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Prevalence of myocardial viability in dysfunctional areas by cardiovascular magnetic resonance in patients with coronary artery disease

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Background

The presence of dysfunctional yet viable myocardium (DV-Myo) is known to predict functional recovery after revascularization and long-term prognosis. We sought to define the prevalence of DV-Myo by cardiovascular magnetic resonance imaging (CMR) in patients with coronary artery disease.

Methods

We analyzed 181 patients from the DEfibrillators To REduce Risk by MagnetIc ResoNance Imaging Evaluation Trial. All patients underwent cine and contrast-enhanced (CE) CMR. Cine and CE studies were scored on a 17-segment model by the consensus of two readers. Cine images were scored for wall motion (WM): 0 = normal, 1 = mild hypokinesis, 2 = moderate to severe hypokinesis, 3 = akinesis, 4 = dyskinesis. CE images were scored for hyperenhanced (HE) infarct transmurality: 0 = none, 1 = 1-25% HE, 2 = 26-50% HE, 3 = 51-75% HE, 4 = 76-100% HE. Manually planimetered, quantitative analysis was also performed to obtain LV ejection fraction (EF) and infarct size using QMass MR 7.2 (Medis, Leiden, the Netherlands). DV-Myo segments were defined as having WM score ≥ 2 and HE score ≤ 1. DV-Myo involving 2-4 of 17 segments (12-24% of LV) was considered prognostically significant only. DV-Myo involving ≥ 5 of 17 segments (≥ 29% of LV) was considered functionally significant.

Results

Baseline characteristics included male sex (84%) and mean age 61.5 ± 11.2 (31-88). Patients were on standard medical therapy, including beta-blockers (93%), ACE inhibitor/ARB (82%), anti-platelet (100%) and lipid lowering agents (94%). The population had a mean EF of 38.9 ± 11.6% (range 11.4 - 69.1%) and infarct size 17.3 ± 10.3% of LV (range 0 - 59.5%). A total of 3077 segments were evaluated, of which 442 (14%) segments met criteria for DV-Myo. Prognostically significant DV-Myo was present in 49/181 patients (27.1%). These patients had a mean of 2.7 ± 0.7 affected segments and a mean EF of 34.4 ± 7.7%. Functionally significant DV-Myo was present in an additional 33/181 patients (18.2%). These patients had a mean of 8.1 ± 3.0 affected segments and a mean EF of 26.2 ± 8.5%.

Conclusions

A substantial proportion of patients with CAD have prognostically significant or functionally significant areas of DV-Myo. This highlights the need for viability assessment to guide appropriate therapy in these patients.

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