T1 mapping for myocardial tissue evaluation in patients with ischemia and stable coronary artery disease: MASS V-Trial Study Group

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Background: T1 mapping is a magnetic resonance imaging (MRI) technique that enables the identification of myocardial structural changes during acute ischemic injury. However, it is not known whether these structural changes are present in patients with chronic effort induced ischemia.Thus, we sought to document the possible T1 mapping changes in chronic coronary artery disease (CAD) patients with documented myocardial ischemia.
Methods: Multivessel CAD patients from MASS V Trial with indication of myocardial revascularization, were evaluated for the presence of ischemia by myocardial scintigraphy. MRI with T1 mapping was performed in all patients. Based on the results of the scintigraphy, the myocardial segments were identified as ischemic and non-ischemic segments. The corresponding segments of scintigraphy and MRI were compared in relation to native T1 map (NT1), post-contrast T1 (CAT1) and extracellular volume (ECV).
Results: Of the 720 myocardial segments analyzed, there were 161 ischemic and 559 non-ischemic segments. Comparing ischemic vs non-ischemic segments, respectively, NT1 was 1022.7 (980.0–1052.0) versus 1029.3 (985.0–1066.3), p=0.57, ECV results were 25.4 (24.0–28.1) versus 26.4 (25.3–29.9), p=0.75 and CAT1 results were 492 (461.9–515.4) versus 488 (469.2–521.7), p=0.09. Myocardial segments supplied by obstructive coronary arteries were compared to those supplied by non-obstructive coronary arteries in relation to NT1 and ECV. NT1 values in obstructive and non-obstructive territories were, respectively, 1024.7 (998.5–1043.5) versus 1036.8 (1008.6–1046.9), p=0.30 and ECV results were 26.8 (24.4–29.9) versus 26.8 (24.4–30.0), p=0.90.
Conclusion: In this study, MRI identified structural similarities between chronic ischemic myocardium compared to the non-ischemic myocardium. This finding supports myocardial tissue stability in the presence of stress induced ischemia.