Acute myocardial ischemia due to septal branch occlusion of LAD: detection by computed tomography angiography

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A 56-year-old female presented to the emergency department (ED) at 7 a.m. with acute chest pain suggesting unstable angina. The first episode of chest pain was experienced 12 h ago. Transthoracic echocardiogram showed hypokinesis of the myocardial septum.

High-sensitivity troponin T was negative at 7:58 a.m. (9.2 ng/L). The admission ECG was normal. Symptoms improved after treatment with acetylic salicylic acid, clopidogrel, and heparin. Coronary CT angiography was performed at 10:30 a.m., demonstrating no evidence of significant stenosis of the main epicardial coronary vessels (Panels A and F). However, the contrast agent filling of the first septal branch discontinued 1 cm after originating from the LAD (Panels A and D), suggesting acute occlusion. The occlusion site was exactly matching with a large subendocardial myocardial perfusion defect in the mid-ventricular septum (Panels B–D), which was extending towards the apical and basal myocardial segments, with partial transmurality. The patient’s angina symptoms increased in severity. Therefore, invasive coronary angiography was performed at 12 p.m. showing high grade 95% stenosis of the first septal branch (Panel E). The branch was too narrow for intervention. Hs-troponin T was increased to 159 ng/L the next day during which the patient was free of angina symptoms.

Conclusion
In patients presenting with acute chest pain to the ED, despite of normal main coronary arteries on coronary CTA, it is important to evaluate the myocardium for the presence of myocardial perfusion defects, indicating acute ischemia. These patients cannot be discharged from the ED, but require further monitoring and diagnostic follow-up.

Acute myocardial ischemia by coronary CTA; septal branch occlusion (A and D) of the LAD by CTA causing a subendocardial mid-ventricular myocardial perfusion defect indicating acute ischemia (white arrows, B–D), with partial transmurality (B, upper white arrow). The myocardial hypoperfusion is coded in black colour (white arrows, G) on the HU map. Invasive angiography (E) showed 95% stenosis of the septal branch. The other main epicardial coronary arteries (F) were normal (RCA-PL, RCA-PDA).

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