Integrated non-invasive imaging of acute ST-elevation myocardial infarction without obstructive coronary artery disease

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A 46-year-old male was admitted to the Emergency Department after an episode of acute chest pain. An electrocardiogram (ECG) showed negative T waves and positive hs troponin (peak of 1838 ng/L). The patient underwent conventional coronary angiography for primary angioplasty with a diagnosis of non-ST-elevation myocardial infarction. No significant coronary artery stenoses were found (see Supplementary data online, Movie S1).

Cardiac magnetic resonance (CMR) performed after 3 days showed normal ejection fraction (55%) without left ventricle dilatation (normalized end-diastolic volume 71 mL); CMR also showed the presence of a transmural hyper-intensity at the level of the basal septum on T₂-weighted images before and after fat suppression (Panels A and B) to be referred to oedema. After gadolinium administration, the same area showed transmural delayed enhancement, confirming the presence of acute myocardial infarction (Panel C). The same pattern was observed at the level of the antero-lateral para-apical wall of the left ventricle. The basal septum was akinetic and rigid on cine images (see Supplementary data online, Movie S2).

After 8 week, the patient underwent ECG-gated computed tomography (CT) coronary angiography to assess the coronary artery wall. Unenhanced CT scan revealed no coronary calcium along the vessels (Agatston score: 0). CT coronary angiography demonstrated the presence of just one large eccentric non-calcific plaque in the middle tract of the left anterior descending coronary artery with positive remodelling (Panels D–G). Integrating the imaging findings, the final diagnosis was acute myocardial infarction of the basal septum with embolic infarctlet of the antero-lateral wall.

The case here described suggests that integrated imaging with non-invasive methods can be of great help not only for the proper diagnosis and stratification of patients with acute coronary syndrome, but also for the understanding of the pathophysiology in the individual patient.

(Panels A–C) CMR shows myocardial alterations with acute pattern. T₂-weighted images (A—arrowhead) shows transmural hyper-intensity in the basal septum that becomes even more evident after fat suppression (B—arrowhead). Ten minutes after intravenous gadolinium administration, the same region shows hyper-enhancement with a hypo-intense core (C—arrowhead). (Panels D–G) Cardiac CT angiography showed only one atherosclerotic plaque at the level of the middle left anterior descending (F, G—arrowhead); the plaque was non-calcified and eccentric with positive remodelling.

Supplementary data are available at European Heart Journal — Cardiovascular Imaging online.

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