

Effect of Exercise-based Cardiac Rehabilitation in Heart Failure Patients Treated in Different Institutions Across Europe

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The EuroCaReD Study Group

Objective:

Chronic heart failure (CHF) is associated with high rate of hospitalization and poor prognosis. Exercise-based cardiac rehabilitation (exCR) is highly beneficial in CHF patients and has been suggested to confer significant symptomatic and functional improvements. The aim of this study was to report exercise capacity in CHF patients compared with non-CHF patients before and after participating in exCR programs in different institutions across Europe.

Methods:

European Cardiac Rehabilitation Database (EuroCaReD) was introduced to get information in patient characteristics, service provision and outcomes in CR across Europe (Fig. 1). Registry data of 682 patients, CHF 44 (6.5%) (LVEF 30 (25-40) %, NT-proBNP 950 (853-1233) pg/ml) and non-CHF 638 (93.5%) (LVEF 60 (50-64) %, NT-proBNP 152 (50-900) pg/ml) were derived from different European countries between 2010 and 2012 using an electronic entry and database (Table 1). Exercise training prescription was left to the institutions discretion. Pre- and post- CR measurements registry data were used to compare improvement of exercise capacity after exCR program in both groups.

Results:

Before start of the exCR program CHF patients showed significantly less exercise capacity than non-CHF patients: HF max. achieved =105 bpm (93-133) vs. 126 bpm (111-143) $p=0.005$; and Watts max. achieved =60 Watts (40-80) vs. 114 Watts (87-145) $p=0.006$. During CR both groups could improve their exercise capacity. However CHF patients improved much more than non-CHF patients. After CR completion no statistical significant difference could be observed anymore between the CHF and non-CHF group: HF max. achieved =126 bpm (104-137) vs. 127 bpm (94-145) $p=0.94$; and Watts max. achieved =88 Watts (60-160) vs. 125 Watts (100-160) $p=0.21$ (Fig. 2).

Conclusion:

The present data show that exCR in CHF patients as performed in clinical practice of different institutions across Europe with different program settings is highly effective and leads to higher relative improvement of exercise capacity in CHF patients compared with non-CHF patients. This observation supports the importance of exCR programs for CHF patients.

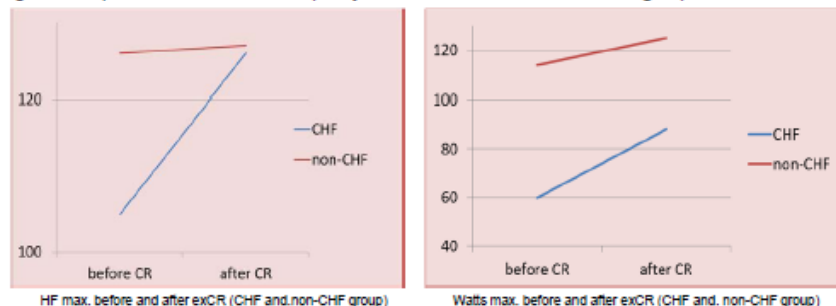
Figure 1: Countries participating the EuroCaReD project



Table 1: Patients characteristics

| Pts. characteristics | CHF | Non-CHF | Between group differences |
|-------------------------|----------------|--------------|---------------------------|
| Male gender (%) | 89 | 77 | 0.07 |
| Age (mean) | 63 | 62 | 0.51 |
| Employed (%) | 32 | 442 | 0.21 |
| Unemployed (%) | 2.6 | 7.4 | 0.27 |
| Retired (%) | 66 | 51 | 0.07 |
| NYHA - Class (%) | | | |
| 0 | 43 | 61 | 0.06 |
| I-III | 57 | 37 | 0.01 |
| LVEF (%) | 30 (25-40) | 60 (50-64) | 0.01 |
| ProBNP (pg/ml) | 950 (853-1233) | 152 (50-900) | 0.07 |
| CV events during CR (%) | 8 | 6 | 0.77 |
| CR completed (%) | 60 | 76 | 0.14 |

Figure 2: Improvement of exercise capacity after exCR in CHF and non-CHF group



FUNCTIONAL AND PSYCHOSOCIAL EFFECTS OF EITHER A TRADITIONAL DANCING OR A FORMAL EXERCISING TRAINING PROGRAM IN PATIENTS WITH CHRONIC HEART FAILURE: A COMPARATIVE RANDOMIZED CONTROLLED STUDY

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| Keywords: | Cardiac rehabilitation, Physical Training, Quality of life, dancing |
|  | <p>Objective: To compare the effects of traditional dancing with formal exercise training in terms of functional and cardiovascular benefits and motivation in patients with chronic heart failure.</p> <p>Design: Randomized controlled trial.</p> <p>Setting: Sports Medicine Laboratory.</p> <p>Subjects: Fifty-one Greek male patients aged 67.1 ± 5.5 years with chronic heart failure of NYHA class II-III, participated in an 8-month study.</p> <p>Interventions: They were randomly assigned to either training with Greek traditional dances (group A, $n=18$), or formal exercise training (group B, $n=16$) or a sedentary control group (group C, $n=17$).</p> <p>Main measures: At entry and the end of the study all patients underwent cardiopulmonary exercise testing and functional ability assessment and quality of life evaluations. The Intrinsic Motivation Inventory was also used to assess participants' subjective experience.</p> <p>Results: After training group A showed increased peak oxygen consumption by 33.8% (19.5 versus 26.1 ml/kg/min, $p<0.05$) and B by 32.3% (19.5 versus 25.8 ml/kg/min, $p<0.05$), maximal treadmill tolerance by 48.5% ($p<0.05$) and by 46.4% ($p<0.05$), and a decreased VE/VCO₂ slope by 18% ($p<0.05$) and 19.5% ($p<0.05$), respectively. Trained patients revealed significant improvement in the quality of life indices. Intrinsic Motivation Inventory was increased only in group A by 26.2% (3.08 versus 3.87, $p<0.05$).</p> <p>Conclusions: Exercise training in chronic heart failure patients with Greek traditional dances led to functional and cardiovascular benefits similar to formal exercise training and to a higher level of motivation.</p> |

Table 1 Aims of cardiac patients functional evaluation

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| Reproducible assessment of patient's exercise capacity |
| Prescription of endurance training intensity |
| Evaluation of response to endurance training |
| Evaluation of response to therapeutic interventions (drugs, ventricular resynchronization, etc.) affecting exercise capacity |
| Evaluation of the O ₂ transport and utilization system efficiency (ventilatory, hemodynamic, and metabolic components) |

Review Paper

Standards for the use of cardiopulmonary exercise testing for the functional evaluation of cardiac patients: a report from the Exercise Physiology Section of the European Association for Cardiovascular Prevention and Rehabilitation

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