

Adaptive Cardiac Resynchronization Therapy Effect on Electrical Dyssynchrony (aCRT-ELSYNC): a randomized controlled trial.

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Abstract

Introduction: Adaptive cardiac resynchronization therapy (aCRT) is known to have clinical benefits over conventional CRT. We aimed to compare the effects of aCRT and conventional CRT on electrical dyssynchrony. **Methods:** We conducted a double-blind, randomized controlled trial in patients receiving CRT for routine clinical indications. Participants underwent cardiac computed tomography and 128-electrodes body surface mapping. We measured electrical dyssynchrony on the epicardial surface using noninvasive electrocardiographic imaging (ECGI) before and 6 months post-CRT. Ventricular electrical uncoupling (VEU) was calculated as the difference between the mean left ventricular (LV) and right ventricular (RV) activation times. An electrical dyssynchrony index (EDI) was computed as the standard deviation of local epicardial activation times. **Results:** We randomized 27 participants (mean age 64±12 y; 34% female; 53% ischemic cardiomyopathy; LV ejection fraction 28±8%; QRS duration 155±21 ms; strict left bundle branch block (LBBB) in 13%) to conventional CRT (n=15) versus aCRT (n=12). In atypical LBBB (n=11;41%) with S-waves in V5-V6, conduction block occurred in the anterior RV, as opposed to the interventricular groove in those who met the strict LBBB criteria. As compared to baseline, VEU reduced post-CRT in aCRT (median reduction 18.9 (interquartile range 4.3-29.2 ms; P=0.034), but not in conventional CRT (21.4 (-30.0 to 49.9 ms; P=0.525) group. There were no differences in the degree of change in VEU and EDI indices between treatment groups. **Conclusion:** The effect of aCRT and conventional CRT on electrical dyssynchrony is largely similar.

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