Vessels and Endothelium

12.9 Arterial Stiffness and Endothelial Function in Relation to Left Ventricular Diastolic Dysfunction in Non-Ischaemic Heart Failure

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Aim. To evaluate arterial stiffness and endothelial function inpatients with non ischemic heart failure (HF) and their relationship with left ventricular (LV) diastolic and systolic function.

Methods. In 47 patients with HF (age 63 ± 13 years, 8 females) and LV ejection fraction (EF) $< 50\%$, applanation tonometry (Sphygmocor®) was used for determining augmentation index (AIx) and central pulse pressure (cPP) by pulse wave analysis (PWA) and carotid to femoral pulse wave velocity (PWV). Endothelium-dependent (flow-mediated dilation, FMD, after 5-minute of forearm ischaemia) and -independent (sublingual glycerol trinitrate, GTN, 25 microg vasodilation were assessed by high resolution ultrasound and computed analysis of brachial artery diameter changes. A complete Doppler and echocardiographic study was performed in all patients, including measurements of E/A ratio and E wave deceleration time (EDT).

Results. Median EF (range) was 30% (17-49%), E/A 0.9 (0.4-4.0) and EDT 160 ms (73-290ms). AIx was inversely related to E/A ratio ($r = -0.51$; $p < 0.01$) and directly to EDT ($r = 0.36$; $p < 0.05$). cPP was inversely related to E/A ratio ($r = -0.46$; $p < 0.01$) and directly to EDT ($r = 0.50$; $p < 0.01$). PWV was significantly associated only with EDT ($r = 0.36$; $p < 0.05$). As compared other patients, those with pseudonormalized or restrictive diastolic pattern had lower AIx (28 ± 10 vs $18 \pm 17\%$, $p < 0.05$), cPP (55 ± 18 vs 34 ± 15 mmHg; $p < 0.001$), PVW (10.6 ± 1.6 vs 8.7 ± 3.2 m/s; $p < 0.05$), and EF (35 ± 9 vs $24 \pm 6\%$; $p < 0.001$). EF tended ($p = ns$) to be related to AIx ($r = 0.28$), cPP ($r = 0.31$) and PWV ($r = 0.24$). FMD, response to GTN and FMD/GTN ratio did not significantly correlated to indexes of LV diastolic and systolic function.

Conclusions. In patients with non-ischaemic HF, LV diastolic dysfunction was associated with reduced central pressure and arterial stiffness, a phenomenon that is possibly related to the amount of systolic dysfunction. Diastolic and systolic LV dysfunction are not related to peripheral endothelial dysfunction.