

The Added Value of Cardiopulmonary Exercise Testing Results in Diagnosing Heart Failure With Preserved Ejection Fraction

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Aim:

To evaluate the diagnostic value of cardiopulmonary exercise testing (CPET) parameters for identifying heart failure with preserved ejection fraction (HFpEF).

Methods:

A retrospective study was conducted by analyzing spiroergometry results. The findings were compared between healthy individuals ($n = 13$) and patients diagnosed with HFpEF ($n = 12$). The following CPET parameters were analyzed: $\text{VO}_2/\text{kg VT1}$, peak VO_2/kg , VO_2/HR , VE/VO_2 , VE/VCO_2 , HR, VE, VT, BF, and their diagnostic value alongside BNP.

Results:

The main differences in CPET results were observed in peak VO_2/kg , VE/VCO_2 and maximal heart rate ($p = 0.031$, $p = 0.041$, $p = 0.025$, respectively). The presence of ≥ 2 pathological indicators – specifically peak $\text{VO}_2/\text{kg} \leq 27.0 \text{ mL/min/kg}$, $\text{VE}/\text{VCO}_2 \geq 27.4$ and $\text{HR max} \leq 144 \text{ bpm}$ – yielded 83.3% sensitivity and 61.5% specificity for diagnosing HFpEF. Combined with an elevated BNP level, the diagnostic accuracy improved significantly to 81.8% sensitivity and 100.0% specificity.

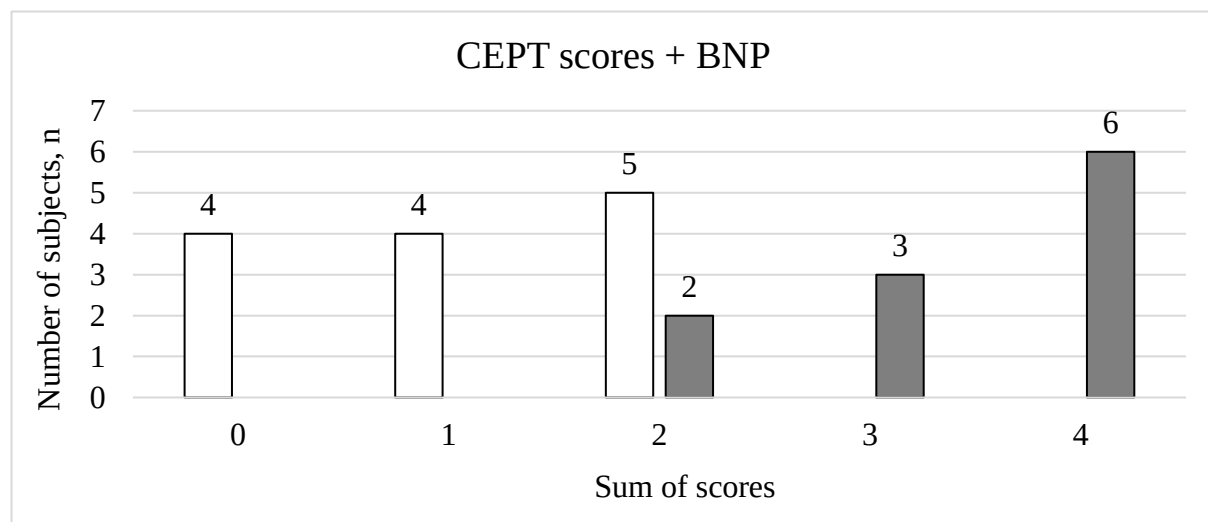


Fig. 1. Distribution of subjects according to the combined spiroergometry and BNP results. White bars indicate healthy subjects, grey bars - HFpEF patients.

Conclusions:

CPET enables the objective identification of pathophysiological changes characteristic of HFpEF that remain undetected at rest. The highest diagnostic accuracy is achieved by evaluating a combination of several CPET parameters: ≥ 2 pathological markers alongside an elevated BNP concentration allows for near-perfect identification of affected individuals.