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Prospective Minnesota Study of ECHO Dyssynchrony in Cardiac Resynchronization Therapy (PROMISE - CRT)

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Abstract:

Introduction: There are no prospective studies assessing the relationship of acute changes in mechanical dyssynchrony with clinical and left ventricular (LV) reverse remodeling response to CRT. We used tissue Doppler imaging (TDI) and speckle-tracking echocardiography (STE) in a prospective multi-center (9 site) study to test the hypotheses that changes in measures of LV mechanical dyssynchrony one-week after CRT will correlate with 1) clinical response at 3 months and 2) LV structural remodeling at 6 months. Methods: Echocardiograms with TDI were performed before, 1 week, 3 and 6 months after CRT in 63 heart failure patients (age = 67 ± 10 yr; 49 male) indicated for CRT by current criteria. LV volumes and ejection fraction were calculated with the biplane Simpson's method. Longitudinal dyssynchrony was calculated as the standard deviation (SD) of time to peak systolic velocity (Ts-12) and peak displacement (TT-12) of 12 segments from three apical views. Radial dyssynchrony [SD of time to peak radial strain (Ts-6_{rad}) in six segments] was assayed using mid-ventricular short axis views and STE. Six minute hall walk (6MHW) and Minnesota Living with Heart Failure Questionnaire (MLHFQ) were measured as markers of clinical response. Results: Overall, CRT significantly ($p < .05$) improved LV ejection fraction, LV volumes, MLHFQ scores, and 6MHW. There were no significant relationships between acute changes (after 1 week) in longitudinal or radial dyssynchrony and changes in 6MHW (Ts-12: $r = .02$, TT-12: $r = .04$, Ts-6_{rad}: $r = .07$) and MLHFQ (Ts-12: $r = .15$, TT-12: $r = .01$, Ts-6_{rad}: $r = .18$) at 3 months. Acute changes in Ts-12 ($r = -.02$) and TT-12 ($r = -.16$) were not related to changes in LVESV at 6 months. Acute change in Ts-6_{rad} was significantly related ($r = .61$, $p < .001$) to change in LVESV at 6 months. Conclusions: Acute changes in dyssynchrony assessed by TDI and STE after CRT are not related to clinical response at 3 months. However, acute changes in radial, but not longitudinal, dyssynchrony are related to LV remodeling response after 6 months of CRT. Ongoing analyses are evaluating the predictive value of additional variables for clinical and LV volume response in this cohort.

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Author Disclosure Information: **A.J. Bank**, Medtronic, M,A; Boston Scientific, M,A; GE Medical, Inc., M,A; Medtronic, S,I; Boston Scientific, S,I; **A.S. Kelly**, Medtronic, M,I; Boston Scientific, M,I; **K.V. Burns**, None; **S.W. Adler**, Medtronic, M,A; Boston Scientific, M,A; St. Jude Medical, M,A; St. Jude Medical, M,I; Boston Scientific, M,I; Medtronic, S,I; **S.R. Goldsmith**, None; **M.P. Olivari**, None; **C. Tang**, None; **A.M. Thelen**, None; **C.L. Kaufman**, Medtronic, M,A; Boston Scientific, M,A; Medtronic, S,I; Boston Scientific, S,I.

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