

# DETECTION OF ANAEROBIC THRESHOLD EMPLOYING HEART RATE IN CHF PATIENTS

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## OBJECTIVES

A method to detect anaerobic threshold involves heart rate (HR). This method, known as 'heart rate deflection point' (Conconi et al., 1996), has practical importance in that it can be used to determine intensity in aerobic exercise training. This study was designed to examine the potentiality of detecting a threshold using HR, to evaluate different methodologies of data analysis and, to correlate them to ventilatory threshold in patients with chronic heart failure (CHF).

## METHODS

Thirteen stable CHF patients, 11 males and 2 females [(M±S) age: 50.9±10.9, VO<sub>2peak</sub>: 14.8±3.5 ml/kg/min], performed a symptom-limited exercise test to exhaustion on a cycle ergometer. The test was consisted of 1-min stages and the increase in workload was individualised according to the Wasserman norms. Power output at the HR threshold was evaluated with HR-workload plots, employing three different models: linear (HR<sub>lin</sub>), log-log transformation (HR<sub>log</sub>) (Beaver et al., 1985) and D<sub>max</sub> (HR<sub>D</sub>) (Cheng et al., 1992). Ventilatory threshold was assessed with the V-slope method (VCO<sub>2</sub>-VO<sub>2</sub> plots), while the corresponding power output (VT) was calculated by the gas analysis system software.

## RESULTS

A HR threshold was detected in all subjects. Mean ± SD values for VT, HR<sub>lin</sub>, HR<sub>log</sub> and HR<sub>D</sub> were 62.5±21.6, 72.2±26.5, 72.6±27.2, and 72.3±24.9 watts respectively. No differences were observed between the HR models examined (p>0.05), while VT was significantly lower in all cases (p<0.05). VT was significantly correlated (p<0.05) to HR<sub>lin</sub> (r=0.92), HR<sub>log</sub> (r=0.92), and HR<sub>D</sub> (r=0.91).

## CONCLUSIONS

A HR threshold can be detected in CHF patients. All analysis models employed were significantly higher than VT, and highly correlated with it. These findings, as well as the comparison of HR threshold to other concepts of anaerobic threshold (e.g. lactate thresholds) and the appropriateness, in general, of the 'HR deflection point' method in prescribing aerobic exercise training in CHF patients, need to be further investigated.