Suboptimal performance of cardiovascular magnetic resonance imaging for the assessment of myocardial viability at the early phase of an acute coronary syndrome: Usefulness of SPECT myocardial perfusion imaging

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CASE

A 55-year-old man was referred to our intensive cardiology care unit for acute dyspnea and chest pain. The EKG showed atrial fibrillation, a QS pattern in the inferior leads, and ST segment depression in the anterior leads (V1 to V5) in the setting of an elevated cardiac-specific troponin. Trans-thoracic echocardiography (TTE) showed left ventricular ejection fraction (LVEF) of 25%. Coronary angiography revealed severe multi-vessel disease (Figure 1). Cardiovascular magnetic resonance imaging (CMR) was performed at day 5 with serum creatinine at 148 µmol/L. Late gadolinium enhancement (LGE) image indicated several segments with more than 50% scarring (Figure 2). Rest-redistribution-thallium-201-SPECT was performed (Figure 3) and indicated a less significant impairment of segmental myocardial viability (Figure 4). Successful revascularization was performed using coronary artery bypass grafting (CABG). TTE was performed 10 days after CABG and indicated a LVEF at 50%.

DISCUSSION

LGE-imaging for the quantification of irreversible myocardial injury has been extensively validated in coronary heart disease. However, dynamic changes of LGE have been described following an acute coronary syndrome (ACS),[1] which may impair the analysis of myocardial viability.[1] Several reasons can account for infarct size overestimation such as technical parameters or altered gadolinium-based contrast agents (GBCA) washout rate due to altered glomerular filtration rate.[2] An alternative mechanism leading to LGE accumulation in the viable myocardium is an increase in GBCA distribution volume caused by interstitial volume increase as a consequence of myocardial edema. In this setting, LGE reduction could be partly explained by the resorption of edema in the first week following an ACS.[3] Because CMR is the optimal technique to assess LV remodeling while SPECT has outstanding sensitivity for the detection of myocardial viability, multimodality

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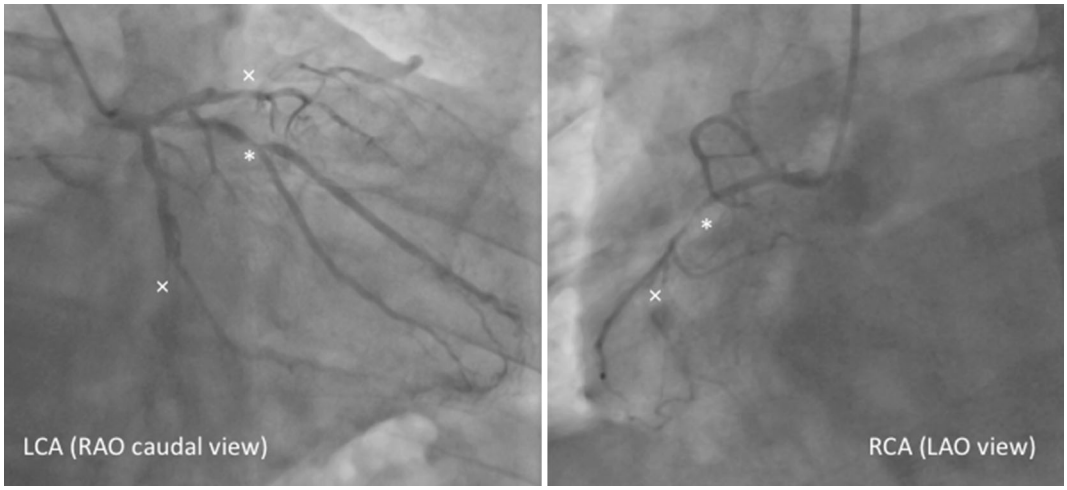

Figure 1. Coronary angiography shows severe multiple vessel disease with Chronic Total Occlusion of right, circumflex, left anterior descending coronary artery (white X), and 70% narrowing of ramus intermedius artery (white cross). *LCA*, left coronary artery; *LAO*, left anterior oblique; *RAO*, right anterior oblique; *RCA*, right coronary artery.

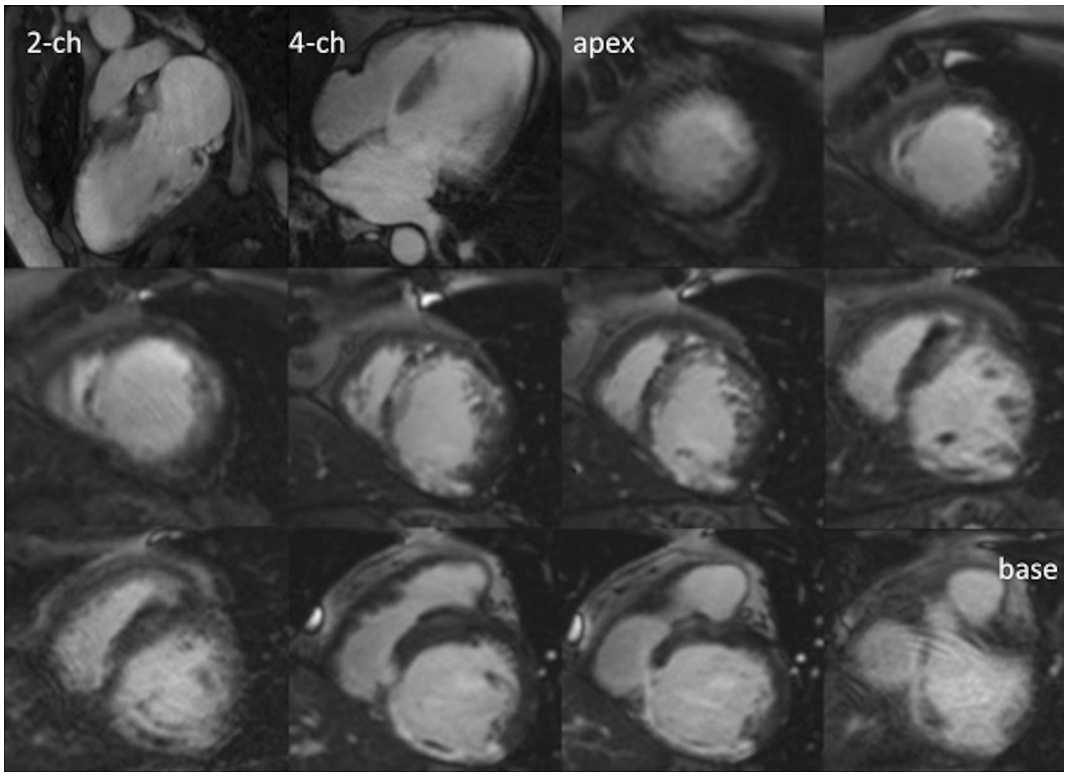

Figure 2. Assessment of myocardial viability by short-axis image Inversion-recovery prepared T1-weighted 2D gradient-echo sequence 10 minutes after intravenous administration of a gadolinium chelate (Dotarem; Guerbet, Roissy CdG Cedex, Paris, France).

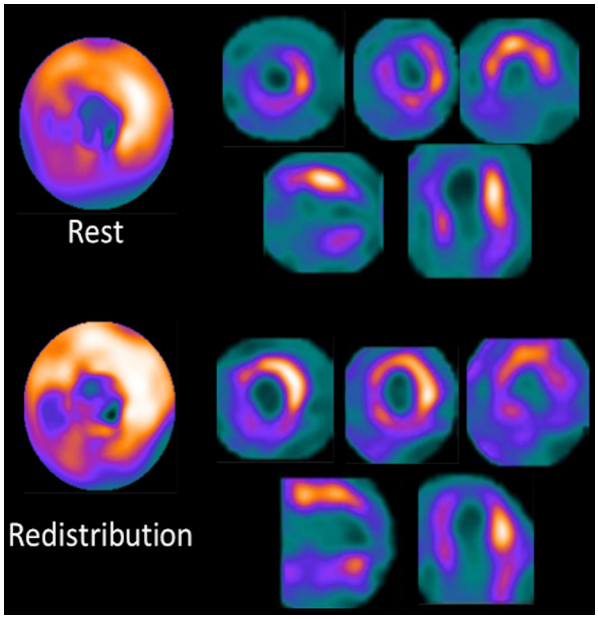

Figure 3. Assessment of myocardial viability by rest-redistribution thallium-201 SPECT. The figure shows 4-hour-redistribution thallium-201 imaging.

imaging might be considered at the early phase of an ACS in the setting of severe CAD with low LVEF.

Disclosure

The authors have indicated that they have no financial conflict of interest.

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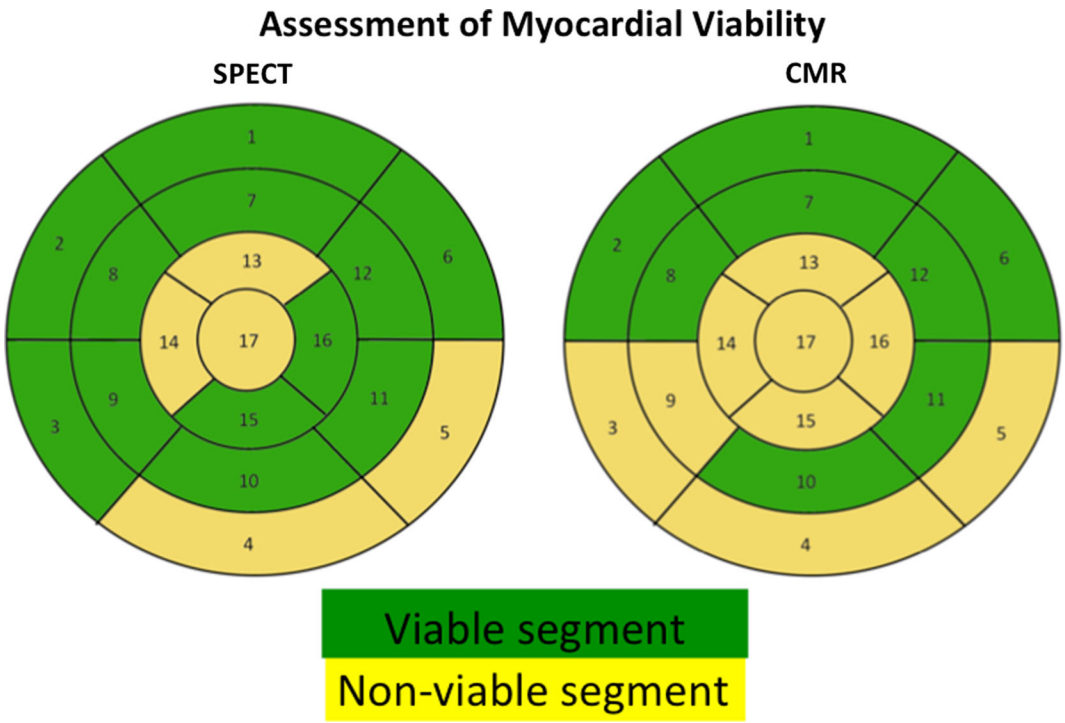

Figure 4. Comparison of myocardial viability analysis by segment between SPECT and CMR.