



EFFECTS OF LONG-TERM AEROBIC TRAINING, DESIGNED WITH INDIVIDUALIZED METHOD BASED ON LACTATE THRESHOLD DEFINITION

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Background:

Finding ways to non-pharmacological effects on myocardium is very relevant.

Objectives:

To evaluate the effects of long-term aerobic training, designed with individualized method based on lactate threshold (LT) definition, on myocardial remodeling in heart failure (HF) patients.

Methods:

297 HF patients III NYHA Class, 55 years old (37;63), BMI – 22(21;26)kg/m², LVEF – 33 (19;39)% were examined. Patients were divided into 2 groups performing physical rehabilitation (PR) of varying intensity for 9 months. In the main group (MG), 237 patients performed training walking daily for 60 minutes at a speed set at 95% of the speed reached at the lactate threshold (LT). 60 patients of the control group (KG) performed training walking three times a week at a speed registered at 55% VO₂peak. ERF activity was evaluated according to a standardized method using the Oxycon Pro equipment (Jaeger, Germany). CRT was performed on a treadmill model: GE Medical Systems Information Technologies using Oxycon Pro equipment (Jaeger, Germany). EchoCG was performed on Philips iE-33. All patients underwent a general clinical blood test. The number of shaped blood elements was determined on automatic hematological analyzer SISME X-1800. The data obtained were processed using Microsoft Excel, Statistica for Windows 10.0 application programs, the differences were considered significant at a significance level of p<0.05. To study the relationship of quantitative parameters, the Spearman correlation coefficient was calculated, estimating the measure of the linear relationship between the features.

Results:

At baseline CPET results in both groups did not significantly differ. VO₂LT and VO₂peak were 8.8+/-0,5; 13,5+/-0,9 ml/min/kg and 9.0+/-0.9; 13,6+/-1,2 ml/min/kg in MG and CG,



respectively ($p_1=0,08$, $p_2=0,07$, respectively). After 9 months of training VO_{2LT} and VO_{2peak} were better in MG than in CG: 16% and 24%, and 4% and 7%, respectively ($p_1<0,01$, $p_2<0,01$). 54 pts in MG – MG90min- have trained every day more than 90 min on their own. After PR course MG patients revealed a statistically significant decrease in LVESV, LVEDD and increase in LVEF. In CG, the LVEF has significantly increased; LVESV, LVEDD have changed unreliably. In the MG90min statistically significant decrease in LVESV, LVEDD was revealed. In MG90min, in 73% patients, LVL increased by more than 10% of the baseline level, $p = 0.02$; in 23%, less than 10%; in 4%, LVEF did not change or decreased. In MG60min, 48% patients increased LVEF more than 10% of the baseline level, $p=0.018$; 31% - less than 10%; in 21% LVEF did not change or decreased. In CG, in 23% of patients LVEF increased by more than 10%, $p = 0.014$; in 52% - less than 10%; in 25%, LVEF did not change or decreased. Associations of changes in ERF activity and LVESV were revealed ($r=-0.81$, $p=0.003$).

Conclusion:

1. Long-term PR calculated on the LT basis initiates physiological reverse remodeling of the myocardium in HF patients to a greater extent than PR calculated on the 55% VO_{2peak} .
2. ERF activity decrease is closely associated with LVESV decrease in against the background of long-term PR calculated on LT.