

Effects of Exercise Training on Endothelial Progenitor Cells and Cardiac Remodeling in CHF Patients

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Background: Exercise training (ET) is a well-known complementary treatment for chronic heart failure (CHF). However, the effect of ET on endothelial progenitor cells (EPC) and the impact on cardiac remodeling is still debatable. The purpose of this study was to evaluate the effect of 3 months ET on exercise capacity, quality of life and cardiac remodeling in patients with CHF.

Methods: Patients with CHF were assigned to 12 weeks of ET. At the baseline and after 12 weeks, a six minute walk test (6MWT), Minnesota quality of life questioner (MQOL), and both LV and RV function assessment using standard echo, tissue Doppler imaging (TDI) and 2D strain techniques were evaluated. The number of circulating EPCs (CD34 + and CD34/KDR); and vascular endothelial growth factor (VEGF) serum levels were quantified.

Results: Sixteen patients (mean age 63±8 years, mean LVEF 30.9±4.0% and mean NYHA 2.8±0.5) on maximal medical therapy were evaluated in this study. The comparison between pre- and post-ET is presented in the Table. An improvement in 6MWT ($p=0.025$), MQOL ($p=0.014$) was observed. Significant decrease in CD34 and CD34/KDR ($p=0.01$ and 0.001) was evident. There was a significant decrease in LV and RV early diastolic velocities (E') ($p=0.02$ and 0.02) and an increase in systolic velocities of LV and RV ($p=0.004$ and 0.01). No changes in 2D longitudinal and circumferential strain were seen.

<IMAGE02>

Conclusions: Our intermediate results demonstrate that ET improves not only functional capacity and quality of life, but also systolic and diastolic function of both ventricles by TDI in patients with CHF. A post-ET decrease in EPCs with no changes in VEGF may be explained either by attenuated effect of ET on recruitment of EPCs or enhanced differentiation of EPCs into mature endothelial cells caused by ET.