

Myocardial Viability: Assessment by Observing the Changes in Myocardial Perfusion Reserve in First-pass MRI

Kyung IL Chung, Tae-Sub Chung, H.-J. Weinmann, Tae-Hwan Lim, Byung-II Choi

Diagnostic Radiology & Cardiology, Ajou University Hospital

Diagnostic Radiology, Yonsei University Severance Hospital

Contrast Media Research, Schering AG

Diagnostic Radiology, AMC University of Ulsan

Purpose: MR imaging has been validated to measure myocardial perfusion by tracing the bolus-profile of a contrast-enhancing agent. The aim of this study was to determine myocardial perfusion reserve (MPR) in reperfused acute myocardial infarction and its significance.

Materials and Method: According to LAD artery occlusion duration of 1hr and 3hrs, 8 felines were grouped into 2. Upon reperfusion for 1hr, Gadomer-17 (0.02 mmol/kg) was injected into the left atrial appendage. Using FGRE sequence (TR/TE = 9.4/2.2 ms, matrix = 256x128, field of view = 120 mm, flip angle = 30° , bandwidth = 15 kHz), the bolus transit of Gadomer-17 was traced during ATP-induced hyperemia and at rest. The upslope of the SI-times curve at the center of myocardial injury was corrected for the left ventricular curve. MPR was calculated as the ratio of the upslopes obtained during hyperemia and at basal state.

Results: On TTC-stained specimen, longer duration of LAD artery occlusion resulted in consistent myocardial infarction with the MPR ranging 0.97 - 1.523 (1.304 ± 0.118) after 1hr occlusion and 0.6 - 1.15 (0.937 ± 0.119) after 3hr occlusion.

Conclusion: Smaller MPR with longer duration of infarction ($P < 0.05$) suggested its close relationship to the viability and MRI measured MPR maybe predictive of the viability outcome.