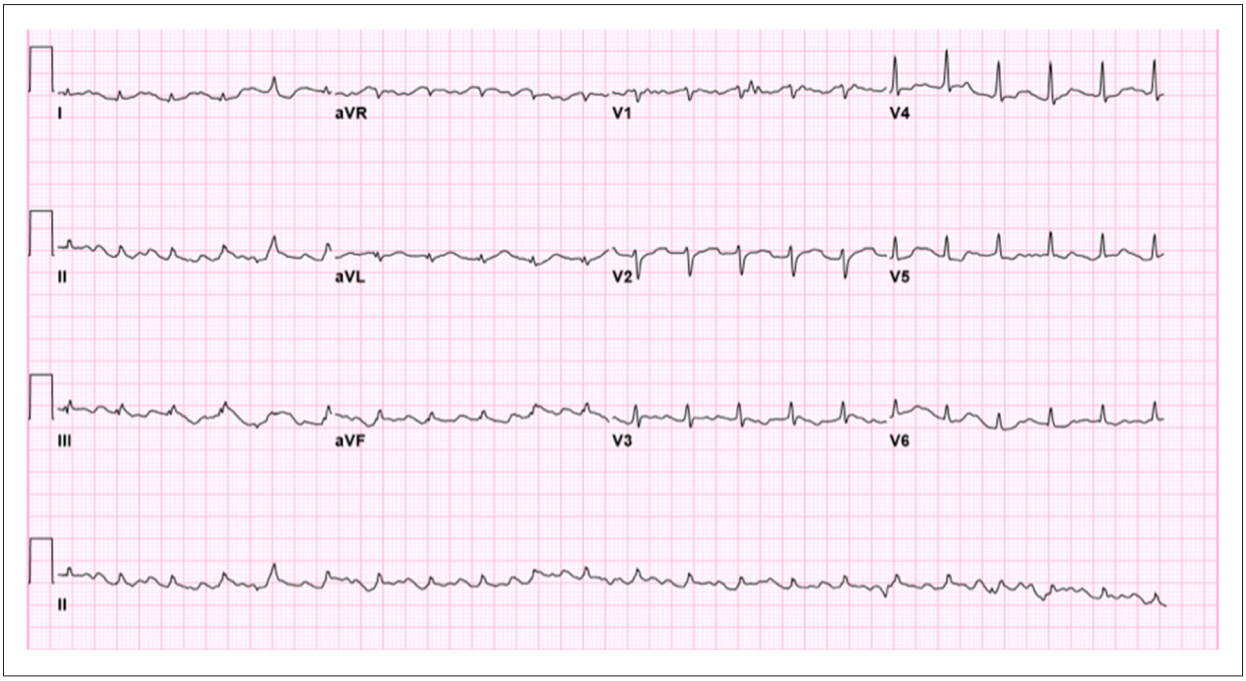

Figure 1. EKG immediately after cardiac arrest showing ST-segment elevation in leads II and III, with ST-segment depression in lead aVL.

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

drug-eluting stents (DES) with good results, and an intravascular ultrasound (IVUS) showed diffuse mild-to-moderate LAD atheroma. She was shifted to the Medical Cardiac Intensive Care Unit (MCICU) on mechanical ventilation and inotropic support. She tested negative for Coronavirus Disease 2019 (COVID-19) and Middle East Respiratory Syndrome (MERS-CoV).

She was successfully extubated on day 3 after admission. On hospital day 5, she developed sudden loss of consciousness secondary to seizure and respiratory arrest, after which she was re-intubated. Brain and chest CT revealed no acute insult. She was started on Levetiracetam 500 mg twice a day for seizure control, which occurred twice during her hospital stay. She was extubated after 3 days of mechanical ventilation. After that, she was downgraded to the medical cardiac ward for continuity of care and discharged home with a good neurological outcome on hospital day 18.

She was discharged on aspirin, clopidogrel, a statin, metoprolol, perindopril, quetiapine, spironolactone, and levetiracetam, and was given instructions for lifestyle modifications. She sustained mild memory loss and behavioral changes along with the aforementioned seizures. She was followed up at 4 months after hospital discharge and found to be independent and in good health.

Discussion

The first case of SCAD was reported in 1931 in a woman aged 42 years and it was called a "dissecting aneurysm of coronary artery" [3]. SCAD is a rare condition, and often requires a high index of suspicion to be detected. Multiple studies in the literature showed that SCAD was the cause of 0.1% to 4% of patients diagnosed with acute coronary syndrome [4-10]. Furthermore, this range was higher in a specific population – women under age 50 years [6,8,11-13]. However, the true incidence of SCAD is still unclear [6]. According to the European Society of Cardiology [14], SCAD has 3 different angiographic types: (1) type 1 has contrast dye staining of the arterial wall with multiple radiolucent lumen; (2) type 2 has non-obstructive coronary arteries (less than 50%), which is long diffuse and smooth narrowing, with obstructive coronary arteries (more than 50%); and (3) type 3 which is focal or tubular stenosis that mimics atherosclerosis. The literature is unclear on the etiology, predisposing factors, and susceptible populations involved. For example, Saw et al reported that almost 20% of SCAD cases were idiopathic [15]. In contrast, another paper from the same author showed that almost all patients had a predisposing arterial disease [16]. Pregnancy and the postpartum period were associated with many SCAD cases [2,6,12,17]. An analysis of 120 pregnancy-associated SCAD cases over 15 years showed that pregnancy-associated SCAD is associated with a high incidence of reduced ejection fraction and life-threating maternal and fetal complications [18]. Recent papers found that most SCAD patients were not pregnant or in the postpartum period [15,19]. Young women generally have a low risk of coronary artery diseases, but pregnancy is associated with a 3 times higher risk of acute myocardial infarction compared to non-pregnant women [20,21]. In addition, fibromuscular dysplasia (FMD) was also linked to SCAD in multiple reports [19,22,23]. This was not the case according to a recently published local registry in our area, the Arab Gulf countries SCAD registry (G-SCAD registry), which showed that not a single patient reported a history of FMD or inflammatory diseases [12]. There is limited literature on the etiology of SCAD and its natural history, especially in our area, the Middle East. The American Heart Association published a scientific statement on SCAD and concluded it with "Despite increased recognition of the condition by the medical community and patients, large gaps in knowledge must be addressed to provide the best outcomes" [6]. Survivors from SCAD are prohibited from getting pregnant due to the high risk of recurrence [24]. However, a recent update about pregnancy after SCAD concluded that "there is insufficient data to challenge the traditional assumption that subsequent pregnancy should be avoided" [24]. Due to the rarity of the disease, many controversies exist about SCAD management. Conservative management was reported in the literature with an average period of 35 days from the event to full angiographic healing [25]. However, PPCI was required in many reports [25]. Coronary artery bypass grafting was the initial treatment in some cases [26]. A patient-specific treatment for SCAD seems to be an acceptable management strategy.

The patient in this case had no risk factors for SCAD other than being in the postpartum period. She had only a very short period of chest pain and went into cardiac arrest with a downtime of about 20 min before arriving to the hospital. ROSC was achieved after 11 min of CPR according to ACLS protocol. Cath lab was activated after ROSC based on clinical suspicion of SCAD, and PPCI was required, which showed a clear RCA dissection. Our patient was treated with a drug-eluting stent (DES) placed in the RCA by interventional cardiology. The patient had 2 episodes of seizure in the hospital, with mild psychological impact. Other than that, she returned back to her normal life and lives independently.

In our case, the location of the SCAD was in an unseal location (the RCA). A high index of suspicion along with knowledge about the predisposing factors of SCAD will help emergency physicians recognize and detect SCAD in a timely manner to ensure adequate and early treatment for those patients, which would positively affect outcomes. Any patient presenting in cardiac arrest with a history of chest pain and an unclear cause of arrest should have SCAD ruled out, even when

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

no clear ischemic changes are present in the ECG. Bedside echocardiography during pulse check or after ROSC can help in ruling out other potential causes of arrest, including massive PE, aortic dissection, and dilated cardiomyopathy. Early defibrillation and high-quality CPR are key for survival with good neurological outcome.

Conclusions

High index of suspicion, familiarity with predisposing factors for SCAD, and PoCUS may play a critical role in detecting and managing SCAD patients who present in cardiac arrest. SCAD is more frequent among pregnant women in their third trimester and in the postpartum period, as was the patient presented in this paper.

References:

1. DeMaio SJ, Kinsella SH, Silverman ME. Clinical course and long-term prognosis of spontaneous coronary artery dissection. Am J Cardiol. 1989;64:471-74
2. Tweet MS, Hayes SN, Codsi E, et al. Spontaneous coronary artery dissection associated with pregnancy. J Am Coll Cardiol. 2017;70:426-35
3. Pretty, HC. Dissecting aneurysm of coronary artery in a woman aged 42: Rupture. BMJ. 1931;1:667
4. Mortensen KH, Thuesen L, Kristensen IB, Christiansen EH. Spontaneous coronary artery dissection: A western Denmark heart registry study. Catheter Cardiovasc Interv. 2009;74:710-17
5. Nishiguchi T, Tanaka A, Ozaki Y, et al. Prevalence of spontaneous coronary artery dissection in patients with acute coronary syndrome. Eur Hear J Acute Cardiovasc Care. 2016;5:263-70
6. Hayes SN, Kim CESH, Saw J, et al. Spontaneous coronary artery dissection: Current state of the science: A scientific statement from the American Heart Association. Circulation. 2018;137:e523-57
7. Lobo AS, Cantu SM, Sharkey SW, et al. Revascularization in patients with spontaneous coronary artery dissection and ST-segment elevation myocardial infarction. J Am Coll Cardiol. 2019;74:1290-300
8. Motreff P, Malcles G, Combaret N, et al. How and when to suspect spontaneous coronary artery dissection: Novel insights from a single-centre series on prevalence and angiographic appearance. EuroIntervention. 2017;12:e2236-43
9. El Hussein MT, Blayney S. Spontaneous coronary artery dissection: A comprehensive overview. J Emerg Nurs. 2020;46:701-10
10. McAlister CP, Yi M, Adamson PD, et al. Trends in the detection, management and 30-day outcomes of spontaneous coronary artery dissection: A six-year, New Zealand Centre Experience. Hear Lung Circ. 2020;6:78-85
11. Nakashima T, Noguchi T, Haruta S, et al. Prognostic impact of spontaneous coronary artery dissection in young female patients with acute myocardial infarction: A report from the Angina Pectoris-Myocardial Infarction Multicenter Investigators in Japan. Int J Cardiol. 2016;207:341-48
12. Daoulah A, Al-Faifi SM, Alhamid S, et al. Spontaneous coronary artery dissection in the gulf: G-SCAD registry. Angiology. 2021;72(1):32-43
13. Saw J, Aymong E, Mancini GBJ, et al. Nonatherosclerotic coronary artery disease in young women. Can J Cardiol. 2014;30:814-19
14. Pustjens TFS, Appelman Y, Damman P, et al. Guidelines for the management of myocardial infarction/injury with non-obstructive coronary arteries (MINOCA): A position paper from the Dutch ACS working group. Netherlands Heart J. 2020;28:116-30
15. Saw J, Aymong E, Sedlak T, et al. Spontaneous coronary artery dissection association with predisposing arteriopathies and precipitating stressors and cardiovascular outcomes. Circ Cardiovasc Interv. 2014;7: 645-55
16. Saw J, Ricci D, Starovoytov A, Fox R, Buller CE. Spontaneous coronary artery dissection: Prevalence of predisposing conditions including fibromuscular dysplasia in a tertiary center cohort. JACC Cardiovasc Interv. 2013;6:44-52
17. Sheikh A, O'Sullivan M. Pregnancy-related spontaneous coronary artery dissection: Two case reports and a comprehensive review of literature. Hear Views 2012;13:53
18. Havakuk O, Goland S, Mehra A, Elkayam U. Pregnancy and the risk of spontaneous coronary artery dissection: An analysis of 120 contemporary cases. Circ Cardiovasc Interv. 2017;10(3):e004941
19. Tweet MS, Eleid MF, Best PJM, et al. Spontaneous coronary artery dissection: Revascularization versus conservative therapy. Circ Cardiovasc Interv. 2014;7:777-86
20. Elkayam U, Jalnapurkar S, Barakkat MN, et al. Pregnancy-associated acute myocardial infarction: A review of contemporary experience in 150 cases between 2006 and 2011. Circulation. 2014;129:1695-702
21. Berg CJ, Callaghan WM, Syverson C, Henderson Z. Pregnancy-related mortality in the United States, 1998 to 2005. Obstet Gynecol. 2010;116:1302-9
22. Makino Y, Inokuchi G, Yokota H, et al. Sudden death due to coronary artery dissection associated with fibromuscular dysplasia revealed by postmortem selective computed tomography coronary angiography: A case report. Forensic Sci Int. 2015;253:e10-15
23. Lie JT, Berg KK. Isolated fibromuscular dysplasia of the coronary arteries with spontaneous dissection and myocardial infarction. Hum Pathol. 1987;18:654-56
24. Davis E, Wood MJ. Pregnancy after spontaneous coronary artery dissection (SCAD): A 2020 update. Curr Treat Options Cardiovasc Med. 2020;22:56
25. Lorenzoni G, Merella P, Bandino S, et al. Conservative management of spontaneous coronary artery dissection. J Invasive Cardiol. 2020;32:E249
26. Lettieri C, Zavalloni D, Rossini R, et al. Management and long-term prognosis of spontaneous coronary artery dissection. Am J Cardiol. 2015;116:66-73

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]