Double Trouble - Spontaneous Coronary Artery Dissection of the Left Anterior Descending and Posterior Descending Arteries in a Right Dominant Circuit: A Case Report

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HPI and PMHx

- 53 y.o. female
- Outside hospital: 1 day of non-radiating, substernal chest pain rated as 7/10 in intensity, no alleviating or aggravating factors
- Associated with shortness of breath and palpitations
- Upon most recent presentation: Improving mild chest pain, hemodynamically stable. temperature of 36.3 °C, heart rate of 86 beats per minute, oxygen saturation of 96% on room air, blood pressure of 149/73 mm Hg, and respiratory rate of 18 breaths per minute

- Past medical history of hyperlipidemia, hypertension, and carotid stenosis
- Home medications included Aspirin 81 mg and Atorvastatin 40 mg daily

Physical Exam

- Lungs clear to auscultation bilaterally
- Heart had regular and rhythm without murmurs, rubs, or gallops
- Extremities were warm, dry, and with no signs of swelling or pitting edema
- 2+ radial and dorsalis pedis pulses bilaterally

What Investigations would you like to do?

Labs?

Imaging?

Differential Diagnosis?

Cardiovascular	Pulmonary	GI	MSK	Miscellaneous
Pericardium Pericarditis Myocardium Myocarditis Heart failure exacerbation Hypertrophic cardiomyopathy Takotsubo cardiomyopathy Valves Aortic stenosis Conduction system Tachyarrhythmias Vessels Acute coronary syndrome Aortic dissection Hypertensive emergency	Pleura Pleuritis (a.k.a. pleurisy) Pneumothorax Airways Asthma exacerbation Alveoli Pneumonia Vessels Pulmonary embolism Pulmonary hypertension Lung cancer	Esophagus GERD Esophagitis Esophageal spasm Stomach Gastritis Peptic ulcer disease	Rib fractures Costochondritis	Severe anemia Herpes zoster (a.k.a. shingles) Acute intoxication with cocaine or amphetamines Acute chest syndrome in sickle cell anemia Psychiatric Panic attack Somatization

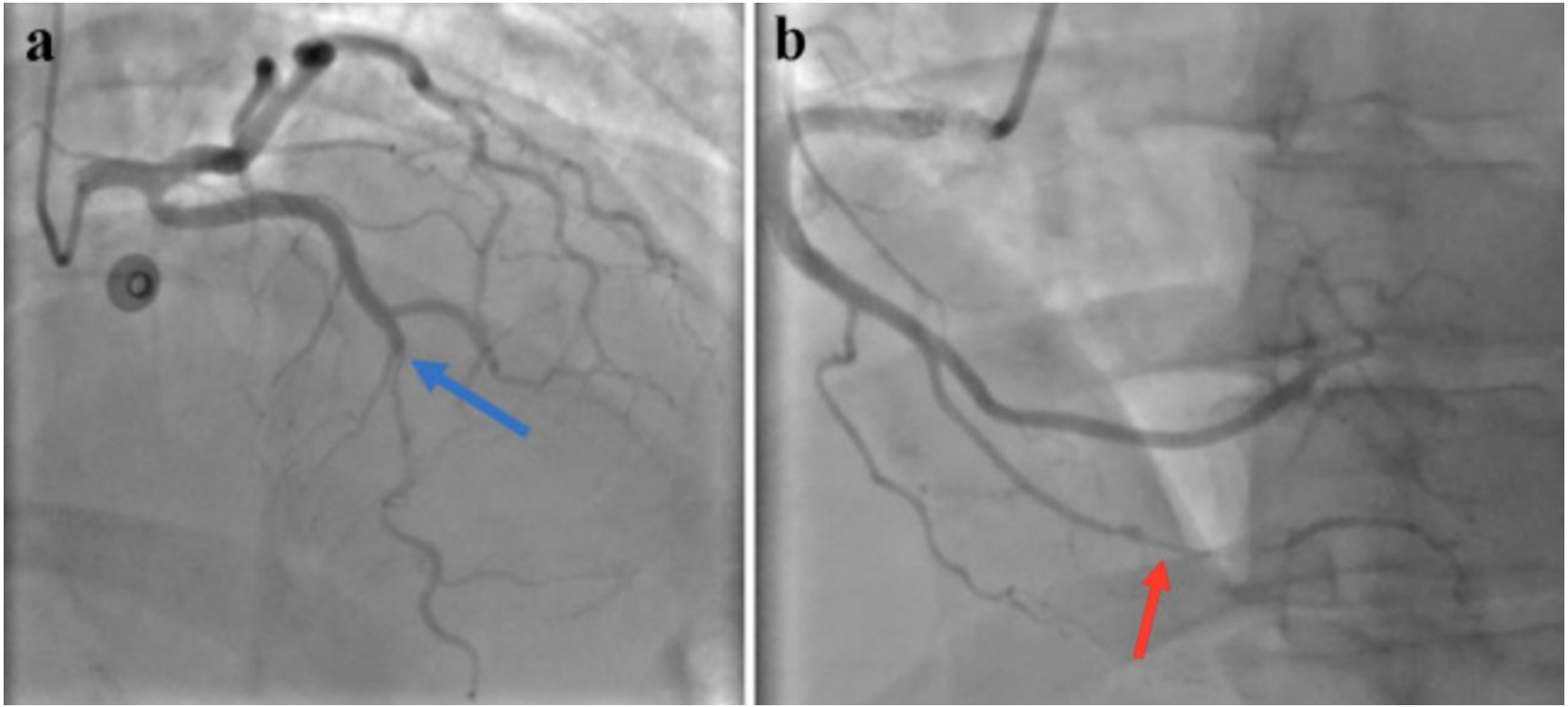
Investigations

- CBC within normal limits
- CMP significant for a potassium of 3.4 mmol/L (reference 3.5 - 5.0 mmol/L)
- Troponins: 0.45 ng/mL and peaked at 4.96 ng/mL (reference range < 0.04 ng/mL) 2 h later

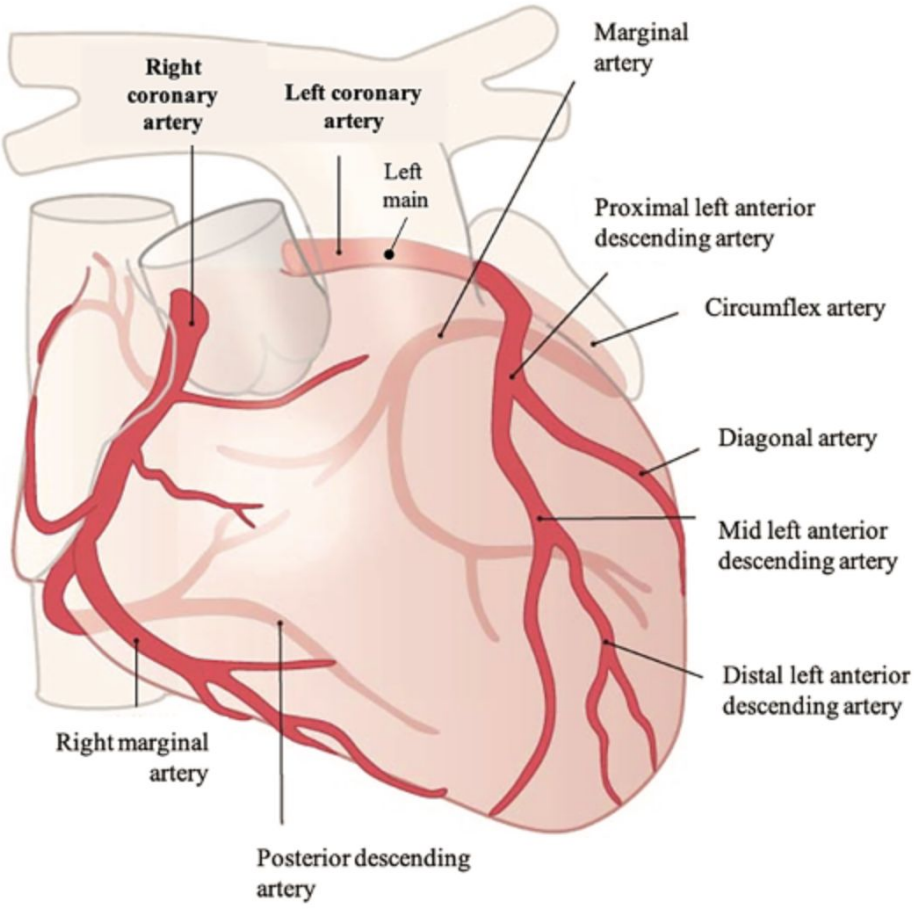
- 12-lead electrocardiogram: sinus rhythm with frequency ectopic beats, no signs of acute ischemia
- TTE: ejection fraction of 26-30% without significant valvular disease

Heart Catheterization

- Left: Right dominant circulation with two vessels that demonstrated stenosis
- LAD, severe diffuse stenosis in the mid vessel that improved distally, the remainder of the LAD appeared narrow and irregular
- Right: gave rise to a small caliber posterior descending artery with severe stenosis and TIMI III flow distally
- The coronary arteries were not engaged given the suspicious morphology for SCAD


a
b

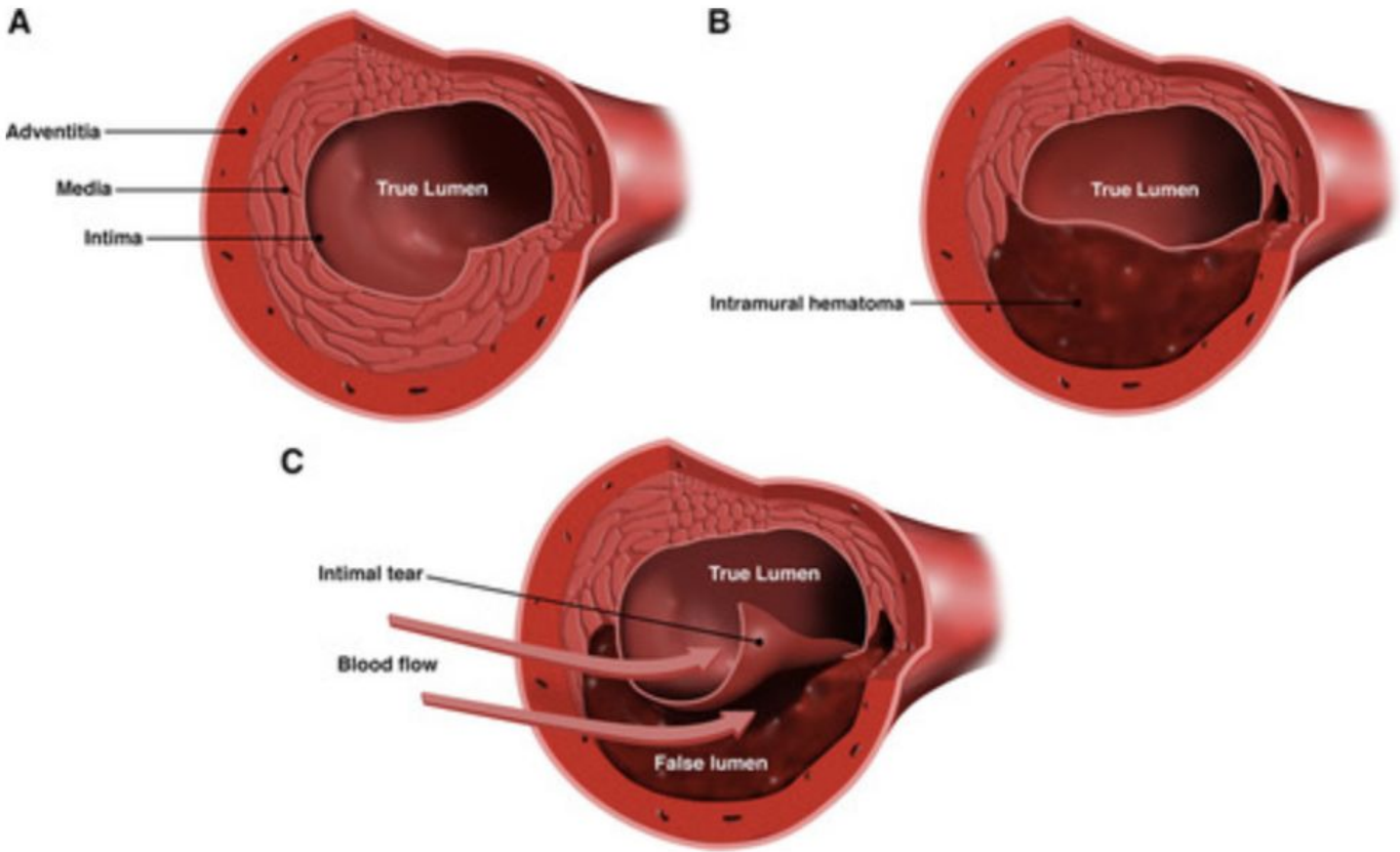
Anatomy


Right coronary artery
Left coronary artery
Left main
Marginal artery
Proximal left anterior descending artery
Circumflex artery
Diagonal artery
Mid left anterior descending artery
Distal left anterior descending artery
Right marginal artery
Posterior descending artery

Outcome

- Follow up TTE: ejection fraction that drastically improved to 60-65%
- Discharged safely to home and advised to continue taking aspirin 81 mg, lisinopril 10 mg daily, and metoprolol 50 mg twice daily

SCAD


A
Adventitia
Media
Intima
True Lumen
B
True Lumen
Intramural hematoma
C
Intimal tear
Blood flow
True Lumen
False lumen

Patient Presentation

- “ACS”
- Chest Pain
- Ventricular arrhythmias
- Troponin positive
- ST elevations

Risk Factors and Clinical Features that Raise Suspicion for SCAD

- Fibromuscular dysplasia
- Multiple pregnancy - Hormonal changes during pregnancy are thought to alter normal elastic fibres, impair collagen synthesis and mucopolysaccharide content, causing weakened media
- Systemic inflammation (systemic lupus erythematosus, Crohn's disease, polyarteritis nodosa and sarcoidosis)
- Connective tissue disorders (Marfan's syndrome, Ehler Danlos, cystic medial necrosis)
- Hormonal therapy
- Coronary artery spasm - History of cocaine or amphetemine use
- Myocardial infarction in young women (age ≤50)
- Absence of traditional cardiovascular risk factors
- Precipitating stress events, either emotional or physical (intensive exercise)

Diagnosis (Imaging)

- Gold standard: coronary angiography - excellent to assess luminal narrowing; however, it is poor in assessing the arterial wall, where the key abnormalities occur with SCAD.
- Intracoronary imaging with intravascular ultrasound - lower spatial resolution, however has deeper penetration allowing for the full vessel and extent of the intramural hematoma (IMH) to be visualized, can delineate true and false lumens
- Optical coherence tomography - much higher resolution, can visualize true lumen, false lumen, and even intimal tears exceedingly well. However, it has poorer penetration than IVUS, and may not visualize the full extent of the IMH