Abstract: P3585

Prognostic value of the assessment of coronary sinus flow by phase contrast cine-magnetic resonance imaging in patients with acute coronary syndrome

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Background:
Phase contrast cine-magnetic resonance imaging (PC-CMR) of the coronary sinus (CS) is a promising approach for quantifying global coronary sinus flow (CSF) and global coronary flow reserve (G-CFR) without the need for ionizing radiation, radioactive tracers, or intravascular catheterization.

Purpose:
We evaluated the prognostic value of G-CFR by quantifying CSF using PC-CMR in patients with ACS treated with primary or emergent percutaneous coronary intervention (PCI).

Methods:
The study prospectively enrolled 387 ACS patients who underwent uncomplicated primary or emergent PCI within 48 hours of symptom onset. Breath-hold PC-CMR images of CS were acquired to assess absolute CSF at rest and during maximum hyperemia within 30 days after primary PCI and revascularization of functionally significant non-culprit lesions of ACS. The association of G-CFR and baseline clinical characteristics with major adverse cardiac events (cardiac death, nonfatal myocardial infarction, late revascularization, or hospitalization for congestive heart failure) was investigated.

Results:
In the final analysis of 366 patients (Male 294 (80.3%), mean age 65) including 233 patients (63.7%) with ST-segment elevation myocardial infarction (STEMI) and 133 patients (36.3%) with non-ST-segment elevation acute coronary syndrome (NSTE-ACS), rest and maximal hyperemic CSF and corrected G-CFR were 1.24 [0.83, 1.71] ml/min/g, 2.56 [1.87, 3.66] ml/min/g, and 2.20 [1.53, 3.17], respectively. During a median follow-up of 16 months, MACE occurred in 84 patients (cardiac death: 9, nonfatal myocardial infarction: 11, late revascularization: 59, hospitalization for congestive heart failure: 5). Cardiac event-free survival was significantly worse in patients with a corrected G-CFR <2.00 (log-rank ?2=20.2, P<0.001). Cox proportional hazards analysis showed that corrected G-CFR were independent predictors of adverse cardiac events during follow-up in patients with STEMI (hazard ratio, 0.66, 95% confidence interval, 0.51?0.85, p=0.001) and NSTE-ACS (hazard ratio, 0.64, 95% confidence interval, 0.43?0.95, p=0.026), respectively.

Conclusions:
In ACS patients successfully revascularized within 48 hours of onset, G-CFR obtained by noninvasive PC-CMR provided significant prognostic information independent of infarction size and conventional risk scores.