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CT coronary angiography clinches the diagnosis in a patient with ST elevation following a suicide attempt

Authors:
A Briosa E Gala¹, A Dimarco¹, S Battison¹, J Shambrook¹, M Mahmoudi¹, A Abbas¹, ¹University Hospital Southampton NHS Foundation Trust - Southampton - United Kingdom of Great Britain & Northern Ireland,

Topic(s):
Coronary CT Angiography

Citation:
A 48-year-old man was admitted as a Level 1 Trauma after attempting suicide by jumping 28 meters into a river. Primary survey was unremarkable except for hypothermia and periorbital bruising. The trauma-protocol computed tomography (CT) scan was initially reported as showing an isolated T5 vertebral fracture. Serial electrocardiograms (ECG) showed dynamic anterior ST-segment elevation without associated chest discomfort. High-sensitivity troponin levels were grossly elevated (>26000ng/L [<18ng/L]). An urgent bedside transthoracic echocardiogram revealed severe left ventricular systolic dysfunction (LVSD) and extensive regional wall motion abnormalities in the left anterior descending (LAD) coronary artery territory. This raised the possibility of LAD dissection, takotsubo syndrome or an acute aortic syndrome secondary to sudden deceleration. Review of the non-gated trauma CT by Cardiothoracic Radiologists demonstrated poor contrast opacification of the LV septum, apex and distal anterolateral wall consistent with an LAD territory myocardial infarct (MI). Contrast was seen to opacify the distal left circumflex and right coronary arteries but was absent in the LAD. No aortic root injury was seen. We arranged an urgent dedicated ECG-gated CT coronary angiogram (CTCA). This confirmed flush occlusion at the ostium of the LAD as the cause of the acute MI. Additionally, it revealed an aortic root intimal tear, an intimal injury in the LAD and left atrial anterior and posterior wall subendocardial disruption. This planar pattern of injuries was highly suggestive of coup and contrecoup injuries sustained on impact with the water. Additionally there was thrombus layering beneath the left main stem ostium. The mechanism of the MI was deemed to be due to either thrombus embolisation or further intimal injury involving the proximal LAD.

An urgent multidisciplinary team (MDT) was convened consisting of cardiologists, cardiothoracic radiologist and surgeons. Due to the high risk of further intimal bleeding the MI was managed conservatively with aspirin mono-therapy. An angiotensin converting enzyme inhibitor, beta blocker, and mineralocorticoid receptor antagonist were started for management of the LVSD. Repeat CTCA at 24 hours did not reveal any change. The patient was observed for 7 days and transferred to a mental health facility for psychiatric evaluation. Follow-up CTCA in 3 months has been arranged.

This case illustrates 3 key points: (1)Gated CT is the gold standard imaging modality in suspected aortic trauma as reflected in current ESC guidelines as without gating subtle changes, such as rare coup and contrecoup injuries, can be missed;(2)Even if there is no facility for ECG-gating myocardial tissue characterisation can identify early infarction and guide further management;(3)Early MDT discussion is vital to form the most appropriate management plan. Inappropriate invasive angiography was avoided which could have had catastrophic consequences.
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Axial CT from non-ECG gated CT (panel A) showing reduced perfusion within the mid to distal LV septum and apex (interrupted white arrows). Axial (panel B) and Coronal MPR (panel C) from ECG-gated CT showing intimal injuries within the aortic root and left atrium (interrupted black arrows) in a contrecoup distribution. Curved reformat images (panel D) showing occluded LAD secondary to further intimal injury (white arrows).