Coronary artery calcium score as a predictor of myocardial ischemia in asymptomatic diabetic patients

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Background and aims: High coronary artery calcium (CAC) scores were shown to predict a higher likelihood of inducible myocardial ischemia and to be associated with a poor cardio-vascular prognosis. However the predictive value for coronary stenoses (CS) has not been tested in asymptomatic diabetic patients. This study aimed to evaluate the predictive value of a high CAC score for silent myocardial ischemia (SMI) and CS in high risk asymptomatic diabetic patients.

Materials and methods: CAC score was measured by computed tomography in 150 diabetic patients without cardiac history or symptom, with a normal resting ECG and ≥1 additional risk factors. SMI was assessed using stress myocardial scintigraphy and/or stress echocardiography, and CS using coronary angiography in those with an abnormal SMI test.

Results: CAC score was ≥100 Agatston units in 35.3% of the patients. SMI was detected in 32 patients (21.3%). A coronary angiography was performed in 17 of SMI patients and detected significant CS in six of them. CAC score was associated with coronary status (no SMI: median value 14 (range 0-12900); SMI without CS: 101 (23-3230) and SMI with CS: 800 (76-2978); p<0.01), and similarly for a CAC score ≥100 (in 37/123 patients without SMI (30.2%), 6/11 with SMI and no CS (54.5%) and 5/6 patients with SMI (83.3%) (p<0.05). A CAC score ≥100 predicted the presence of SMI in 30.2% of patients had SMI vs 11.3% of those with CAC <100 (odds ratio 3.4 [1.4-8.0], p<0.01), with a sensitivity and specificity of 59% and 70%, and positive and negative predictive values of 30 and 87%, respectively.

Conclusion: These data suggest that in asymptomatic high risk diabetic patients CAC score is associated with cardiac ischemic status, with a 3.4-fold increased risk of SMI when the score is ≥100. The negative predictive value of CAC score for SMI is an interesting finding. The predictive value for CS remains to be determined in a larger sample of patients with CS.

Predictor of left ventricular remodeling after acute myocardial infarction: a study of end-systolic wall stress

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Objectives: investigate whether the end-systolic wall stress is a predictor of left ventricular remodeling (LVR) in the aftermath of an acute myocardial infarction after successful reperfusion.

Background: LVR is a poor prognosis outcome associated with a greater number of major adverse cardiovascular events. It remains difficult to predict which patients will remodel.

Methods: 169 STEMI patients were prospectively included in a CMR study. We calculate, among other parameters, end-systolic wall stress (WS) by three-dimensional MRI method with an home-made software. CMR was performed at day 5±2 and repeated at 3 months follow-up. LVR was defined as a LV end-diastolic volume indexed (LVEDVi) > 120ml/m² at 3 months.

Results: 13 patients presented LVR, including 11 due to anterior MI. LVR patients presented worse initial CMR parameters: WS 25.9±6 vs 16.0±4103 N•m⁻² (p <0.001), a LVEDVi 117.2±20 vs 84.6±16ml/m² (p<0.001), an infarct size 46.8±20 vs 22.8±15g (p <0.001), a microvascular obstruction size 8.7±1.9 vs 9±3g (p <0.001) and a LV ejection fraction 31.0±8 vs 49±4% (p <0.001). The initial global WS emerges as an independent predictor of LVR (OR 1.298 [1.046 to 1.612], p <0.018) as LVEDVi (OR 1.093 [1.013 to 1.180], p <0.022) and the occurrence of heart failure (OR 9.912 [1.094 to 89.842], p <0.041). LVEF as infarct and microvascular obstruction size were not independent predictors. Patients with an initial global WS below 20.88 103 N•m⁻² will not develop LVR in 98.5% of cases (sensitivity and specificity of 84.6%).

Conclusion: end-systolic wall stress is an independent predictor of LV remodeling in post-MI. Patients with an initial global WS below 20.88 103 N•m⁻² will not develop LVR in 98.5% of cases.