Postpartum spontaneous coronary artery dissection: A rare occurrence

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ABSTRACT

Introduction: Postpartum spontaneous coronary artery dissection is a rare but well described presentation of acute coronary syndrome. Acute phase mortality is 5–10%. The majority of dissections occur within two weeks postpartum. Risk factors include advanced age, multiparity, hormonal changes, activities that increase coronary shear stress and hemodynamic factors such as hypertension, cocaine use and weight lifting. Dissections typically involve proximal segment of coronary arteries. Angiographic studies confirm etiology of postpartum MI to be: dissection 35%, stenosis 30%, thrombus 15%, spasm <5%, and 10% with normal coronaries. Case Report: A 30-year-old female, 10 days postpartum presented with recurrent oppressive retro-sternal chest pain, radiating to left arm and back, with orthopnea and vomiting. She reported lifting weights the day prior to admission. Apart from elevated blood pressure, physical examination was otherwise unremarkable. Diagnosis of spontaneous coronary artery dissection was confirmed through laboratory and radiographic testing which showed elevated cardiac enzymes and both an abnormal echocardiogram and angiogram, respectively. Patient was managed medically due to difficult anatomy for percutaneous coronary intervention. Conclusion: SCAD is a rare life threatening condition that affects predominantly young, healthy women, particularly during pregnancy or postpartum period. The pathogenesis is still unclear. The mechanism, however, is increased shear stress in the coronaries by severe systolic hypertension, cocaine use, activities such as snow shoveling, weight lifting. Contributing factors in our young patient with dissection causing acute MI may have resulted from: lifting weights a day earlier, underlying CAD, parity and typical age/time frame for postpartum dissection.

Keywords: Spontaneous coronary artery dissection, Postpartum, SCAD

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INTRODUCTION

Spontaneous coronary artery dissection (SCAD) is a rare cause of acute coronary syndrome or sudden cardiac death (Figure 1). The etiology is unclear. The first case of SCAD was reported in 1931 [1]. Since then,
more than 300 cases have been documented [2]. The mean age of onset is 30–45 years. More than 70% of SCAD cases are women (Figure 2), 30% occurs during the peripartum period [2, 3]. One-third of all SCAD cases in women occur in this period, one-third occur in late pregnancy and two thirds in the early postpartum period. [4, 5]. The peak incidence is at the first two weeks after delivery. Identified risks factors include advanced age and multiparity [6].

The left anterior descending artery is involved in 78% cases, the left main artery in 24% and multi-vessel dissection occurs in 40% [2]. Spontaneous coronary artery dissection (SCAD) can be divided into the following four subgroups [3]: (i) Underlying atherosclerosis is common in men with a mean age of 55 years; the mechanism of dissection is plaque rupture and intimal disruption that allows dissection to occur. RCA is involved in the majority of cases. (ii) The second group includes arthritis or connective tissue disorders, where integrity of the arterial wall is compromised by inflammation of defective structural proteins like vasculitis, SLE, sarcoidosis, Marfan’s syndrome, Ehlers-Danlos syndrome, etc. (iii) The third group includes peripartum or hyperestrogenism states like oral contraceptives and hepatic cirrhosis. The mean age in this group is 33 years and dissection is most common within two weeks postpartum. Eighty-seven percent of peripartum coronary dissection involve the left coronary tree and in 40% cases multiple coronaries are involved. (iv) In the idiopathic SCAD the average age of presentation is 41 years; three fourths of patient are premenopausal women with no cardiac risk factors. The mechanism is increased shear stress in the coronaries by severe systolic hypertension, cocaine use, activities such as snow shoveling, weight lifting, etc [3].

CASE REPORT

A 30-year-old African–American female at 10 days postpartum, presented with recurrent oppressive retrosternal chest pain, radiating to the left arm and back, associated with shortness of breath, nausea and vomiting. Patient reported 20 lb weight lifting the day prior to admission after a long period of no exercise. Review of systems was positive for sore throat without additional respiratory symptoms. Her past medical history was unremarkable with no underlying hypertension, diabetes or hypercholesterolemia. Obstetric history was relevant for G3P3 with uncomplicated vaginal delivery and normal prenatal care. She never smoked, used drugs or alcohol. Medications included iron and ibuprofen. Her family history was negative for coronary artery disease (CAD). On ED arrival patient was hypertensive; vitals were: blood pressure 164/104 mmHg, pulse 65/min, temperature 98.2°F and weight 87.7 kg. Cardiovascular examination was normal with no murmurs, jugular vein distention, gallop or carotid bruits. Lungs and chest X-ray were unremarkable. Routine laboratory investigations were within normal limits, including BNP which was 59 pg/mL. Toxicology was also negative. Pulmonary embolism was excluded by chest CT scan. Initial set of cardiac enzymes were elevated, with troponin of 0.181 ng/mL which later peaked to 58.9 ng/mL (CK-MB Index 5.8% with peak CK of 2086 U/L). Electrocardiogram showed low atrial rhythm and minor ST/T changes. Echocardiogram showed mild MR, trace of PI, LV EF of 35%, mid anterior septum inferior and apical hypokinesia. Angiography revealed a mid-left anterior descending (LAD) artery dissection extending into large second diagonal (D2) artery and distal LAD as well as 85% lesion of the first diagonal and 70% lesion of the proximal marginal artery with diffuse disease and preserved flow with severe distal left circumflex artery stenosis (Figure 3). During angiography patient developed ventricular fibrillation requiring direct
current cardioversion with lidocaine and amiodarone. Due to severe CAD and distal dissection she was not considered a candidate for percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG) hence was managed medically with aspirin 81 mg daily, clopidogrel 75 mg daily, metoprolol 50 mg two times per day, lisinopril 10 mg daily and rosvastatin 20 mg daily.

DISCUSSION

Spontaneous coronary artery dissection is a rare life threatening condition that affects predominantly young, healthy women, particularly during pregnancy or postpartum period. Mortality rate is about 3% (0–4%) [2] in the acute phase with 95% 2-year survival rate [5]. The overall mortality is of the peripartum group is 38% [2]. Multivariate analysis of 222 patients showed that the strongest predictors of death included female sex (odds ratio (OR) 4.27) and delayed treatment (OR 35.5) [5]. Causes include mechanical factors like coronary artery bypass or post angioplasty, trauma or extension of aortic dissection. Some other factors as given in Figure 4 are also implicated in the pathogenesis. The pathogenesis in the peripartum period is still unclear. A hypothesis proposed to explain the occurrence of spontaneous coronary artery dissection in pregnancy states that hemodynamic factors together within arterial wall smooth muscle cell proliferation, impaired collagen synthesis and alterations in the protein and acid mucopolysaccharide content of the tunica media, oxidative stress secondary to delivery, a lytic action of proteases released from eosinophils and hyperestrogenism altering the normal arterial wall architecture may be responsible for increased susceptibility. SCAD results from vessel wall hematoma formation creating a false lumen of the tunica media or between the media and the adventitia [6, 7]. The clinical recognition of SCAD is more evident after advent of coronary angiography. Intra-venous ultrasonography can diagnose SCAD, especially those that are angiographically inapparent [2]. Coronary artery dissection is noted in approximately 0.2% of coronary angiographies performed and in up to 3.5% of coronary angiographies with intravascular ultrasonography for acute coronary syndromes. [6]. Dissection typically involves the proximal segment of the coronary artery. Angiography may reveal an intimal flap, but if there is no visible flow into the false lumen or if the dissection develops as a consequence of an intramural hematoma, angiography may reveal only a simulated coronary stenosis due to compression of the true lumen [2]. Treatment options for SCAD include medical therapy with anti-platelet agents and anticoagulants. The decision to manage the patient conservatively with medication or to perform percutaneous coronary intervention (PCI), or coronary artery bypass graft surgery (CABG) must be individualized. Multi-vessel involvement, or failed PCI procedures are treated by CABG. In cases of spontaneous dissections involving a long coronary artery segment, CABG can be very challenging. Reperfusion therapy is mandated if the patient has ongoing symptoms of myocardial ischemia [6]. Our case fits the classic presentation of a patient with postpartum coronary artery dissection including age, parity, postpartum timing and possible contribution to the condition by weight lifting. The additional interesting aspect of this case is that patient not only had postpartum SCAD but also was found to have underlying CAD which is rare in this age group especially with no identifiable risk factors.

CONCLUSION

High index of suspicion is required when a patient presents with chest pain in the postpartum period to
identify and manage SCAD. Angiography with intravascular ultrasound is the most accurate method for diagnosis and a prompt diagnosis diminishes long- and short-term mortality. Treatment includes medical-management, angioplasty/stenting and CABG; and it should be individualized.

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Author Contributions
Juan Roa Mendez – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Jenny Gerner – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published
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Guarantor
The corresponding author is the guarantor of submission.

Conflict of Interest
Authors declare no conflict of interest.

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REFERENCES
