

Prognostic value of 6-minute walk test and cardiopulmonary exercise test in acute heart failure (from the ESCAPE trial)

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Authors: Hesham R. Omar^a, Maya Guglin^b.

Objectives

Heart failure (HF) is common and is associated with high rates of morbidity and mortality. Functional capacity is an important predictor of morbidity and mortality in HF. Functional capacity is assessed via the 6-minute walk test (6MWT), or via cardiopulmonary exercise testing (CPET) measuring maximal oxygen uptake (VO_2max) [1]. Of the two, the 6MWT is easier to perform, requires no equipment, and mimics daily activity [2]. The aim of this study was to determine the utility of the 6MWT and CPET in patients with acute systolic HF in predicting postdischarge all-cause mortality and rehospitalization.

Study methods

In this study, 433 patients with acute HF ejection fraction <30% and NYHA classification IV were included. Included patients had three months of symptoms despite treatment and systolic blood pressure <125 mmHg. Six-minute walk distance (6MWD) and CPET variables were measured at admission and after discharge at three months. End points included all-cause rehospitalization and mortality at six months follow-up.

Results

The average 6MWD recorded in patients on admission and discharge was 597 and 765 ft., respectively. The 6MWD on admission was significantly higher for survivors, both on admission (624 vs. 463 ft., $P=0.006$) and at discharge (789 vs. 636 ft., $P=0.006$). Patients who had normal 6MWD cutoff values of >288ft. on admission and >320 ft. on discharge experienced significantly lower mortality (11.1% vs. 28.3%, OR0.316, $P=0.002$). Admission ($P=0.009$) and discharge 6MWD ($P=0.016$) predicted mortality determinants after adjustment for confounding variables. Of note, CPET-derived variables did not predict mortality or rehospitalization.

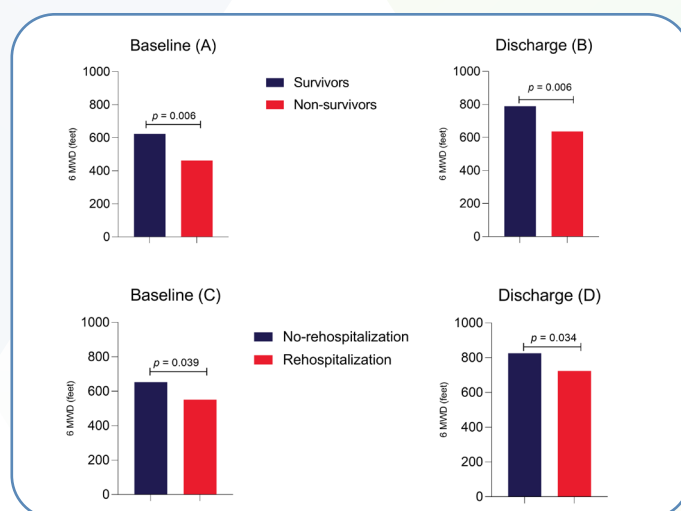


Figure 1. Mean of baseline and discharge 6MWD in survivors and non-survivors (A,B) and those who rehospitalized or non-rehospitalized at six months (C,D).

^a Online Care Group (AmericanWell.com), Boston, MA, 02109, USA.

^b Division of Cardiovascular Medicine, Indiana University, Indianapolis, IN, USA.

What is CPET?

Cardiopulmonary exercise testing (CPET) provides assessment of pulmonary and cardiovascular system functionality by measuring the response of these systems to both submaximal and peak effort during exercise. Often using either a cycle ergometer or a treadmill, the subject breathes into the CPET device which measures oxygen consumption and carbon dioxide production, along with highly accurate standard spirometric function such as minute ventilation and tidal volume. CPET is frequently used to evaluate unexplained dyspnea and may be valuable in identifying the cause of dyspnea and exercise intolerance in these patients.

What is the 6MWT?

The six-minute walk test (6MWT) was developed by the American Thoracic Society and is utilized as a submaximal exercise test for assessment of a patient's functional status. The distance covered over a time of six minutes is used as the outcome by which to compare changes in performance capacity.



Figure 2. Vyntus™ CPX is an example of a CPET measuring device*.

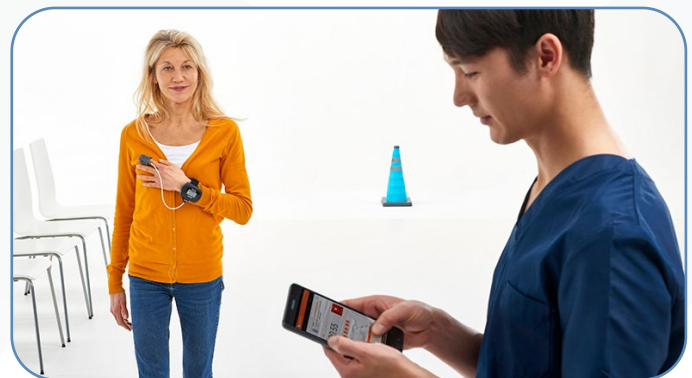


Figure 3. Vyntus™ WALK is an example of a 6MWT measuring device*.

Take home message from this study

- 6MWD is an independent predictor mortality in advanced systolic HF.
- CPET is helpful for determination of risk of death or re-hospitalization in patients with less severe HF.
- Many patients such as those included in the ESCAPE trial (only able to accomplish 6MWD of 288 feet) show such a low functional status that CPET is not as useful.
- In patients with acutely decompensated HF, even rest or minimal activity may be the equivalent of maximal exercise.
- CPET is more useful compared to 6MWD for risk stratification in patients with less severe HF.

*No endorsement of any specific measuring devices in this paper

References

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2. Omar HR, Guglin M. Prognostic value of 6-minute walk test and cardiopulmonary exercise test in acute heart failure (from the ESCAPE trial). American Heart Journal Plus: Cardiology Research and Practice. 2021;1:100005.

For more details on the content of the study, please refer to the original article here.

Full reference: Omar HR, Guglin M. Prognostic value of 6-minute walk test and cardiopulmonary exercise test in acute heart failure (from the ESCAPE trial). American Heart Journal Plus: Cardiology Research and Practice. 2021 Jan 1;1:100005.

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 Jaeger Medical GmbH
Leibnizstrasse 7
97204 Hoechberg
Germany

Jaeger Medical America, Inc.
14050 Rebecca St, Bldg 4
Moreno Valley, CA 92553
USA

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