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**CRT pacing: Midterm follow-up in LV only pacing without RV lead in patients with normal AV conduction**

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**Background:** LV only pacing is a validated CRT option; nevertheless, studies concerning CRT without RV lead are not available; the main criticism for not using RV lead would be AV block occurrence and variability of AV conduction.

**Purpose:** Outcome of real life CRT fusion pacing using only right atrium/left ventricular (RA/LV) leads in patients (pts) with normal AV conduction (NAVc).

**Methods:** Consecutive NAVc pts with CRT-P indication were implanted with a RA/LV DDD pacing system. Exclusion criteria: myocardial infarction, CRT-D indication in secondary prevention, severe LA dilatation. Any AV block occurrence during implantation was followed by RV lead placement and true triple chamber CRT-P. In pts not feasible for endocardial pacing due to unfavorable CS anatomy, epicardial LV lead was placed using mini thoracotomy with subsequent implantation of a dual chamber PM using direct subclavian vein puncture for RA lead. Complete follow-up at 1, 3 and every 6 months thereafter included complex echocardiography, holter recording and stress testing.

**Results:** 35 pts were initially included; during implantation 2 pts developed acute AV block and needed RV lead. The final RA/LV CRT-P group had 33 pts (18 male) aged 61±11 yo. Average follow-up: 20±16 months. CRT-D upgrade was not necessary. All pts were responders. LV lead position was posterior-lateral in 12 pts, lateral 14 pts, posterior 1 pt, anterolateral 3 pts, epicardial leads 3 pt. NYHA functional class improvement was noted in 28 pts (84%). Mitral regurgitation degree decreased in 23 pts (70%). Non-sudden cardiac death occurred in 2 pts (6%). Amiodarone was introduced for AF episodes in 2 pts (6%) and atrial flutter cavotricuspid ablation was performed in another patient (3%) without any other complication. No evidence of recurrence of AV block was noted in those 2 pts who needed classic 3 leads CRT-P, and LV only pacing was also the best strategy for long term follow-up.

**Conclusions:** CRT-P using only RA/LV pacing showed a positive outcome in carefully selected patients and may be an elegant alternative to classical triple CRT. Cost analysis and complex evaluation (complications, long term follow-up) may be done in larger multicenter studies.

**Funding Acknowledgements:** Sponsored by Abbott

**Background:** Cardiac resynchronization therapy (CRT) with multipoint left ventricular (LV) pacing (MultiPoint™ Pacing [MPP]) has been shown to improve acute hemodynamics and chronic outcomes compared to conventional biventricular pacing (BIV). The impact of MPP on 3D electrical synchronization has not been revealed.

**Purpose:** The aim of this study was to compare QRS metrics derived from 3D vectorcardiograms (VCG) during acute BIV and MPP stimulation.

**Methods:** Patients implanted with a CRT-D device (Quadra Assura MP™ and Quartet™) LV lead underwent a predefined pacing protocol prior to hospital discharge. The pacing protocol included 4 simultaneous BIV configurations (with LV pacing at each of the 4 LV electrodes), and 8 MPP configurations. For each pacing configuration, VCG reprocessing from 12-lead surface ECGs by an independent, blinded corelab resulted in three QRS metrics indicative of electrical synchrony: duration, amplitude, and area.

**Results:** Thirty patients (80% male, EF 31±7%, QRS duration 161±18 ms, 27% ischemic) enrolled in 4 European centers completed the pacing protocol and 3D VCG analysis. The range of all MPP settings for each patient, relative to BIV settings, yielded significantly lower QRS duration (MPP: 134±17 ms, BIV: 142±18 ms, \( p < 0.01 \)), QRS amplitude (MPP: 0.87±0.26 mV, BIV: 1.02±0.27 mV, \( p < 0.01 \)), and QRS area (MPP: 57±22 mV ms, BIV: 69±23 mV ms, \( p < 0.01 \)), all indicative of improved synchrony with MPP.

**Conclusion:** Vectorcardiography demonstrated greater acute electrical synchrony associated with MultiPoint Pacing than conventional biventricular CRT.

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**Vectorcardiography illustrates enhanced electrical synchronization by multiPoint pacing**

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**Background:** CRT pacing: Midterm follow-up in LV only pacing without RV lead in patients with normal AV conduction

**Purpose:** The purpose of this study was to compare QRS metrics derived from 3D vectorcardiograms (VCG) during acute biventricular pacing (BIV) and multiPoint pacing (MPP).

**Methods:** Thirty patients (80% male, EF 31±7%, QRS duration 161±18 ms, 27% ischemic) enrolled in 4 European centers completed the pacing protocol and 3D VCG analysis. The range of all MPP settings for each patient, relative to BIV settings, yielded significantly lower QRS duration (MPP: 134±17 ms, BIV: 142±18 ms, \( p < 0.01 \)), QRS amplitude (MPP: 0.87±0.26 mV, BIV: 1.02±0.27 mV, \( p < 0.01 \)), and QRS area (MPP: 57±22 mV ms, BIV: 69±23 mV ms, \( p < 0.01 \)), all indicative of improved synchrony with MPP.

**Conclusion:** Vectorcardiography demonstrated greater acute electrical synchrony associated with MultiPoint Pacing than conventional biventricular CRT.

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