Assessment of Three Activity Questionnaires in Patients with Heart Failure

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The activity questionnaire most frequently used in heart failure, the New York Heart Association Classification, does not correlate well with peak oxygen uptake. The correlation of this variable with other activity questionnaires was analyzed in 83 patients (69 with heart failure and 14 control patients), 61.5 ± 11 years old, who were interviewed and classified according to the Canadian Cardiovascular Society Classification. The Dyspnea-Fatigue Index and functional capacity according to the Specific Activity Questionnaire were determined for each patient. Subsequently, the treadmill cardiopulmonary exercise test (Naughton) was performed and the following correlations with peak oxygen uptake were found: Canadian Cardiovascular Society, \( r = -0.39 \); Dyspnea-Fatigue Index, \( r = 0.44 \); Specific Activity Questionnaire, \( r = 0.38 \). \( p < 0.001 \) for all three. The Dyspnea-Fatigue Index yielded the best correlation, although it was only slightly better than the Canadian Cardiovascular Society Classification, which is easier to obtain.

Key words: Heart failure. Exercise. Oxygen

INTRODUCTION

There are several classifications in the cardiological literature that group patients with dyspnea in functional degrees, which is useful for their clinical management. The best known of these classifications are those of the New York Heart Association (NYHA)\(^1\) and Canadian Cardiovascular Society (CCS).\(^2\) Later, others have published that try to improve the correlation with peak oxygen consumption (VO\(_2\) p): the specific activity scale of Goldman,\(^3\) the index of dyspnea-fatigue (IDF) of Yale University,\(^4\) the Activity Status Index of Duke University\(^5\) and, finally, the Specific Activities Questionnaire (SAQ).\(^6\)

The purpose of this study was to evaluate some of these functional classifications (CCS, SAQ and IDF) in a series of outpatients with heart failure, and to correlate scores with VO\(_2\) p.

PATIENTS AND METHOD

Patients

Patients diagnosed as heart failure (Framingham criteria)\(^7\) with at least one hospital admission were
included. Exclusion criteria included patients with aortic stenosis, hypertrophic cardiomyopathy, inability to walk (disabling arthritis or lower limb amputation, residual stroke, severe intermittent claudication, etc.), chronic airway obstruction, hyperdynamic heart failure, complete left bundle branch block or ventricular pacemaker associated to ischemic heart disease, angina pectoris, or myocardial infarction in the last 3 months. In addition, a group of control patients without a history of heart failure and with an ejection fraction (EF)>0.5 in the echocardiogram was included to increase the number of cases of NYHA classes I-II.

The study included 83 patients (69 with heart failure and 14 controls), mean age 61 years, 66% men (Table 1). Most of the patients had dilated cardiomyopathy (61 [73.5%] with an EF<0.5), CCS functional class II-III, and sinus rhythm.

**METHOD**

Patients were interviewed in baseline conditions and classified into one of the 4 grades of CCS classification. Next, the IDF was obtained; the IDF score consisted of 3 components (magnitude of the task, rate of execution, and functional limitation), each graded from 0 (minimum) to 4 (maximum). The final score ranged from 0 to 12. Finally, patients were interviewed about the SAQ list of activities. This questionnaire, a list of 13 tasks with a known energy consumption in METS, is conceived in English as a self-administered questionnaire. To our knowledge, it has not been validated for use in Spanish, which is why we administered it as an interview. We replaced the questions about «moderate gardening work like weeding or raking leaves» and «pushing an electrical or gasoline-powered lawnmower over level land» (unusual activities in our hospital area) with «masonry jobs (building walls), automobile maintenance, cleaning glass» and «painting with a brush, mopping floors, dancing», respectively, which have a similar energy consumption. The most important activity in terms of energy consumption that the patient could carry out was recorded.

After the interview, an echocardiogram was made (Toshiba SSH 140) to measure the EF (Teicholz method or the monoplane ellipsoid in a 4-chamber apical plane if segmental contractility disturbances existed). Likewise, ergospirometry was carried out (Marquette MAX 1 treadmill, Naughton protocol), measuring VO₂ p and CO₂ production (CPX Express, Medgraphics). The respiratory ratio=1 was surpassed and the test was detained for exhaustion.

**Statistical analysis**

Continuous variables are given as the mean and deviation standard, with a range of values. The correlation between VO₂ p and the values of the 3 classifications (Pearson test if both variables were normal, Spearman when some did not have a normal distribution) was analyzed. The SPSS 10.0 statistical program was used.
The results of all the classifications correlated significantly with VO$_2$ p (Table 2). The CCS grade had a moderate level of correlation (−0.39) (Figure 1), similar to the correlation obtained with SAQ (0.38) (Figure 3). The IDF had the best correlation (0.44) (Figure 2).

**DISCUSSION**

The classification most often used to evaluate the functional grade of patients with dyspnea is the NYHA classification of 1964. Another much used classification is that of the CCS of 1972, which requires more effort, with questions about city blocks walked and number of flights of stairs climbed. These classifications group patients into 4 functional classes and show a discrete correlation with VO$_2$ p, with correlation coefficients between −0.28 for NYHA and −0.58 for CCS.

Later classifications have attempted to improve the correlation with VO$_2$ p. The Specific Activity Scale of Goldman (1981) tried to describe the functional level of patients more precisely, interrogating them about their capacity to carry out activities with a known energy consumption, although it continues to group patients in 4 classes and its correlation with VO$_2$ p is still suboptimal (r=0.67; r=0.356).

The index of dyspnea-fatigue of Yale University (1984) consists of a score from 0 to 12, which shows a moderate correlation with the duration of effort (r(Pearson)=0.37).

In 1989, the Activity Status Index of Duke University was published, a self-administered questionnaire with 12 questions that assigns a score for various physical activities that a patient can carry out comfortably, then obtains a final index. The correlation with VO$_2$ p was r=0.58.

The latest questionnaire on physical activity to date is the Specific Activity Questionnaire (1994), which was correlated with VO$_2$ p in 1996 (r=0.71).

Our results indicate that all the questionnaires had a discretely significant correlation with VO$_2$ p, particularly the Yale IDF, with r=0.44, which is somewhat higher than the value communicated in the

**TABLE 2. Correlations with VO$_2$ p**

<table>
<thead>
<tr>
<th>Variables</th>
<th>R</th>
<th>P</th>
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<tbody>
<tr>
<td>CCS</td>
<td>−0.39</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>IDF</td>
<td>0.44</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>SAQ</td>
<td>0.38</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

VO$_2$ p indicates peak oxygen consumption; CCS, Canadian Cardiovascular Society; IDF, index of dyspnea-fatigue of Yale University; SAQ, specific activity questionnaire.

**Fig. 1.** Scatter diagram of the variables peak O$_2$ consumption (VO$_2$ p) and classification of the Canadian Cardiovascular Society (CCS). The Spearman correlation coefficient is shown.

**Fig. 2.** Scatter diagram of the variables peak O$_2$ consumption (VO$_2$ p) and index of dyspnea-fatigue of Yale University (IDF). The linear regression and Pearson correlation coefficient are shown.

**Fig. 3.** Scatter diagram of the variables peak O$_2$ consumption (VO$_2$ p) and Specific Activity Questionnaire (SAQ). The Spearman correlation coefficient is shown.
REFERENCES


CONCLUSIONS

1. The 3 activity questionnaires studied correlated moderately but significantly with VO_{2}p.
2. The best correlation was obtained with the IDF of Yale University, although this index is more troublesome to obtain and only slightly better than the CCS classification, which is much simpler in conception.