Plasma levels of troponin I is reduced after a 12 week exercise training program in patients with uncomplicated heart failure. A substudy of the SMARTEX-HF study

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Background: Low-level elevation of cardiac troponins has been associated with adverse outcome, and concentrations even within the normal range provide independent information concerning risk in heart failure (HF). Exercise training exerts many beneficial effects on the cardiovascular system, and longitudinal observational data from epidemiological studies suggest that higher physical activity (PA) is associated with lower concentrations of cardiac troponins.

Purpose: Our aim was to compare changes in plasma troponin I (TnI) levels (Abbott Diagnostics) in patients with symptomatic heart failure undergoing a 12 week structured exercise training program (Intervention group, IG) with changes in controls on a recommendation of regular exercise (RRE); control group, (CG) in a randomized clinical trial.

Methods: This was a post hoc analysis of the SMARTEX-HF trial in 199 patients with symptomatic HF with LVEF <35% and NYHA II-III. The patients were randomly assigned to High Intensity Interval Training (HIIT, n=73), Moderate Continuous Training (MCT, n=59) or RRE, (n=67) for 12 weeks. HIIT and MCT groups constituted the intervention group (IG). Measurements and clinical data acquired before and after the 12-week exercise training intervention were analysed.

Statistical analysis: Changes of TnI levels from baseline to 12 weeks are presented as medians and interquartile ranges. One-sample Wilcoxon sign rank test was used to determine if for a specific group of patients, the median change of troponin levels was equal to zero. In addition, Mann-Whitney U test was used to compare reductions of TnI between two groups.

Results: After 12 weeks plasma levels of TnI were reduced for all patients (median 11.9 to 11.4 ng/L, p=0.032) and there was no difference between the study groups (p=0.072). However, when the groups were studied separately, reduction of plasma levels of TnI was statistically significant in the IG only (12.5 to 11.7 ng/L, p=0.011), (CG 11.4 to 10.7 ng/L, p=0.955).

For the study cohort restricted to patients without additional complicating factors (i.e. no atrial fibrillation, no history of hypertension, diabetes or chronic obstructive pulmonary disease, n=77), difference in changes of plasma levels of TnI between IG (n=54) and CG (n=23) was found to be statistically significant (p=0.004). IG changed from 11.3 to 9.5 ng/L (p=0.002), (CG 12.6 to 12.7 ng/L, p=0.467).

Conclusions: A 12 weeks exercise-training program was associated with a reduction of plasma TnI levels in patients with mild to moderate HFrEF without additional complicating factors.

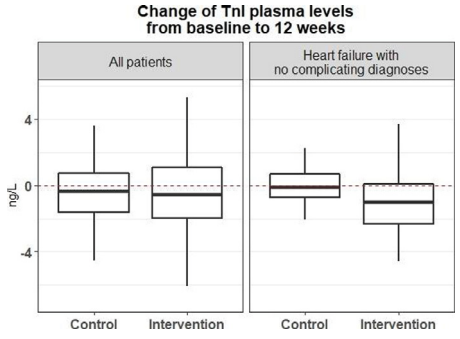

Figure 1