University Journal of Medicine and Medical Specialities

ISSN 2455- 2852 2021, Vol. 7(3)

Spontaneous coronary artery dissection involving all three coronaries in a young male

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Abstract

Spontaneous coronary artery dissection is a rare cause of acute coronary syndrome. Its non-acute presentation with dyspnoea on exertion as the sole symptom has not been reported in the literature. We present a case of a middle aged gentleman, presented with spontaneous coronary artery dissection involving all the coronary arteries and with dyspnoea as the only symptom.

Case History

A 39-year-old gentleman, smoker with no co-morbid conditions or significant family history, presented to the department of Cardiology, with NYHA class II exertional dyspnoea for 3 months. Clinical examination was normal. Electrocardiogram revealed normal sinus rhythm. Echocardiography revealed normal left ventricular function with no regional wall motion abnormality. Exercise stress test showed inducible ischemia at 4.2 METs.

Coronary angiography revealed normal left main coronary artery and spontaneous spiral dissection involving all three coronary arteries. In the left anterior descending (LAD) artery, the dissection was seen from proximal to early mid segment and also involved proximal diagonal artery (Figure 1). The non dominant proximal left circumflex (LCx) coronary artery and its first obtuse marginal branch was also involved with a long segment spontaneous dissection (Figure 2). The dominant right coronary artery (RCA) had a CTO in the mid segment, but the proximal RCA had a long segment spontaneous dissection (Figure 3). The distal RCA and its posterior descending branch were filling by left to right collaterals. With symptomatic spontaneous dissection involving all three coronaries and a chronically occluded right coronary artery, he was advised to undergo coronary artery bypass grafting.

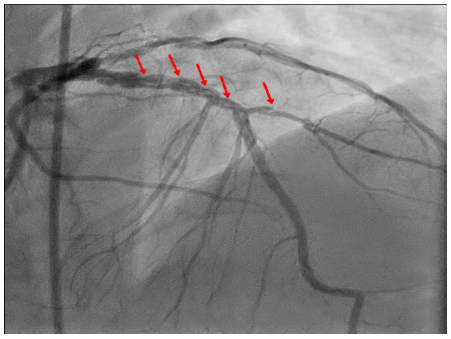

Figure 1: Left coronary angiography in RAO (right anterior oblique) cranial view showing spiral dissection (red arrows) involving proximal and early mid LAD, also extending into the first diagonal branch

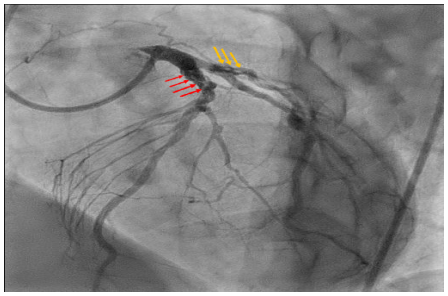

Figure 2: Left coronary angiography in LAO (left anterior oblique) cranial view showing spiral dissection involving LAD (red arrows) and proximal part of LCx with its first obtuse marginal branch (yellow arrows)

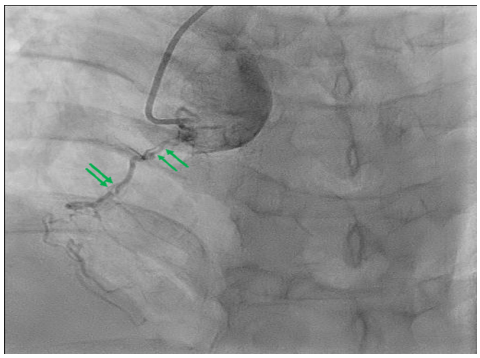

Figure 3: Right coronary angiography in LAO view showing spontaneous spiral dissection of proximal RCA (green arrows). RCA is occluded in the mid part and bridging collaterals are noted around occlusion

Discussion

Spontaneous coronary artery dissection (SCAD) is a rare cause of myocardial infarction and sudden cardiac death (SCD).[1] It is reported most often in women between the ages of 35 to 46 years, in the postpartum period. Although less commonly, it has also been reported in atherosclerotic coronary artery disease and collagen vascular disease.[1] Maeder et al reported an incidence of 0.1% among patients referred for coronary angiography[2]. LAD is the vessel most often involved among women whereas RCA involvement is commonly seen in men.[3] Single coronary artery involvement is seen in 81% of cases and involvement of all three coronary arteries is rare.[4,5] Acute coronary syndromes are the commonest presentations of SCAD[6], while exertional angina[7] and SCD[1] have also been reported occasionally as the initial presentation. The most common association in women was postpartum status whereas extreme physical activity was the principal precipitant in men. Fibromuscular dysplasia is commonly associated with SCAD and is thought to be a potential causative factor.[8]

SCAD is thought to be due to non-traumatic and non-iatrogenic separation of the coronary arterial walls, creating a false lumen.[9] Two proposed mechanism to explain formation of false lumen include – (a) an intimal tear resulting in blood being pushed through the space between intima and media and thus creating a false lumen filled with blood and (b) rupture of vasa vasorum resulting in the formation of intramural hematoma and a pressurised false lumen. Compression of the true lumen by this pressurised false lumen leads to myocardial ischemia and even infarction.[9]

Although coronary angiography was considered as gold standard for diagnosis, recent studies show that relying only on coronary angiography may lead to significant under diagnosis of SCAD.[10] Three distinct angiographic appearances and patterns exists for SCAD. Type 1 is characterised by contrast dye staining of arterial wall with multiple radiolucent lumens. This is the pathognomonic angiographic appearance.

Type 2 is characterised by diffuse (>20mm) stenosis of varying severity and type 3 mimics atherosclerotic coronary artery disease.[10] Diagnosis of type 2 and type 3 SCAD needs additional intracoronary imaging. Intracoronary imaging like intravascular ultrasound (IVUS) and optical coherence tomography (OCT) will allow better visualisation of arterial wall and hence will complement coronary angiography in diagnosis of all types of SCAD.[10] Intracoronary imaging helps in differentiating SCAD from an organised thrombus, which is a great angiographic mimicker of SCAD.[11]

Treatment of spontaneous coronary artery dissection is challenging. Although percutaneous coronary intervention (PCI) has a potential critical role in the management of acute symptomatic SCAD, it should be undertaken judiciously, especially given the high procedure related complication rates.[8] Given the relatively good prognosis with initial conservative management, PCI would probably be necessary only in patients with ongoing ischemia or infarction. A minimalist strategy may thus be beneficial. Stent placement has been reported often to result in propagation of hematoma and hence to be considered after careful consideration of risk versus benefit. Moreover IVUS or OCT guidance of the interventional strategy may be crucial. Fibrin specific thrombolytic drug therapy in case of ST elevation myocardial infarction due to SCAD has also been reported to lead to propagation of intramural hematoma.[6,12] Especially in stable patients with normal flow in the affected coronary artery, a conservative approach is very rewarding option. However, in case of symptomatic multi-vessel or left main coronary arterial involvement surgical revascularisation is preferred.[2,6,13]

Our patient had angiographic features suggestive of type 1 SCAD involving all three coronaries. Given the extensive involvement, he was advised to undergo coronary artery bypass surgery.

Learning points

A young male with no evidence of vasculopathy, presenting with symptoms of exertional dyspnoea and spontaneous dissection of all three coronaries is altogether an unusual clinical profile for spontaneous coronary artery dissection.

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