

The influence of arterial stiffness on left ventricular diastolic dysfunction in patients with hypertension and type 2 diabetes mellitus

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Objective: to investigate the influence of arterial stiffness (AS) on left ventricular diastolic dysfunction (LV DD) in patients with arterial hypertension (AH) and type 2 diabetes mellitus (T2DM).

Methods. We examined 60 patients with AH, T2DM, LV DD and preserved ejection fraction, (34 males, aged 56.5 ± 4.7 years). Baseline characteristics of patients included history of AH (8.4 ± 3.3 years) and T2DM (5.7 ± 1.5 years). In all patients the level of HbA1c was assessed. AS was measured as brachial-ankle pulse wave velocity (baPWV). Diastolic function was assessed by echocardiography including Tissue Doppler Imaging. We evaluate LV mass (LVM), LV mass index (LVMI), peak velocity of early trans-mitral flow (E velocity) and atrial flow (A velocity), E/A ratio, E/e' ratio, the deceleration time (DT), isovolumic relaxation time (IVRT).

Results. Among observed patients were 38 individuals with impaired relaxation - mild DD (E/A ratio <1.0 and $DT > 240$ ms), 22 had a pseudonormal diastolic function - moderate DD (E/A ratio of 1.0 to 1.5 and $DT > 240$ ms). There was no one with restrictive DD in our research. Patients with moderate DD had a longer duration of T2DM compare to the patients with mild DD (5.6 ± 1.2 years vs 2.8 ± 1.1 years, $p < 0.05$) and higher level of HbA1c ($8.1 \pm 0.9\%$ vs $6.7 \pm 0.7\%$, $p < 0.05$). In addition we detected that moderate DD patients had significant higher rate of baPWV compare with mild DD patients (18.34 ± 2.21 m/s vs 16.78 ± 1.51 m/s, $p < 0.05$). The baPWV significantly correlated with LVM ($r = 0.32$, $p < 0.05$), LVMI ($r = 0.41$, $p < 0.05$), E/A ratio ($r = -0.37$, $p < 0.05$), DT ($r = 0.43$, $p < 0.05$), E/e' ratio ($r = 0.59$, $p < 0.05$).

Conclusions. Increase of AS independently associates with more severe LV DD in patients with AH and T2DM. Early detection of increased baPWV may be important for prevention of DD in such patients.