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T1 mapping and myocardial extracellular volume assessed by cardiac magnetic resonance in diabetic patients with stable coronary artery disease

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Background: T1 mapping is a quantitative technique of cardiac magnetic resonance (CMR) increasingly used for characterization of the myocardium. Type 2 diabetes mellitus (T2DM) may impact myocardial tissue structure, however studies that assessed this association using non-invasive methods have conflicting results.

Purpose: We sought to compare the tissue characteristics of the non-infarcted myocardium of patients with and without diabetes with multivessel CAD.

Methods: Patients with stable multivessel CAD and preserved left ventricular ejection fraction (LVEF), included in the MASS V trial, underwent contrast-enhanced CMR before revascularization procedures. Patients were stratified according to the T2DM diagnosis at baseline. Values of myocardial native T1, post-contrast T1 and extracellular volume fraction (ECV) were compared between diabetic and non-diabetic patients. Only myocardial tissue without late gadolinium enhancement were assessed.

Results: Of 155 patients studied, 67 (43%) were diabetic and 88 (57%) non-diabetic. Baseline characteristics were similar between groups (age 70 ± 10 vs 69 ± 11 ; 69% vs 68% males; LVEF 65 ± 13 vs 67 ± 9). Mean Syntax score was 21.2 ± 8.5 and 20.4 ± 8.5 ($p=0.52$) in diabetic and non-diabetic, respectively. Myocardial native T1 values showed no difference in diabetic and non-diabetic (1013 ± 67.9 vs 1015 ± 61.4 , $p=0.72$). However, in diabetic patients values of post-contrast T1 were significantly lower (482.2 ± 43.8 vs 499.4 ± 47.2 , $p=0.024$) and ECV were higher (29.62 ± 6.61 vs 27.08 ± 4.22 , $p=0.004$). Multivariable analyses adjusted for age, sex, BMI, hypertension and Syntax score showed no differences in the results.

Conclusion: In this study, T2DM was associated with higher ECV and lower post-contrast T1 values in the myocardial tissue. These findings suggest an increase in the myocardial interstitial matrix in patients with diabetes and stable multivessel CAD.

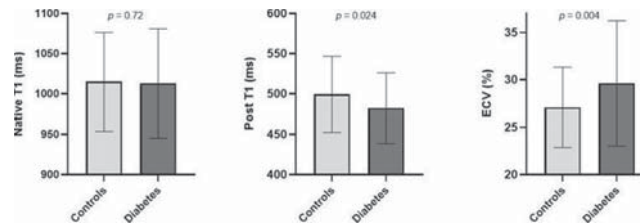


Figure 1