

## Heart Failure: Walk Test versus Peak Oxygen Consumption

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### Dear Editor,

The six-minute walk test (6MWT) is a simple assessment of physical capacity in patients with heart failure (HF) and can be performed in a hallway or on the treadmill<sup>1</sup>. It is suggested that the kind of effort during the 6MWT resemble the daily activities, enabling the patient to determine the rhythm of walking<sup>2</sup>.

Carvalho et al<sup>3</sup> evaluated the reproducibility of the 6MWT in the hallway, as well as the correlation of the variables  $VO_2$ , WD and HR in the sixth minute of the 6MWT with those of the cycle ergometer peak cardiopulmonary exercise testing (CPET) in HF. The authors demonstrated reproducibility between the 6MWTs and correlation with the CPET, concluding that the 6MWT is a reliable and low-cost assessment tool for the prescription of exercise

in HF. However, the assessment of functional capacity in cycle ergometer shows a difference of 10 to 15% less when compared to that obtained with the treadmill test<sup>4</sup>. Thus, the correlation found in this study can be the difference between the types of tests. Moreover, the intensity of walking during the 6MWT in HF is influenced by verbal encouragement, as demonstrated by Guimarães et al<sup>1</sup>.

Discussions about the reproducibility of the 6MWT are not recent, as well as its safe use in HF<sup>2</sup>. Nevertheless, in our country, there has been no longitudinal study involving a significant number of patients with HF of nonischemic, ischemic and chagasic etiology. Furthermore, the use of this test for exercise prescription is purely theoretical, making larger studies necessary to clarify its applicability for this purpose.

### Keywords

Heart failure; walking; exercise; respiratory function tests.

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### Reply

In a letter sent to the editor of the Brazilian Archives of Cardiology, the reader of the article published in this journal asks questions and makes comments about our recently

published results, indicating that the 6MWT can be performed either in the hallway or on the treadmill. Considering that, it should be emphasized that the use of the 6MWT in our study

followed the guidelines of the American Thoracic Society Statement: Guidelines for the Six-Minute Walk Test<sup>1</sup>. These guidelines do not recommend the use of a treadmill for the performance of such a test, despite the economy of space, as patients are unable to properly choose the parameters of the ergometer during the test performance (gait speed and their variations, duration of one or more interruptions of the movement, etc.), as in the test carried out in the hallway. Furthermore, studies show that the distance walked in the 6MWT in a same group of patients is significantly longer, when compared to the one performed on the treadmill<sup>2,3</sup>.

Moreover, in the original manuscript, we did not compare the absolute maximum values of each variable in the 6MWT to those obtained in the CPET, as we believe, as the reader suggests, that the 6MWT is representative of the patient's performance in submaximal loads of physical exertion, while the CPET was conceived and designed, in the present study, to be a stress test of maximum intensity. This aspect was well expressed in the presentation of results and discussion of the manuscript. Instead of seeking comparisons between the absolute values, the basic goal of the study was to test the degree of correlation between the magnitude of physical fitness at the CPET and the performance at the 6MWT. On the other hand, investigations regarding the comparison of performance in patients who underwent 6MWT and CPET in a cycle ergometer have been reported by other authors<sup>1,3-5</sup>.

When discussing the original article, it was emphasized that the difference found in the average  $\text{VO}_2$  peak of the

6MWT compared to that obtained in the CPET was due to the formula used to calculate the  $\text{VO}_2$  during the 6MWT, which overestimates the real value of  $\text{VO}_2$  peak. Thus, contrary to what the reader's letter suggests, it is not necessary to take into account the specificity of exercise in relation to the type of ergometer used to explain the observed differences. On the other hand, during the performance of both tests, all patients received verbal encouragement to voluntarily reach the best performance compatible with the existing functional reserve, following the recommendations of the aforementioned guidelines<sup>1,6</sup>. Having said that, we are convinced that the documented results were not influenced by the lack of such encouragement.

The results of our study lead to the conclusion that the 6MWT may be an alternative, not a substitute to the CPET and that it has shown to be safe and effective in quantifying the functional reserve of the cardiovascular system of patients with HF. Finally we should mention that, in spite of the favorable evidence regarding the use of the 6MWT published by us, they are preliminary ones and studies with larger samples are needed to definitively demonstrate the effectiveness of the 6MWT when prescribing physical training to patients with HF.

Sincerely,

**Eduardo Elias Vieira de Carvalho**

**Marcus Vinícius Simões**

**Lourenço Gallo Junior**

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