

Pathophysiologic and gender differences regarding exercise responses in decompensated Heart Failure patients

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INTRODUCTION

Heart Failure (HF) patients often present impairment on their functional capacity. Exercise training is the key component of cardiac rehabilitation and must be early implemented¹. Knowing the characteristics that lead a patient to be a good responder to an exercise intervention would be useful to identify the ones that could benefit from this same intervention^{2,4}.

PURPOSE

Identify the characteristics of good responses to an aerobic exercise training in decompensated heart failure (HF) patients and understand if there are gender differences.

METHODS

Cross sectional study with 76 inpatients who performed an aerobic exercise training program (AET) (Figure 1)³. Functional capacity was evaluated at admission and discharge using the London Chest of Activity of Daily Living (LCADL) scale, the Barthel Index (BI) and the 6-minute walking test (6MWT). Multivariate linear regression was performed to understand which variables lead a patient to have better performance. Since it is known that men and women have different responses to exercise training, the results and analysis of the data collected were performed by gender.

RESULTS

The characteristics of the patients are presented in table 1 and an analysis by gender was also performed. Regarding the multivariate analysis, six predictive equations were obtained, one for each functional capacity (FC) tool divided by gender (table 2). NYHA class III patients do not differ from class IV in terms of FC at discharge. However, HF reduced ejection fraction patients presented higher 6MWT distance (309,6m vs 231m; p=0.01) and lower LCADL score (11 vs 15; p=0.03) compared to non-reduced. Women had an average of 4 days longer in-hospital stay and a considerable difference in the 6MWT. The differences by gender in terms of FC are presented in graph 1. Traditionally women are more sedentary and present less fitness level than men. The linear regression model shows that gender is a independent variable that contributes to the change in the 6MWT - favoring men.

CONCLUSIONS

The AET program appears to be more effective in younger patients, with low FC at admission and who are less impaired. Gender influences the performance of patients undergoing exercise training. Men present higher FC at discharge but the predictive models are stronger for women.

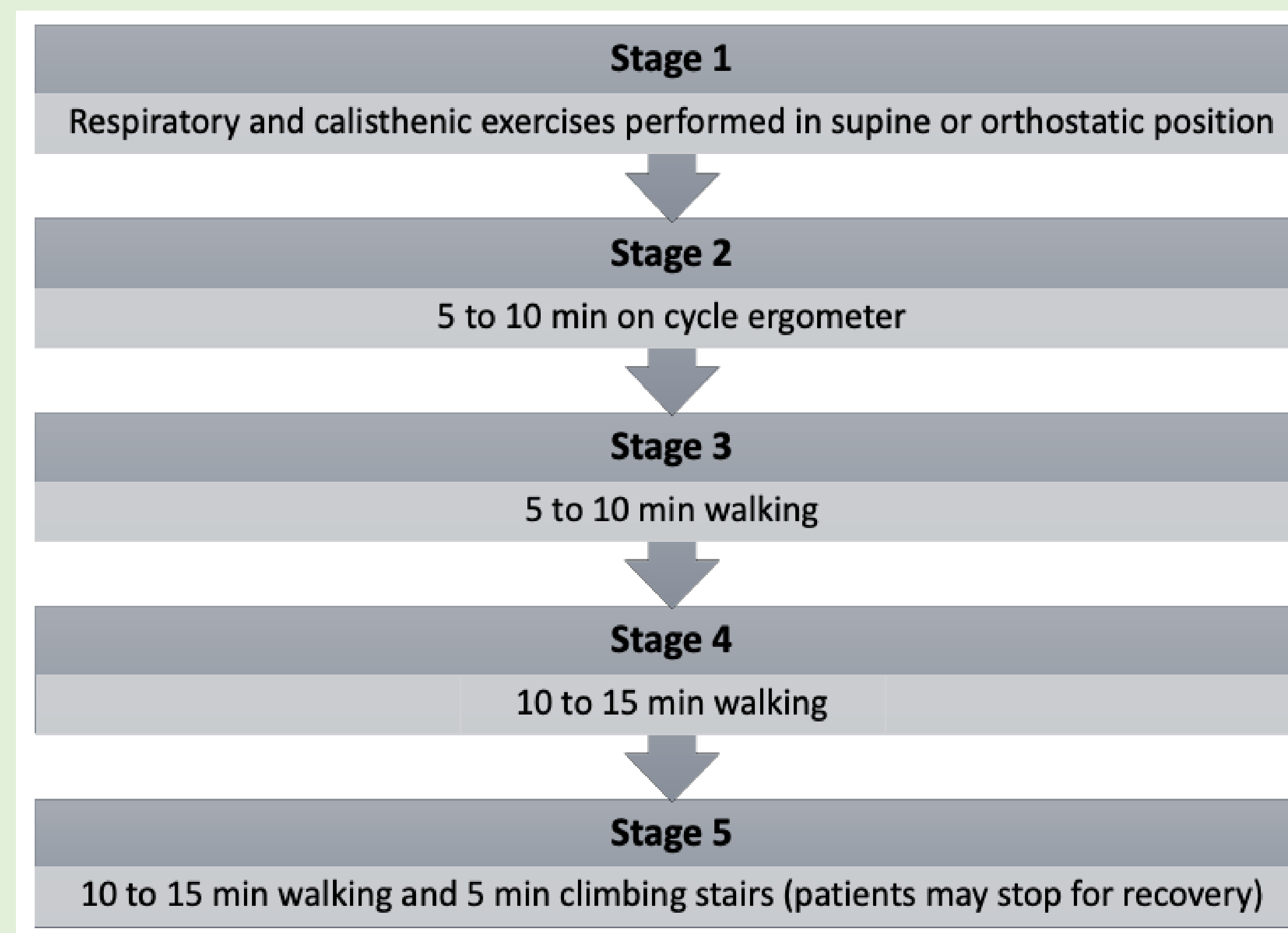


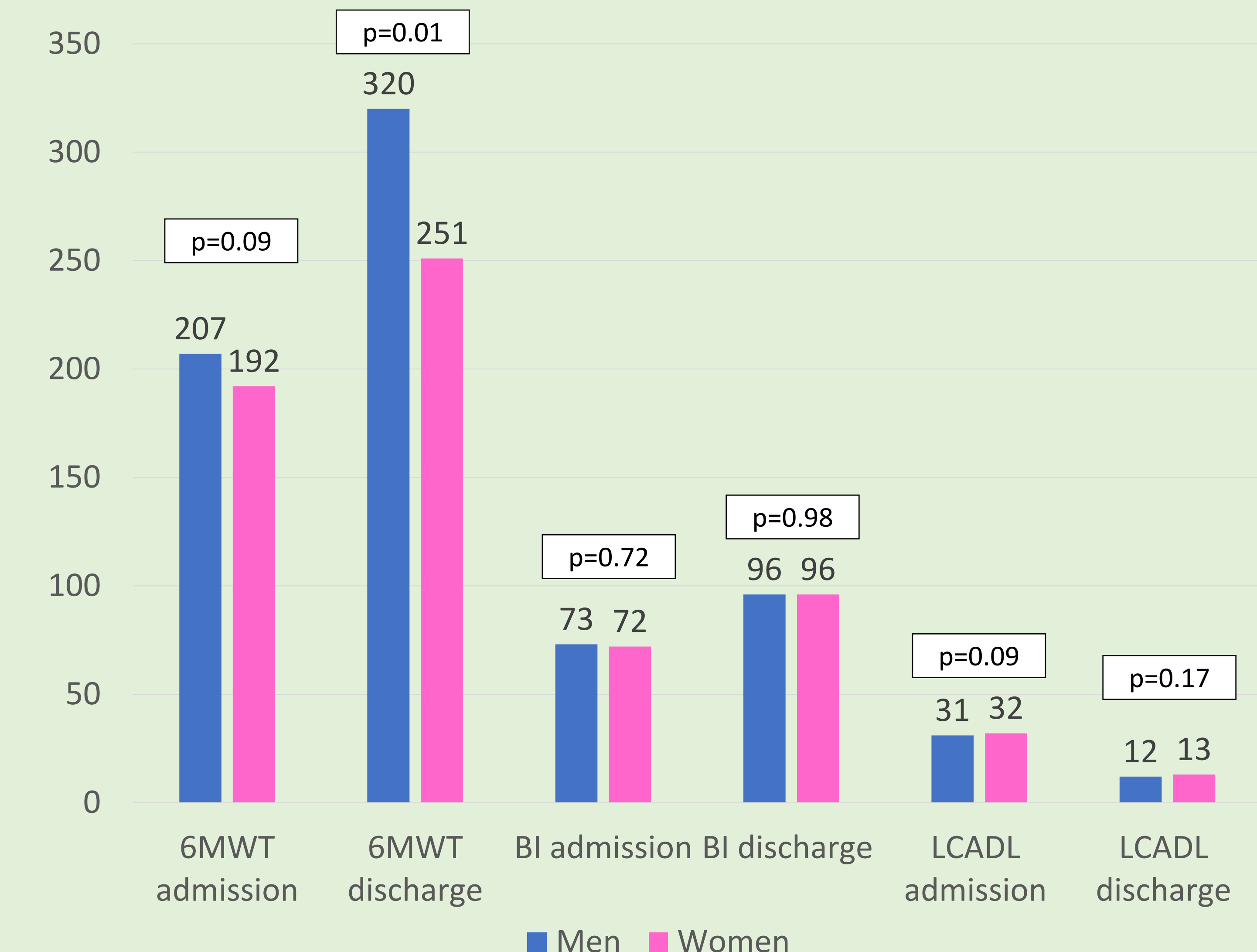
Figure 1 – Exercise training program – ERIC-HF program

Difference between final and initial 6MWT	
Men	452.487 - (0.974*initial6MWT) - (4.915*age) + (2.544*initial Barthel)
Women	376.746 - (0.839*initial6MWT) - (4.49*age) + (2.138*initial Barthel)
Difference between final and initial Barthel Index	
Men	89.591 - (0.831*initial Barthel) + (0.014* initial6MWT) + (0.127*age)
Women	94.284 - (0.816*initial Barthel) - (0.171*age)
Difference between final and initial LCADL	
Men	-5.114 - (0.794*initial LCADL) + (0.158*age)
Women	4.03 - (0.721*initial LCADL)

Table 2 – predictive equations

Parameter	Total (n=76)	Value	
		Male (n= 52; 70%)	Female (n=24; 30%)
Age (years)	66.7±10.4	65.8±10.5	69.5±9.9
Inhospital stay	19±10	17.8±9.1	21.5±11.3
Diabetes	23 (30.2%)	14 (60.8%)	9 (39.2%)
Ventricular function and NYHA class			
HFpEF	10 (13.1%)	6 (7.7%)	4 (16.7%)
HFmEF	8 (10.6%)	2 (3.8%)	6 (25%)
HFrEF	58 (76.3%)	44 (84.6%)	14 (58.3%)
NYHA III	64 (84.2%)	41 (78.8%)	23 (95.8%)
NYHA IV	12 (15.8%)	11 (21.2%)	1 (4.2%)
Ethiology			
Valvular disease	22 (29%)	10 (19.2%)	12 (50%)
Ischemic disease	27 (35.5%)	20 (38,5%)	7 (29.1%)
Other	27 (35.5%)	22 (42.3%)	5 (20.9%)

Table 1 – patient's characteristics



Graph 1 – functional capacity differences by gender

These results are consistent with the evidence that **gender** plays an important role in determine the performance of patients in **exercise training programs**.

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