

Learning Objective

CT coronary angiogram with optical coherence tomography (OCT) is beneficial in identifying vulnerable plaque, especially in young patients with risk factors for premature coronary artery disease.

Case Presentation

A 26-year-old obese male with tobacco abuse presented with persistent substernal chest pain of 12-hour duration that radiated to his left upper arm. Two weeks prior, he had an upper respiratory tract infection. His family history was significant for premature coronary artery disease. Physical examination was unremarkable except for hypertension and mild tachycardia.

Initial work-up and management on admission:

Initial work-up and management on admission:

CBC: Leucocytosis (WBC 19,000).

EKG: ST-segment elevations in leads II, III, aVF, and submillimetre elevations extending into leads V4-V6 and Q waves in leads II, and III without any reciprocal EKG changes.

Troponin I: 3.5ng/ml.

Bedside ECHO: Small anterior pericardial effusion with no signs of tamponade. Normal left ventricular ejection fraction and valvular function with no wall motion abnormalities.

He was admitted to the coronary care unit (CCU) loaded with aspirin and started on heparin, statin, and beta-blockers.

Differential diagnosis:

Acute myopericarditis, ACS.

Events during admission:

•**Troponin:** Trended upwards overnight from 3.5ng/ml to 15ng/ml prompting a coronary angiogram.

•**Coronary angiogram:** Demonstrated a proximal 30-40% hazy stenosis of the left anterior descending artery (LAD) and an apical hazy filling concerning for dissection versus thromboembolization. (Figure 1)

Figures

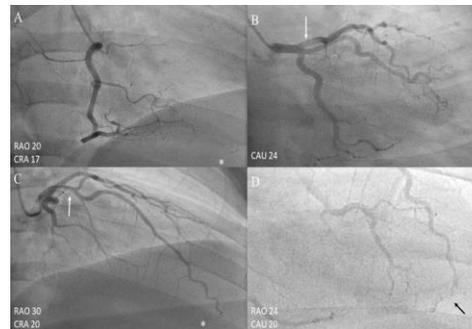


Figure 1

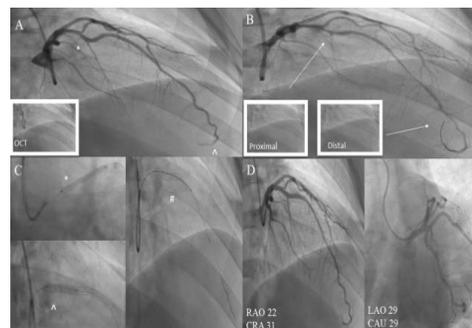


Figure 2

Further investigations

A formal transthoracic echocardiogram was unremarkable with no gross wall motion abnormalities.

CT angiogram revealed a large, solitary, noncalcified plaque in the proximal LAD causing 25-49% stenosis. The plaque spanned 13 mm in length and demonstrated CT features of vulnerability prompting repeat coronary angiography.

Repeat coronary angiography with optical coherence tomography imaging was performed (figure 2) and confirmed a proximal LAD ruptured lipid plaque with a adherent red thrombus

Outcome

The patient was successfully treated with aspiration thrombectomy and drug-eluting stent placement. The final angiogram revealed excellent angiographic result with TIMI 3 flow through the entire LAD territory. He was discharged 2 days later with dual-antiplatelet therapy, beta blockers and statin without complications.

Discussion

Atypical presentations of ACS in young adults pose a diagnostic challenge even to the astute clinician. Here, we underscore the use of multimodality imaging to guide decision making in this subset of patients.

The patient's coronary angiogram was concerning for distal thromboembolization or a type III spontaneous coronary artery dissection (SCAD) which raised suspicion to further characterize the lesion with other imaging modalities.

Optical coherence tomography (OCT) is an infrared high-resolution intravascular imaging modality of the coronary arteries that can be utilized to identify vulnerable plaques or culprit lesions in ACS.