Detection of myocardial infarction by delayed contrast-enhanced multislice computed tomography

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A 60-year-old man presented with acute myocardial infarction and 4-mm ST-segment elevation in leads V3–V6 after 10 h onset of pain. Coronary angiography revealed proximal occlusion of the left circumflex coronary artery that was successfully stented. Multislice computed-tomography (MSCT) cardiac study was performed 24 h after PCI. MSCT (Toshiba Aquilion 16-slice system) left-ventricular images obtained immediately after iodine-contrast intravenous administration (120 mL at 5 mL/s with 350 mg/mL iodine concentration) showed subendocardial area of reduced signal intensity attributable to a perfusion defect in the lateral wall (Panel A). A second acquisition, 7 min after contrast injection, showed increased signal intensity in the whole extent of the same lateral wall (Panels B and C).

A cardiac magnetic resonance (CMR) study was also performed 48 h after MSCT. Gadolinium first-pass contrast-enhanced images confirmed a subendocardial hypoperfusion area in the lateral wall (Panel D), whereas a delayed contrast study showed transmural gadolinium enhancement in the same territory (Panels E and F).

These findings show the potential of MSCT cardiac studies for providing information not only regarding coronary anatomy but also on the presence of myocardial infarction. Similarities between MSCT and CMR images in both early and delayed contrast studies suggest a common mechanism for iodine and paramagnetic contrast agents in the assessment of myocardial perfusion and necrosis.

Panel A. MSCT image of left-ventricular short-axis view depicting a subendocardial area of low signal intensity corresponding to a non-transmural perfusion defect of the lateral wall (arrows). MSCT images acquired 7 min after iodine-contrast administration. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

Panel B. Left-ventricular long-axis view is shown. Delayed contrast enhancement is observed in the lateral wall (arrows) corresponding to the infarcted area. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

Panel C. Left-ventricular short-axis view is shown. Delayed contrast enhancement is observed in the lateral wall (arrows) corresponding to the infarcted area. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

Panel D. CMR image on a left-ventricular short-axis view showing a subendocardial area of low signal intensity corresponding to a non-transmural perfusion defect of the lateral wall (arrows). CMR image was obtained using an inversion-recovery sequence with a long inversion time delay (500 ms). LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

Panel E. Delayed contrast-enhanced magnetic resonance image in the left-ventricular long-axis view is shown. Myocardial hyperenhancement is observed in the lateral wall (arrows) corresponding to the infarcted area. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

Panel F. Delayed contrast-enhanced magnetic resonance image in the left-ventricular short-axis view is shown. Myocardial hyperenhancement is observed in the lateral wall (arrows) corresponding to the infarcted area. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

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