

CARDIAC FUNCTION AND HEART FAILURE

SUCCESSFUL RESTORATION OF HEART RATE RESPONSIVENESS TO EXERCISE USING CARDIAC RESYNCHRONIZATION THERAPY DELAYS ANAEROBIC THRESHOLD IN PATIENTS WITH ADVANCED HEART FAILURE

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Background: Chronotropic incompetence (CI), defined as <80% maximum predicted heart rate, is a common finding in patients with advanced heart failure (HF) and is associated with a worse functional capacity. Whether rate responsive pacing with cardiac resynchronization therapy (CRT) would improve exercise performance in patients with advanced HF and severe CI (<70% MPHR) is unknown.

Methods: Patients (N=13) with HF, chronic CRT, and severe CI were randomized in a double blind crossover trial to either DDD (control) or DDDR (rate responsive). Six minute walk test (6MWT) distance, oxygen consumption at anaerobic threshold (VO₂ @ AT), and VO₂ max were measured. Testing was repeated in the alternate pacing mode.

Results: Rate responsive pacing commenced with standard settings in 9 of 13 (69%) patients. In these 9 subjects, 6MWT distance improved from 358.5 ± 40.7 m to 376.8 ± 24.5 m with DDDR pacing (p<0.05). VO₂ @ AT occurred later and improved from 9.6 ± 1.8 ml/kg/min to 10.8 ± 2.9 ml/kg/min with DDDR pacing (p=0.29). There was a linear relationship between the increase in heart rate at 3 min during rate responsive pacing and improvement in VO₂ @ AT (r 0.83, p<0.05, Fig 1). VO₂ max did not change acutely with rate responsive pacing.

Conclusions: Activation of rate responsive programming using standard settings does not reliably result in increased pacing rate during exercise. When rate responsive pacing using a CRT device is achieved in patients with advanced HF and severe CI, aerobic exercise performance improves acutely.

