Alternating Right Ventricular Site Pacing Compared to Right Ventricular Apical Pacing: A Meta-Analysis

ACC Poster Contributions
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Background: Evidence is emerging that chronic right ventricular (RV) pacing in patients with and without normal left ventricular (LV) function causes LV dyssynchrony, remodeling, and possible LV dysfunction. RV septal (RVS) & RV outflow tract (RVOT) pacing have been tested as an alternative but the results from small sized studies are not definitive.

Methods: We performed a meta-analysis of published clinical trials to evaluate the effects of long-term RVS and RVOT pacing and compare them with RV apical (RVA) pacing. Pubmed, Embase, and Cochrane were searched for indexed studies on RV pacing. Studies that compared pacing in RVS or RVOT to RVA and reported (or provided by communication) baseline & final LV ejection fraction (LVEF) were included. Data was extracted on an intention-to-treat basis. Heterogeneity of studies was analyzed and a random effect model was used.

Results: Out of twenty studies identified, thirteen studies with 813 patients met inclusion criteria. Six studies compared RVOT with RVA and seven studies compared RVS with RVA pacing. Analysis of all studies showed that patients with RVA pacing (median age 72 years, range 61-77 years, median percentage of males 60% & range 16.6-100%, Percent RV pacing 95% & range 49.0-99.3%, median follow up for 18 months & range 3-116.4 months) had a bigger decrease (mean difference in LVEF: 5.82, 95% Confidence Interval: 3.64-8.00) in LVEF compared to RVOT/RVS pacing (median age 70 years, range 61-77 years, median percentage of males 62%, range 25-100%, percent RV pacing 91% & range 52.7-98.9%, median follow up for 18 months & range 3-116.4 months). This result did not change when the two non-randomized studies were excluded from analysis. Subgroup meta-analysis showed that RVOT/RVS pacing was superior to RVA pacing in patients with LV dysfunction (3 studies with 269 patients) and atrial fibrillation (4 studies with 345 patients) but not in patients with AV block (5 studies with 270 patients).

Conclusion: RV or RVOT pacing may be an emerging alternative to RVA pacing. As these studies are small, further comprehensive larger studies are needed, especially to determine if there are specific subgroups of patients that might benefit from RVOT/RVS pacing.