crease arterial stiffness may impair LV function. We investigated whether first degree relatives of diabetics have similarly impaired coronary microcirculatory function. LV myocardial strain and twisting with patients with diabetes as assessed after an oral glucose tolerance test (OGTT).

Methods: In 76 subjects without known diabetes a standard 75-g OGTT was performed and glucose and serum insulin levels were measured at 0, 30, 60, 90 and 120 min after glucose load. We measured a) pulse wave velocity (PWV=aortic index) and augmentation index (AI)= (Arteriograph, Tensiomend). b) E’ and mitral annular velocities and their ratio E’/A’ using tissue Doppler imaging, LV longitudinal (GLS), strain, systolic (LVSIsos) and diastolic strain rate (LGSsE), twisting (Ter-deg), peak twisting (Tw) and untwisting (unTw-deg/sec) velocity using speckle tracking echocardiography c) coronary flow reserve (CFR) of the LAD after adenosine infusion using Doppler echocardiography at baseline. We assessed insulin resistance using the insulin sensitivity index (ISI) which includes both insulin and glucose levels at 0 and 120 min. Results: Of the 76 relatives, who were first degree relatives of diabetics had normal OGTT (n=20), had normal OGTT and no family history of diabetes (n=20) and had abnormal OGTT (diabetics). Age, sex and BMI were similar between subgroups (p>ns). Compared to normals, diabetics and relatives had both higher baseline PWV (9.3±2 vs. 8.1±2 vs. 7.2±1.6), AI (23.9±3 vs. 24.1±18.1±15), insulin (median 14 vs. 30.6 vs. 10.8 μU/ml) and lower ISI (50.0±24 vs. 73.2±22 vs. 93.1±17), baseline E’/A’ (0.75±0.2 vs. 0.96±0.2 vs. 1.1±0.3), LGSsE (0.95±0.1 vs. 1.14±0.1 vs. 1.15±0.1), LVSIsos (0.88±0.1 vs. 1.21±0.1 vs. 1.3±0.1) in the first 15±7 vs. 13±5 vs. 17±7 and unTeVeolicity (95±31 vs. 94±40 vs. 116±36) and lower CFR (2.7±1.1 vs. 2.6±0.9 vs. 3.0±0.6) (p<0.05 for all comparisons). ISI was related with PWV (r= -0.37), CFR (r= -0.40), LGSsE (r= -0.31), LVSIsos (r= -0.33), unTeVeolicity (r= -0.26), E’/A’ (r=0.52) (p<0.05 for all associations) in relatives and diabetics. PWV was related with LGSsE, E’, TwVeolicity, unTeVeolicity and E’/A’ (p<0.05).

Conclusions: First degree relatives and diabetics have increased arterial stiffness, abnormal wave reflection and decreased CFR compared to normals on the grounds of insulin resistance. Insulin resistance is also related with abnormal LV myocardial strain, twisting and untwisting likely because of increased arterial stiffness and impaired coronary microcirculatory function.