Imaging Techniques

7.4 Early Cardiac Damage in High Cardiovascular Risk Patients

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Introduction. Diabetes is often associated with left ventricular hypertrophy, but it is not known if functional impairment, especially diastolic impairment, can be present also without left ventricular hypertrophy.

Aim. To investigate diastolic dysfunction in diabetic patients without echographic assessed cardiac hypertrophy.

Methods. 53 subjects were studied. Among those patients, 24 were type 2 diabetic normotensive patients (group A), 16 type 2 diabetic hypertensive patients (group B) and 13 were sex and age matched healthy controls (group C). All diabetics assumed metformin and all hypertensives assumed Ace inhibitors. In each subject we performed an echocardiographic evaluation of diastolic function (E/A and Dec time) including Tissue Doppler analysis of lateral (L) mitral annulus. Data collection included the glycometabolic profile, blood pressure and body mass index.

Results. Blood pressure, body mass index, blood glucose and insulin resistance all showed higher values in group B than in group A and C. (BMI: 31 ± 0.8 vs 26.9 ± 0.6 and 25.0 ± 0.6 kg/m² respectively, $p < 0.03$; systolic and diastolic BP: $154/89$ vs $136/79$ and $130/81$ mmHg respectively, $p < 0.01$; blood glucose: 139.8 ± 9.2 vs 134.0 ± 4.7 and 88.0 ± 3.7 mg/dL respectively, $p < 0.02$; Homa index 3.6 ± 0.8 vs 3.1 ± 0.8 and 2.0 ± 0.8 Units respectively, $p < 0.05$). There was no significant between group difference in diastolic function when assessed by E/A ratio (0.8 ± 0.01 ; 0.84 ± 0.05 ; 1.0 ± 0.01 msec in B, A and C respectively) and Dec time (B: 206 ± 8.0 ; A: 224 ± 10 ; C: 200 ± 10 msec). However, tissue Doppler analysis showed a marked and similar impairment in cardiac relaxation in the two diabetic groups as compared to controls (B: LEm/Am 0.08 ± 0.02 ; A: LEm/Am 0.09 ± 0.03 ; C LEm/Am 0.1 ± 0.01 , $p < 0.01$ for B vs C and $p < 0.04$ for A vs C). There was no correlation between this alteration and BP, blood glucose and the Homa index.

Conclusions. Diastolic function is altered in type 2 diabetics both normotensive or hypertensive patients. Such impairment appears earlier than left ventricular hypertrophy and can be detected by echocardiography but only if implemented by tissue Doppler analysis.