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ECHOCARDIOGRAPHIC PREDICTORS OF LONG TERM OUTCOMES IN PATIENTS UNDERGOING CARDIAC RESYNCHRONIZATION THERAPY: WHAT IS THE OPTIMAL METRIC?

Poster Contributions
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Background: Cardiac resynchronization therapy (CRT) imparts survival benefit in patients with heart failure and a wide QRSd, but not all respond. A variety of markers of positive CRT effect have been proposed, principally indices of reverse ventricular remodeling (RVR). However, their comparative efficacy is controversial. We tested the effect of commonly applied echocardiographic indices of response on long term outcomes.

Methods: We collected clinical and echocardiographic data on 292 patients with heart failure undergoing CRT. Changes in left ventricular (LV) ejection fraction(LVEF), LV end-systolic volume(LVESV), and LV end-diastolic volume(LVEDV) following CRT were calculated. The following definitions of RVR were created: any improvement in LVEF, improvement in LVEF ≥5% and ≥10%, any reduction in LVESV, reduction in LVESV ≥5%, 10%, 15%, and 20%, any reduction in LVEDV, reduction in LVEDV ≥5%, 10%, 15%, and 20%. Using a nested multivariate model of a priori determined predictors of long term survival free of LVAD or heart transplant, each definition was added to the model individually to determine which provided the best prediction of long term outcomes.

Results: Over a mean follow up of 5.3±2.4 years, there were 134 endpoints (8 LVADs, 13 heart transplants, and 113 deaths). When added to a nested model controlling for gender, cardiomyopathy subtype, ICD (CRTD vs. CRTP) , LBBB, QRS duration, beta blocker use, ace inhibitor use, creatinine, hemoglobin , and pre-CRT LVEF, all definitions of RVR resulted in improvement in model fit defined by a statistically significant reduction in the -2log likelihood ratio. LVEF improvement ≥5% and LVESV reduction ≥ 10%, 15%, and 20% produced the best model fit and were similar to each other. LVESV reductions <10% were inferior compared to definitions using greater reductions. All definitions using LVEDV were inferior to all other definitions.

Conclusion: Following CRT, LVEF improvement ≥5% and reduction in LVESV ≥10%, 15%, and 20% were the best remodeling predictors of long term outcome, and approximately equivalent to each other. LVEDV indices of RVR were inferior to all others.