

Volume of exercise in patients admitted for decompensated Heart Failure

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INTRODUCTION

Decompensated Heart Failure (HF) patients have a significant functional dependence, impairment of performance in activities of daily living and low exercise tolerance^{1,2}. Exercise is a well establish cardiac rehabilitation intervention which leads to improvement of symptoms, and is recommended even for inpatients^{1,3,5}. The amount of Exercise is directly related to its benefits^{5,6}, however, safety should always be a concern too, and the volume of exercise performed must be adjusted to safety issues^{3,4}. ERIC-HF program is an aerobic exercise training program to HF inpatients.

PURPOSE

To evaluate the volume of exercise that HF patients preform during the hospitalization, according to ERIC-HF program.

METHODS

50 patients performed an aerobic exercise training program (ERIC-HF: Early Rehabilitation in Cardiology – Heart Failure) with 5 sequential stages: respiratory training, cyclo ergometer training, walking training and climbing stairs (Table 1). The patient progresses on the program according to his symptoms, subjective perception of effort and nurse clinical judge. The volume of exercise is registered in number of turns on the cyclo ergometer, meters walked, number of steps (Figure 1) and the amount of time they spent exercising. Subjective perception of exertion using Borg scale, and vital signs are evaluated in every training session (twice a day for 5 days a week). At discharge patients preform a 6 minute walking test (6MWT) to evaluate their functional capacity.

RESULTS

Patients performed 692 sessions of exercise with an average of 14 sessions each, for 16 (±9) days of hospitalization (Table 2). The major etiology of HF is ischemic and valvular disease and most patients have reduced ejection fraction (Figure 2)). Patients performed progressive periods of exercise, for more time and with lower levels of perceived exertion, presenting an average value of 6 (±3) in the admission and 2 (±2) at the discharge day (Figure 3). Only 2 patients stayed in the second stage of the program during the all inhospital stay, 21 patients reached the forth stage and 27 patients reached the final stage of the program (climbing stairs) with an average of 87 steps in 5 minutes (Figure 4). The patients who performed a bigger volume of Exercise walked more distance in the 6MWT: 403 (±87) meters compared with patients who didn't performed stairs: 252,5 (±31). This difference is a statistically significant (p=0,05) and also clinically.

No major adverse cardiovascular events occurred during the training sessions (Table 3).

LIMITATIONS

The main limitations of this study were the fact that not all patients performed the same number of sessions, due to the duration of inhospital stay; the absence of a 6MWT at admission, the relatively small study sample; and the inability to perform subgroup analysis for important characteristics, particularly left ventricular ejection fraction

CONCLUSIONS

AET can be well tolerated by patients admitted due to decompensated HF and patients who are capable to perform a bigger volume of exercise can improve much more their functional capacity showed by the 6MWT results.

Performing exercise according to ERIC-HF program is also safe.

REFERENCES

- Gary RA, Cress ME, Higgins MK, Smith AL, Dunbar SB. A combined aerobic and resistance exercise program improves physical functional performance in patients with heart failure: a pilot study. *J Cardiovasc Nurs.* 2012;27(5):418-30
- Ponikvar P, Voors AA, Anker SD, et al. 2016 ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure. *Rev Esp Cardiol (Engl Ed).* 2016;69(12):1167.
- ACSM. Guidelines for Exercise Testing and Prescription. In: Agostolini S, Baruth M, Brainerd T, Brewer CA, editors. Tenth Edition e2016.
- Mezzani A, Casciastore F, Catanzaro R, et al. Early-start Exercise training after acute hemodynamic decompensation in patients with chronic heart failure (RE-START). A multicenter, randomized, controlled trial on short-term feasibility and impact on functional capacity, symptoms and neurohumoral activation. *Monaldi Arch Chest Dis.* 2014;82(1):20-
- Ivarez P, B. Hannawi and A. Guha (2016). "Exercise And Heart Failure: Advancing Knowledge And Improving Care." *Methodist Debaakey Cardiovasc J* 12(2): 110-115.
- Cattadori, G., C. Segurini, A. Piccoli, L. Padeletti and C. Anzà (2018). "Exercise and heart failure: an update." *ESC Heart Fail* 5(2): 222-232.

Stage	Type of exercise
I	Respiratory and calisthenic exercises performed in supine or orthostatic position
II	5 to 10 min on cycle ergometer
III	5 to 10 min walking
IV	10 to 15 min walking
V	10 to 15 min walking and 5 min climbing stairs (patients may stop for recovery)

Table 1 – ERIC-HF program stages

	Nº of days of hospitalization	Nº of sessions
Average	5	5
Máximum	41	28
Mínimum	8,1	5,9
SD	18,7	13,8

Table 2 – inhospital stay and sessions of exercise

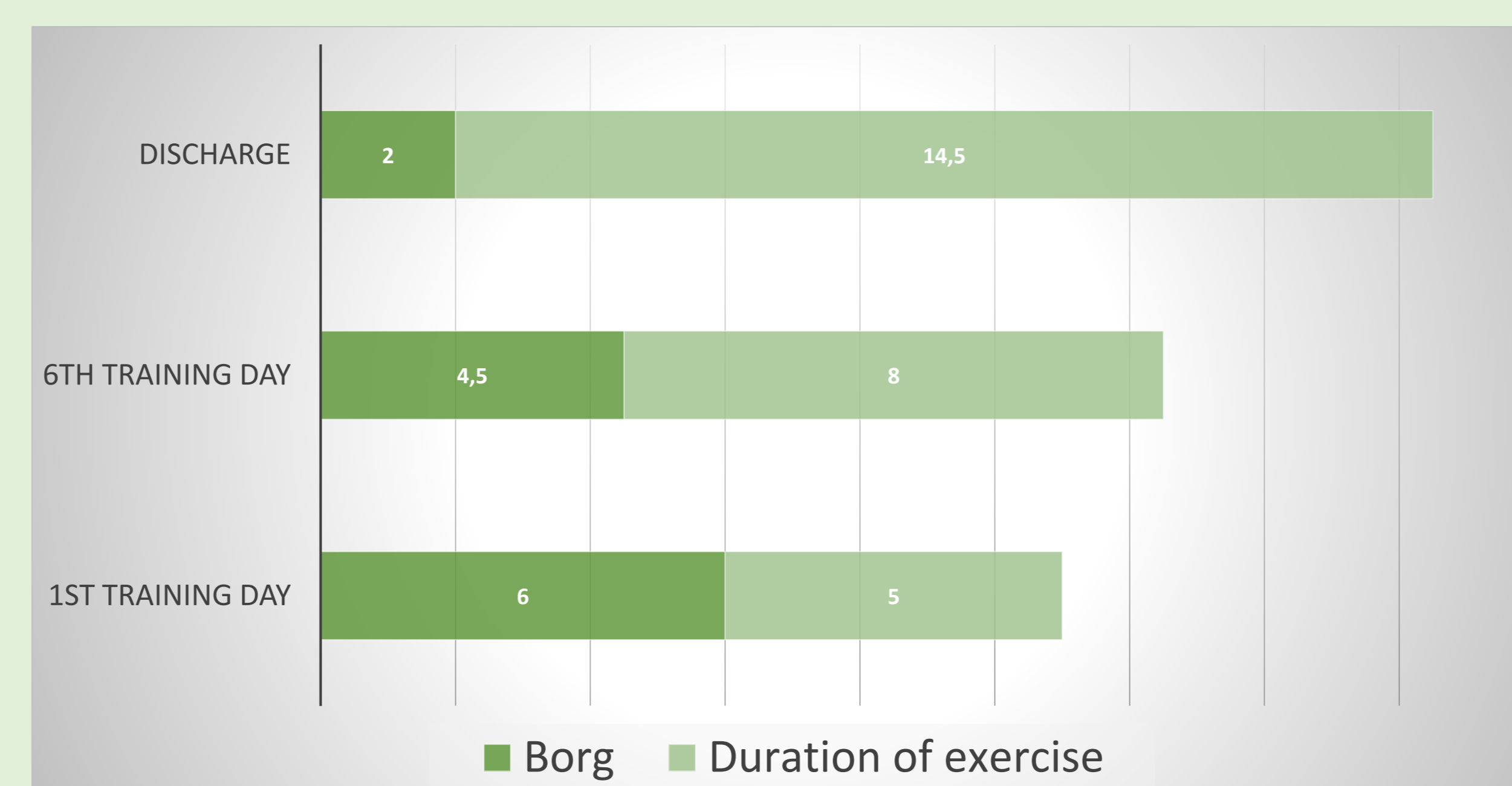


Figure 3 – Perception of exertion and duration of exercise

Adverse Event	N (%)
Atrial fibrillation (rapid ventricular response)	12 (1,7%)
Decrease of SBP> 20mmHg	38 (5,4%)
Clinical worsening	0 (0%)
SPE ≥ 8	57 (8,2%)
Precordial pain	0 (0%)

Table 3 – adverse events

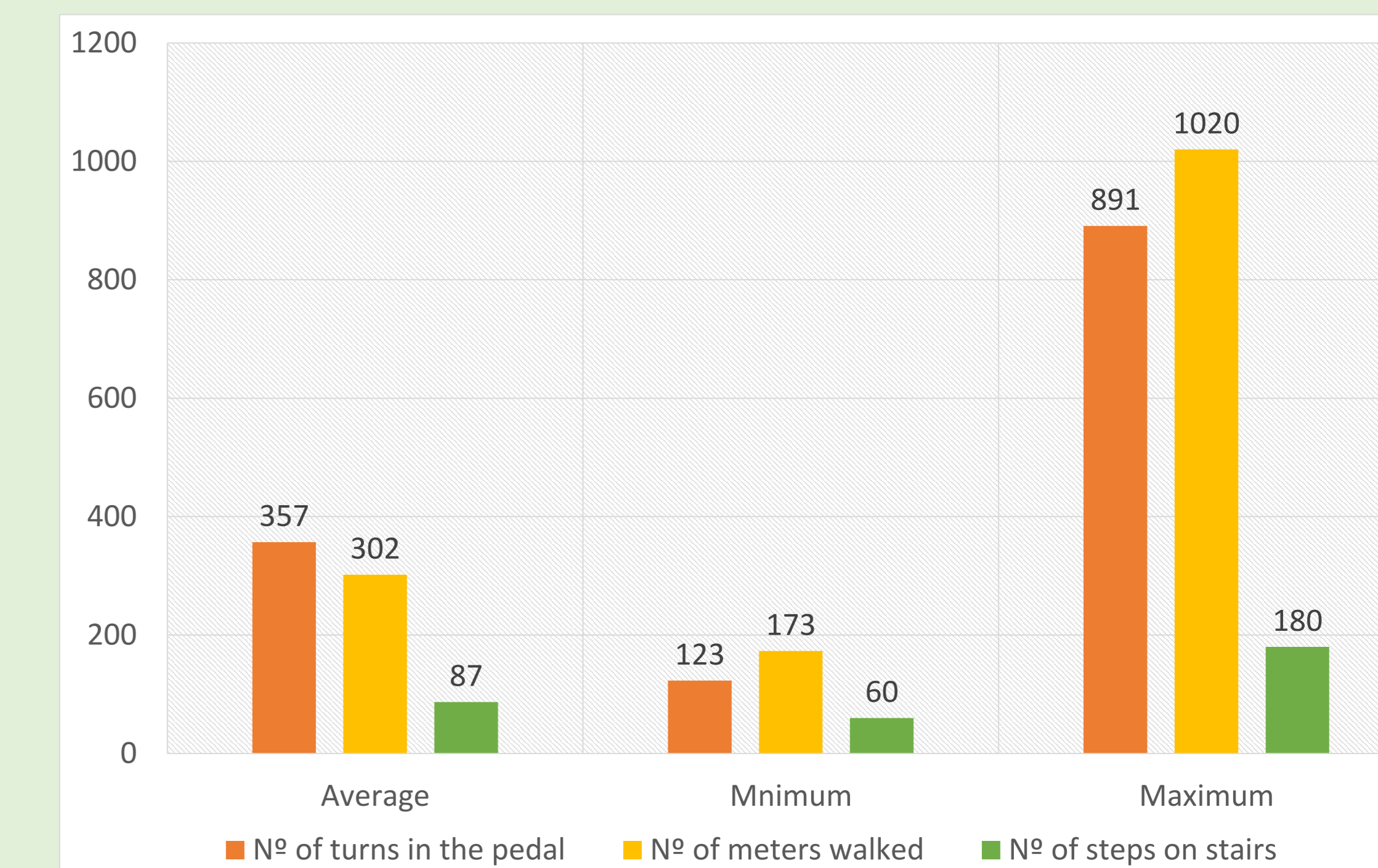


Figure 1 – Parameters of exercise

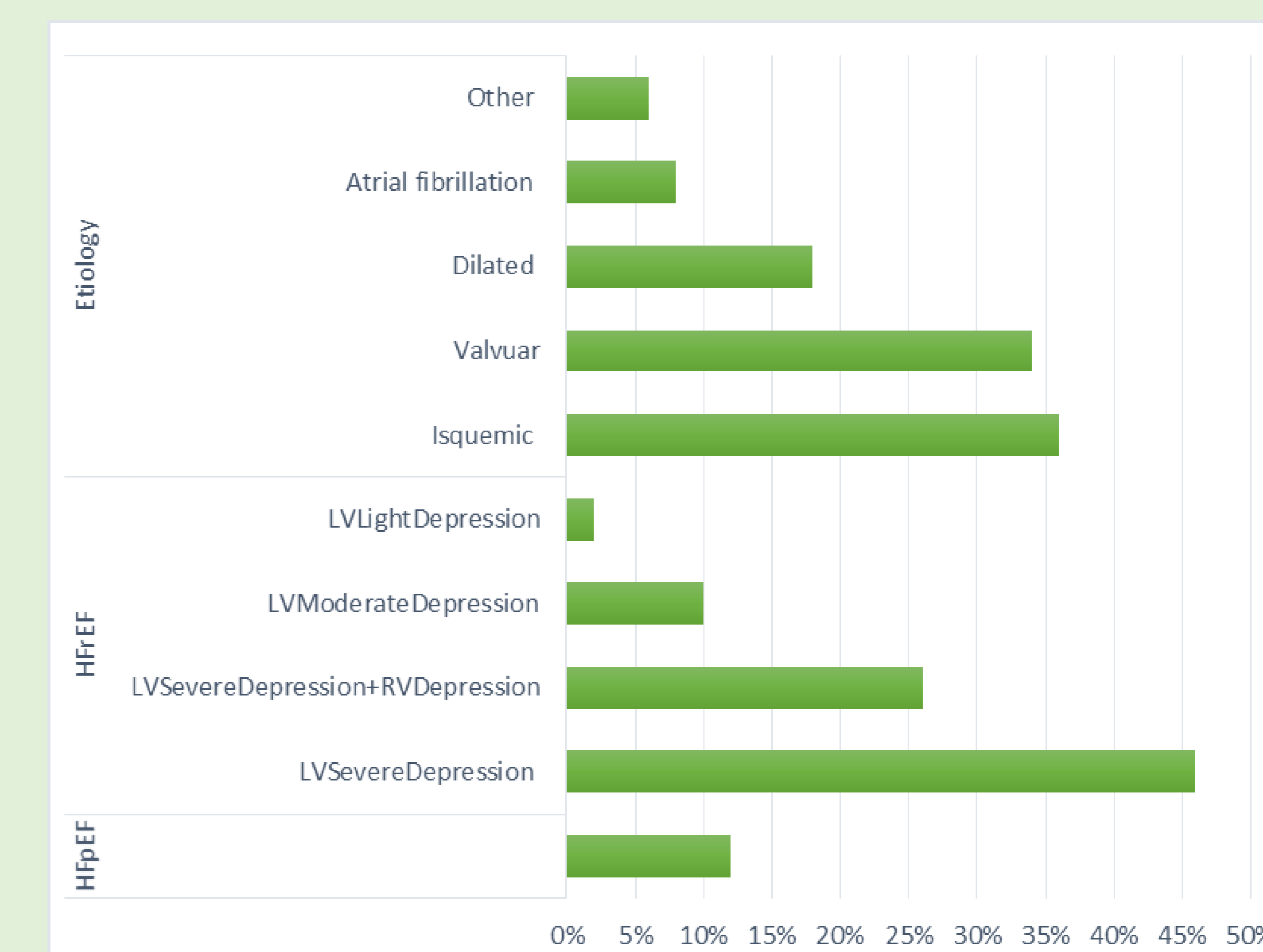


Figure 2 – Ventricular function and etiology of HF



Figure 4 – Perception of exertion and duration of exercise