OXIDATIVE STRESS AND LEFT VENTRICULAR PERFORMANCE IN PATIENTS ACCORDING TO DIFFERENT GLYCOMETABOLIC PHENOTYPES

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Recent studies demonstrated that in normoglycemia-tolerant subjects (NGT), 1-h post load plasma glucose value ≥155 mg/dl, during OGTT, identifies a worse cardio-metabolic risk profile with increased risk for Type 2 Diabetes Mellitus (T2DM). T2DM patients present increased oxidative stress, due to high blood glucose levels, which plays a central role in the development of CV events. The aim of our study was to evaluate the correlation between oxidative stress and subclinical myocardial damage, assessed with speckle tracking echocardiography, in NGT patients with 1-h post load ≥ 155 mg/dl vs NGT<155 subjects, impaired glucose tolerance (IGT) and T2DM patients. We enrolled 100 Caucasian patients (61 M, 39 W, mean age 61.4±10.7) afferent to CATAMERI study. Main exclusion criteria were CV complications, history of malignant or chronic respiratory disease, alcohol, drug influencing glucose metabolism or smoking abuse. All subjects underwent clinical and laboratory evaluation, OGTT and HOMA-IR. The serum values of the markers of oxidative stress (8-isoprostane and NOX-2) were assessed with ELISA sandwich. Statistical analysis was performed with ANOVA test, linear correlation analysis and stepwise multivariate linear regression model. According to OGTT results, subjects were divided into 4 groups: NGT<155 (n=30), NGT≥155 (n=24), IGT (n=28), T2DM (n=18). Serum levels of 8-isoprostane and NOX-2 were significantly increased (p<0.0001) in NGT≥155 compared to NGT<155 group, but similar with IGT, indicating an increase in oxidative stress with the worsening of the metabolic status. The left global systolic function, evaluated as myocardial deformation and global longitudinal strain (GLS), appeared progressively lower proceeding from the NGT<155 group to the T2DM group (p<0.0001). Moreover, for similar values of ejection fraction (EF), NGT≥155 subjects presented reduced GLS compared to NGT<155 (p=0.001), but similar to IGT patients. The linear correlation analysis showed that endo/epi ratio was significantly and inversely correlated with 1 hour post load glycaemia (r= -0.632, p<0.0001), NOX-2 (r=-0.638, p<0.0001), 8-isoprostane (r=-0.508, p<0.0001); GLS was inversely correlated with 1 hour post load glycaemia (r = -0.734, p <0.0001) and directly and significantly correlated with 8-isoprostane (r= 0.564, p<0.0001), NOX-2 (r=0.625, p<0.0001). From stepwise multivariate linear regression model, NOX-2 resulted the major predictor of endo/epi ratio, justifying 40.7% of its variation. 1-h post load glycaemia was the second predictor of endo/epi ratio justifying another 9.2% of its variation. Similarly 1-h post load glycaemia was the strongest predictor of the GLS, explaining 53.9% of its variation. Our study demonstrated that NGT≥155 subjects present functional alterations of myocardial contractile fibers, compared to NGT<155 subjects, but similar to IGT, and these alterations are correlated with oxidative stress. Moreover, GLS is able to identify early alterations in the contractility of subendocardial longitudinal fibres long before the alteration of EF. This data have a central role in ongoing research on the association between hyperglycaemia at 1-hour post load and CV risk.