Effects of Atorvastatin Therapy in Heart Failure: Oxidative Stress, Inflammation, Endothelial Dysfunction and Exercise Capacity

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Background: Chronic heart failure (CHF) is associated with increased oxidative stress (OS), leading to inflammation and endothelial dysfunction. Statins have antinflammatory and antioxidant actions. However, their use in CHF is still controversial.
Objective: To evaluate the effect of statin use on OS, inflammation, endothelial function and exercise parameters in CHF patients.
Methods: Prospective study. Fifteen patients with compensate CHF, left ventricular ejection fraction (EF), <40% and normal cholesterol who had not received statins previously were included. All patients received a 4 week course of placebo and then atorvastatin 20 mg daily for 8 weeks. At baseline, 4 and 12 weeks blood samples were obtained for malondialdehide (MDA), endothelial-bound superoxide dismutase (ecSOD), Metalloprotinase-9 (MMP-9), TIMP-1, usPCR and TNF-α. At each visit patients underwent endothelial vasodilation reactive hyperemia test and six-minute walk test.
Results: Mean age was 59±10. Twelve (80%) were men. CHF was ischemic in seven patients (46%). Mean EF was 30±7%. A significant correlation was found between changes in ecSOD and EV (r=0.64, p= 0.01). Main results are summarized in the table.

	Baseline	Placebo	Atorvastatin	*P*
ecSOD (U.mL^{-1}.min^{1})	143 ± 22*	132 ± 11*	226 ± 46	0.001
MDA (μM)	0.74 ± 0.1*	0.9 ± 0.1*	0.73 ± 0.06	0.71
MMP-9	0.38 ± 0.1*	0.42 ± 0.1*	0.31 ± 0.1	0.01
TIMP-1	1.06 ± 0.3*	1.1 ± 0.1*	1.2 ± 0.2	0.03
PCR us (pg/mL)	5.1 ± 9*	6.0 ± 10*	2.3 ± 2.2	0.01
TNFα (pg/mL)	0.81 ± 1.3*	1.1 ± 1.5*	0.64 ± 1.2	0.007
VE (%)	4.3 ± 1.6*	4.57 ± 2.1*	6.9 ± 2.6	0.004
Six-minute walk (mts)	430 ± 73*	425± 60*	480 ± 80	0.03

* Baseline vs. placebo Wilcoxon rank sum test p=NS**Conclusion:** Atorvastatin therapy in CHF is associated with a decrease of inflammation and extracellular matrix remodeling parameters and increased ecSOD levels, improving endothelial function and exercise capacity. Fondecyt 1050768-FONDAP15010006