EFFECTS OF ATORVASTATIN TREATMENT ON ENDOTHELIAL PROGENITOR CELLS AND VASCULAR FUNCTION IN ISCHEMIC HEART FAILURE

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Background: Ischemic heart failure (HF) is characterized by increased inflammatory status and impaired endothelial function. Endothelial progenitor cells (EPCs) contribute to the maintenance of endothelial integrity and function. Statins beyond its lipid lowering effect exert beneficial effect on endothelial function and inflammatory process in patients with atherosclerosis. In the present study we examined the impact, of atorvastatin treatment, on vascular function, inflammatory status and circulating EPCs in HF patients.

Methods: We studied the effect of 4 weeks atorvastatin treatment (40mg) in 23 patients with ischemic HF. Measurements were carried out at baseline and at the end of the treatment period. Endothelial function was evaluated by flow-mediated dilation (FMD) of the brachial artery. Carotid-femoral pulse wave velocity (PWV) was measured as an index of aortic stiffness and augmentation index (AIx) as a measure of arterial wave reflections. Serum levels of tumor necrosis factor alpha (TNF-a), intracellular adhesion molecule-1 (ICAM-1) and brain natriuretic peptide (BNP) were measured by ELISA. The number of circulating CD34(+)/CD133(+)/KDR(+) EPCs were evaluated by flow cytometry in a randomly selected subgroup population (8 subjects).

Results: Compared to baseline, atorvastatin treatment significantly improved FMD (3.18±3.03% vs. 5.98±2.49%, p=0.001), AIx (25.98±8.55% vs. 23.09±8.87%, p=0.046) and marginally improved PWV (10.13±3.87 m/sec vs. 9.42±3.10 m/sec, p=0.058). Furthermore, compared to baseline, a reduction in logTNF-a levels (0.099±0.323 pg/ml vs. -0.011±0.247 pg/ml, p=0.012) and logICAM-1 levels (2.46±0.13 ng/ml vs. 2.37±0.16 ng/ml, p<0.001) was observed with atorvastatin treatment, while there was no statistically significant difference in logBNP levels (2.10±0.36 pg/ml vs. 2.17±0.38 pg/ml, p=0.57). Interestingly, compared to baseline, circulating EPCs were significantly increased with atorvastatin treatment [413 (334, 510) vs. 194 (151, 241), p=0.028].

Conclusions: Short term atorvastatin treatment increases not only the number of circulating EPCs but also improves endothelial function and arterial stiffness.