CASE REPORT

Spontaneous coronary artery dissection causing acute coronary syndrome in a young patient without risk factors

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Spontaneous coronary artery dissection (SCAD) is a rare cause of acute myocardial infarction that is more common in younger patients (under age 50) and in women. Although the etiology is not known, some predisposing conditions to SCAD are well known and include Marfan syndrome, pregnancy and peripartum state, drug abuse, and some anatomical abnormalities of the coronary arteries such as aneurysms and severe kinking. We describe a case of SCAD in a young woman who presented with sudden onset of chest pain and was admitted for the treatment of acute coronary syndrome. The coronary angiography showed dissection of the left anterior descending artery. The patient underwent successful percutaneous transluminal coronary angioplasty and stent placement.

Keywords: SCAD; dissection; fibromuscular dysplasia; acute coronary syndrome

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A 37-year-old Latino female presented with mid-sternal and left-sided chest pain that started 2 days prior to admission. She described the pain as pressure-like, 9–10 in intensity, intermittent, radiating to back, relieved by rest, not associated with exertion or food intake. The pain was associated with shortness of breath, palpitation, and light headedness. She denied any history of recent travelling or use of birth control pills. Her past medical history was significant for depression diagnosed 2 years ago for which she was taking citalopram, buspirone, and trazodone. She had regular monthly periods and denied any recent pregnancy (G1P1A0). Her last pregnancy was 5 years ago, and it was uneventful. There was no family history of early or sudden cardiac death. She denied any illicit drug use, herbal medications, or other over-the-counter medicines.

On examination her blood pressure was 125/80 mm Hg and equal in both arms, pulse rate was 78 per minute, and oxygen saturation was 98%. The physical examination did not reveal any abnormalities. The urine drug screen test was negative, and urine beta hCG was negative as well. The electrocardiogram (ECG) revealed Q waves and J-point elevation in lead II, III, aVF, V4–V6 (Fig. 1).

The cardiac troponin I was 0.06 (units)(normal range < 0.04). The patient was admitted to coronary care unit and was treated with sublingual nitroglycerin, aspirin, clopidogrel, simvastatin, unfractioned heparin, and eptifibatide for acute coronary syndrome (ACS). The transthoracic echocardiogram report showed normal left ventricular systolic function with probable apical hypokinesia and abnormal left ventricular diastolic function. The serial cardiac troponins increased to 4.75 and peaked at 9.02 (units).

Based on the above findings coronary angiography was performed which showed distal spiral dissection of the left anterior descending (LAD) artery with 80% stenosis. The left main, right coronary, and left circumflex arteries were patent (Fig. 2).

The patient underwent successful percutaneous transluminal coronary angioplasty and stent placement using a Bare Metal stent covering the proximal portion of the dissection with excellent TIMI 3 flow and resolution of the dissection post procedure. True lumen confirmation was done by injecting through the over-the-wire balloon. Further workup including erythrocyte sedimentation rate, C-reactive protein level, complement level, anti-nuclear
antibody test, and rheumatoid factor level were found to be normal. During follow-up, our patient continued to remain asymptomatic.

Discussion
Spontaneous coronary artery dissection (SCAD) is an extremely rare cause of ACS. It has been known for years that SCAD mainly affects young females during their peripartum (1, 2), although there have been a few case reports of SCAD in postmenopausal women above age 60 (3). Apart from pregnancy there have been other conditions associated with SCAD that include autoimmune vasculitis, Marfan's syndrome, Ehler-Danlos syndrome, intense physical activity, oral contraceptives, cocaine use, and fibromuscular dysplasia (4). Because of the widespread use of coronary angiography and percutaneous coronary intervention (PCI) in ACS, the diagnosis of SCAD is becoming more frequent.

The underlying mechanism of SCAD mainly includes weakness of a vessel wall, which can be due to inflammation, rupture of atherosclerotic plaques, hormonal variation associated with pregnant states, or eosinophilic infiltrates of arterial wall (3).

The clinical presentation of SCAD is dependent on the location and severity of coronary vessel involvement. It can present as non-ST-elevation myocardial infarction, as it did in our patient, but can present as unstable angina, ST-elevation myocardial infarction, or even sudden cardiac death (5).

The most common modality of diagnosing SCAD is coronary angiography. It typically shows an intimal flap that separates the true and false lumen. However, the disease process may include the formation of hematoma deeper in the vessel wall between the media and adventitial layers, which can be seen in the absence of dissection (6). In these circumstances, intravascular ultrasound or multidetector computed tomography can be useful (7, 8).

Because of the absence of established guidelines, the optimal treatment strategy remains undetermined, and it is based on the clinical presentation, amount of involved myocardium, and extent of dissection (9).

The therapeutic options include conservative strategy, fibrinolysis, PCI, and coronary artery bypass grafting (6).

Fig. 1. 12-lead ECG showing Q waves in lead II, III, aVF, V4–V6.

Fig. 2. Spontaneous dissection of the midportion of LAD.
The conservative approach is supported by most of the data especially in patients with normal coronary artery flow. Fibrinolysis can precipitate increased flow in false lumen and propagate the dissection, and thus should be avoided (3, 5, 10). PCI is helpful when patients have ongoing ischemia or infarction, although increased incidence of complications is associated with PCI that includes propagation of dissection through passage of wire into the false lumen and intramural hematoma displacement by stent placement (6). The use of intravascular ultrasound and optical coherence tomography can minimize these complications as it provides precise localization of dissection (11, 12).

The recurrence rate of SCAD in one large study was 17%, and it occurred only in female patients in whom fibromuscular dysplasia was noticed. It usually have alternating dilatation and constriction of the vessel (string of beads appearance) and areas of dilatation are larger than the normal caliber of the artery on coronary angiography. The long-term survival in patients with SCAD appears quite high, regardless of the treatment modalities used.

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References

1. Schnitker MA, Bayer CA. Dissecting aneurysm in young individuals, particularly in association with pregnancy. Ann Intern Med 1944; 20: 486.
2. James AH, Jamison MG, Biswas MS, Brancazio LR, Swamy GK, Myers ER. Acute myocardial infarction in pregnancy: A United States population-based study. Circulation 2006; 113: 1564–71.
3. Mujtaba S, Srinivas VS, Taub CC. Spontaneous coronary artery dissection causing acute myocardial infarction in a 62-year-old postmenopausal woman without co-morbidities: A case report. J Med Case Rep 2012; 6: 430.
4. Biswas M, Sethi A, Vyce SJ. Spontaneous coronary artery dissection: Case report and review of literature. Heart Views 2012; 13(4): 149–54.
5. Sabatine MS, Jaffer FA, Staats PN, Stone JR. Case records of the Massachusetts General Hospital. Case 28–2010. A 32-year-old woman, 3 weeks post partum, with subternal chest pain. N Engl J Med 2010; 363(12): 1164–73.
6. Tweet MS, Hayes SN, Pitta SR, Simari RD, Lerman A, Lennon RJ, et al. Clinical features, management, and prognosis of spontaneous coronary artery dissection. Circulation 2012; 126: 579–88.
7. Zheng M, Li J, Xu J, Chen K, Zhao B, Huan Y. Spontaneous dissection of left anterior descending coronary artery: The diagnostic role of dual-source computed tomography. J Thorac Imaging 2010; 25: W79–81.
8. Manghat NE, Morgan-Hughes GJ, Roobottom CA. Spontaneous coronary artery dissection appearance and follow up on multi-detector row CT coronary angiography. Clin Radiol 2005; 60: 1120–5.
9. Fontanelle A, Olivari Z, La Vecchia L, Basso C, Pagliani L, Marzocchi A, et al. Spontaneous dissections of coronary arteries and acute coronary syndromes: Rationale and design of the DISCOVER Y, a multicenter prospective registry with a case-control group. J Cardiovasc Med (Hagerstown) 2009; 10: 94–9.
10. Buys EM, Suttorp MJ, Morshuis WJ, Plokker HW. Extension of a spontaneous coronary artery dissection due to thrombolytic therapy. Cathet Cardiovasc Diagn 1994; 33: 157–60.
11. Deftereos S, Giannopoulos G, Mavrogianni A, Sykioti A, Pyrgakis V, Bobotis G. Role of grey-scale intravascular ultrasound and ChromaFlo in deciding on treatment approach for spontaneous coronary dissection in a young woman. Hellenic J Cardiol. 2011; 52: 364–6.
12. Lim C, Banning A, Channon K. Optical coherence tomography in the diagnosis and treatment of spontaneous coronary artery dissection. J Invasive Cardiol 2010; 22: 559–60.