Reference – June 2011 – Abraham, et al: "Subgroup Analysis of a Randomized Controlled Trial Evaluating the Safety and Efficacy of Cardiac Contractility Modulation in Advanced Heart Failure," Journal of Cardiac Failure

Link to trial summary - https://pubmed.ncbi.nlm.nih.gov/21872139/

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Background: Cardiac contractility modulation (CCM) signals are nonexcitatory electrical signals delivered during the absolute refractory period intended to improve contraction. We previously tested the safety and efficacy of CCM in 428 NYHA functional class III/IV heart failure patients with EF ≤35% and narrow QRS randomized to optimal medical treatment (OMT) plus CCM (n=215) versus OMT alone (n=213) and found no significant effect on ventilatory anaerobic threshold (VAT), the study's primary end point. In the present analysis, we sought to identify if there was a subgroup of patients who showed a response to CCM.

Methods and Results: The protocol specified that multiregression analysis would be used to determine if baseline EF, NYHA functional class, pVO_2, or etiology of heart failure influenced the impact of CCM on AT. Etiology and baseline pVO_2 did not affect efficacy. However, baseline NYHA functional class III and EF ≥25% were significant predictors of increased efficacy. In this subgroup (comprising 97 OMT and 109 CCM patients, ≈ 48% of the entire population) VAT increased by 0.10 ± 2.36 in CCM versus -0.54 ± 1.83 mL kg^{-1} min^{-1} in OMT (P = .03) and pVO_2 increased by 0.34 ± 3.11 in CCM versus -0.97 ± 2.31 (P = .001) at 24 weeks compared with baseline; 44% of CCM versus 23% of OMT subjects showed improvement of ≥1 class in NYHA functional class (P= .002), and 59% of CCM versus 42% of OMT subjects showed a ≥10-point reduction in Minnesota Living with Heart Failure Questionnaire (P = .01). All of these findings were similar to those seen at 50 weeks.

Conclusions: The results of this retrospective hypothesis-generating analysis indicate that CCM significantly improves objective parameters of exercise tolerance in a subgroup of patients characterized by normal QRS duration, NYHA functional class III symptoms, and EF >25%.