

Figure 1

Clinical effects of the enhanced external counterpulsation therapy in patients with ischemic chronic heart failure and chronic obstructive pulmonary disease

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Objective: The aim of the study was to assess the effects of the enhanced external counterpulsation (EECP) therapy in patients with ischemic chronic heart failure (CHF) and chronic obstructive pulmonary disease (COPD).

Methods: Eighty eight (n=88) stable symptomatic CHF (NYHA, functional class I-II; 35% \leq LVEF \leq 50%) subjects (76 male and 12 female; mean age 62 \pm 15.2) with prior anamnesis of coronary artery disease (CAD), at least one myocardial infarction and COPD were randomized in 3:1 manner into either 35 1-hour 250-300 mm Hg sessions of EECP (n=66; 56 male, 10 female) or Sham-EECP (n=22; 20 male, 2 female). All subjects had been received optimal CHF, CAD and COPD drug therapy. At baseline, 3 months and 1 year after EECP course every subject was examined with echocardiography and 6-minute walk test.

Results: All 66 active EECP treatment group subjects improved by at least 1 NYHA class, 65% of them had no heart failure symptoms post treatment (p<0.01). 95% of treatment group pts. had sustained NYHA class improvement at 1-year follow-up (p<0.01), compared with baseline. There was significant difference between LVEF 40 \pm 8.4% at baseline vs post-EECP LVEF 48 \pm 6.4% (p<0.01) in active EECP treatment group subjects. At the same time there were no significant changes of NYHA class and LVEF in Sham-EECP subjects. No one subject dies after one year of follow up.

Conclusions: Enhanced external counterpulsation (EECP) therapy sustainably improves NYHA functional class and LVEF in patients with ischemic CHF and COPD.

Effect of exercise training on NT-PRO-BNP plasma levels in patients with left ventricular systolic dysfunction after anterior st elevation myocardial infarction

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Background: Exercise-based cardiac rehabilitation (CR) in patients recovered from Anterior STEMI has a lot of beneficial effects on cardiovascular functional capacity, quality of life, psychological profile, risk factor modification, morbidity and mortality.

Aim: This study was done to identify the Effect of exercise training on NT-PRO-BNP biochemical marker and Echocardiography Determinants in Patients with LV Systolic Dysfunction.

Patients and methods: We included 40 adult patients recovering from acute anterior STEMI, with LV systolic dysfunction (LVEF 30-45%). The patients were divided into two groups, each composed of 20 patients: Group A enrolled in a 3-month exercise-based cardiac rehabilitation program and Group B who cannot comply to our program and these patients were discharged home with generic instructions to continue physical activity. All of them were recruited during the period between January 2016 to December 2016 and were on guideline-based optimal medical treatment. NT-Pro BNP, 12 lead surface ECG, and echocardiography were done before and after recruitment in a 3 months exercise training program.

Results: Our study showed statistically significant improvement in functional capacity, exercise tolerance, Ejection fraction and statistically significant reduction in heart rate compared to control group. Although BNP level was significantly reduced in both groups, the percent of change showed significant reduction in BNP level in patients group compared to control group.

Conclusion: The present study confirms the previous evidence that involvement of patients in cardiac rehabilitation program improves their cardiovascular risk factors, functional capacity and Health related quality of life through optimization of medical treatment, risk factor control, prescribed exercise training, physical activity and motivation and it should be implemented in routine management of these patients and supported by the government.

Objective: to assess the influence of physical rehabilitation in inotropic-dependent patients with chronic heart failure (CHF) of class III-IV on venous lactate and oxygen levels.

Methods: a prospective randomized study included 120 men aged 18-65, hospitalized in our National Research Centre due to decompensated CHF class III-IV, with left ventricular ejection fraction (LVEF) \leq 30%; blood pressure (BP) \geq 90/60 mmHg (with or without inotropic therapy). Patients of group 1 and 2 receiving dopamine or dobutamine for \geq 2 weeks were randomized into 2 groups: group 1 – participating in the program of physical training (PPT), 2 – without PPT. Group 3 – patients without inotropic support, participating in PPT. Initially, all patients were comparable in clinical and haemodynamical features, NTproBNP level, LVEF, arterial blood oxygen saturation (SpO₂, pulse oximetry): 97% [96.98] in 1st, 97% [96.98] in 2d and 97% [96.98] in 3d group. Venous blood (ScvO₂, from central venous catheter): 57% [46.65] in 1st, 57% [50.67] in 2d and 55% [51.65] in 3d group. Lactate level in venous blood at rest was normal in all 3 groups, comparable in groups 1 and 2, but higher in 1st (p=0.01) and 2nd (p=0.009) groups compared to 3d: 1.7 [1.3;1.8], 1.8 [1.2;2.2] and 1.1 [0.8;1.3] mmol/l. Aerobic physical training started at very low intensity, calculated by heart rate reserve. The follow-up was 6 months.

Results: Initially, at 3 and 6 months at peak of exercise, no decrease was observed (<90% in SpO₂) in groups 1 and 3. Initially, ScvO₂ at peak of exercise decreased comparably in 1st and 2nd groups to 37% [26.57] and 39% [31.45]; at 3 months: to 39% [34.42] and 38% [32.46]; at 6 months: to 41% [37.43] and 44% [41.49], respectively, without life-threatening adverse events. Peak lactate levels were comparable in groups 1 and 2, initially: 2.0 [1.8;3.0] and 2.0 [1.7;2.3] mmol/l; at 3 months: 2.2 [2.0;3.0] and 2.0 [1.8;3.8] mmol/l; at 6 months: 2.6 [1.9;4.3] and 2.5 [1.7;3.6] mmol/l. Intensity of physical training initially was very low, at 3 and 6 months – moderate in both groups. By 3d and 6th month of follow-up intra-group analysis showed no significant changes in SpO₂, ScvO₂ at rest in all 3 groups. Statistically significant dynamics was not observed in lactate levels at rest in all 3 groups, but in group 2, up to 6 months the lactate level became significantly higher than in groups 1 (p=0.005) and 3 (p=0.008): 1.1 mmol/l [0.8;1.5] in 1st, 2.3 [1.8;3.5] in 2nd and 1.4 [1.2;1.7] in 3d group. **Conclusions:** Inotropic-dependent and inotropic-independent patients with CHF at a peak of low and moderate intensity PPT had a comparable decrease in ScvO₂ and increase in venous level of lactate, not associated with life-threatening adverse events. By 6 months, there was no significant dynamics in rest venous lactate levels in all 3 groups, but in group 2 up to 6 months the lactate level became significantly higher than in 1st and 3d groups.

Cardiac and noncardiac factors influencing CPET variables in HF patients

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Background: Cardiopulmonary exercise testing (CPET) has long been used as golden standard for accessing functional status in heart failure (HF) patients. Exercise intolerance in HF patients may arise from reduced cardiac reserve, ventilatory and muscle/metabolic levels. These specific levels, alone or in combination, may have an impact on different CPET parameters. Red blood cell parameters is inexpensive and widely available tool for the assessment of prognosis in patients with chronic heart failure.

Aim: The aim of this study was to determine the cardiac and non-cardiac factors that may influence the CPET variables in patients with heart failure.

Materials and Methods: 100 patients with HFmEF and HFREF mean age 66 \pm 10.2 years, 72% men performed a symptom-limited, incremental exercise test (Bruce modified). The following exercise parameters were analyzed: peak oxygen uptake (VO₂ peak; ml/kg/min), anaerobic threshold (AT; % VO₂ max), ventilatory equivalent for carbon dioxide (VE/VCO₂). Other investigations include Echocardiography, NT-proBNP, Blood count, Respiratory muscle strength evaluation (maximal inspiratory and expiratory pressure (P_{imax} and P_{Emax}). Data are presented as mean and standard deviation. In multivariate analysis, the nonsignificant variables, resulted from the univariate regression analysis were excluded from the model following the criterion of greater P^* ($P < 0.05$).

Results: Mean Ejection fraction (EF, %): 39 \pm 8.7; peak oxygen uptake (peak VO₂, mL/kg/min): 13.7 \pm 4.8. Median NT-pro-BNP: 596.3 (Q1-3 1443-2401). In the multivariate regression models age (p<0.0001); EF(p<0.002) and RDW-CV (p<0.03) were significantly associated with VO₂ peak; Ve/ Vco2 was significantly associated only with age and EF.