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Meeting abstract

2015 Myocardial perfusion after percutaneous recanalization of coronary chronic total occlusions: a cardiovascular magnetic resonance study

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Introduction

Recanalization of coronary chronic total occlusion (CTO) is controversial. Adenosine cardiovascular magnetic resonance (CMR) myocardial perfusion imaging (MPI) detects areas of inducible myocardial ischemia.

Purpose

We sought to investigate if successful coronary CTO recanalization is associated with improvement on myocardial perfusion.

Methods

Sixteen consecutive patients with CTO were recruited in the study and 12 patients underwent a CMR MPI both before (6.3 ± 6.4 days) and after revascularization (56 ± 39 days). CMR MPI study was performed in 1.5 T Siemens Avanto scanner using a 3 slice hybrid-EPI sequence with T-SENSE. First-pass stress perfusion imaging was performed after 4 minutes of 140 μg/kg/min adenosine and 0.1 mmol/Kg of Gd-DTPA injected at 7 ml/s, followed by late enhancement imaging with inversion-recovery segmented FLASH sequence. First-pass rest perfusion images were acquired > 20 minutes after stress perfusion imaging. In addition, we obtained multiple SSFP cine images to encompass the left ventricle from base to apex (8 mm slice thickness, 2 mm gap). A visual wall motion, gadolinium and perfusion score (0–4) on a 16-segment model was applied and myocardial perfusion reserve index (MPRI) was calculated in all CTO myocardial territories. Left ventricular end-diastolic (LVDV) and end-systolic volumes (LVSV), ejection fraction (LVEF) and infarcted mass were also calculated.

Results

Inducible myocardial ischemia was detected in 92% of patients (n = 11) and subendocardial myocardial infarction (mean 14.8 ± 14.5 g) was identified in 11 patients. The total perfusion score per patient decreased from 14.7 ± 5.6 to 9.1 ± 6.7 ($p < 0.001$). MPRI was also significantly improved after CTO recanalization from 1.47 ± 0.45 to 2.04 ± 0.55, $p = 0.003$. Wall motion score index tended to decrease from 8.5 (0–39) to 5.5 (0–36) ($p = 0.06$). LVEF significantly increased from 56.2 ± 18.1% to 59.8 ± 18.5% ($p = 0.025$). LVES and LVED volumes showed a non significant reduction. No new myocardial infarction was seen on the second scan.

Conclusion

CMR MPI demonstrated a significant reduction of inducible myocardial ischemia and improvement of myocardial

perfusion reserve following successful recanalization of CTO. This finding is also associated with an increase of left ventricular ejection fraction.