Methods: A group of 100 consecutive patients (pts) in sinus rhythm, with intrinsic AV < 200 ms, successfully implanted CRT were randomized to FOI vs nominal programming group (NOM). Mean age 66±10 years, 68% males, 30% ischemic cardiomyopathy, LV ejection fraction 25±7%, QRS 177±24 ms. The AV interval was optimized looking narrowest QRS with fusion from intrinsic conduction during LV pacing. The VV interval was then adjusted measuring QRS duration introducing RV pacing at 90 ms, 120 ms, and 130 ms respectively. Pts were seen at 6-months intervals. Clinical response was defined as an increase >10% at the 6 minutes walking test (6MWDT) or 1 point functional class. LV remodeling was defined as an increase in -10 points in LV ejection fraction.

Results: Of 100 pt, 49 (49%) were randomized to FOI and 51 (51%) to NOM. Of 100 pt, 49 (49%) were randomized to FOI and 51 (51%) to NOM. Mean age 66±10 years and 68% of patients were male. The groups were comparable among the 2 groups. The QRS duration was further reduced in FOI pts: 125±13.9 ms vs NOM: 144±3.25.8 ms, p < 0.005. By FOI, all pts showed >10% shortening of the baseline QRS. Percentage of ventricular pacing was 96%±7% in FOI vs 96±5% in NOM, p=0.04. At 12 months overall mortality was similar in both groups. The percentage of clinical responders was 80% in FOI vs 78% in NOM, p=0.31. Reverse LV remodeling was obtained in 61% of FOI pts vs 33% in NOM, p=0.02.

Conclusions: Device optimization by ECG based on QRS duration working for fusion; achieve a shorter QRS at baseline and results in increased number of ECG responders at 12 months follow up as compared to nominal programming.

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Acute haemodynamic improvement with cardiac resynchronisation therapy is predicted by baseline haemodynamic status
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Purpose: Acute haemodynamic improvement with cardiac resynchronisation therapy (CRT) is often used to guide optimization of device function, and may predict long-term response to therapy. We studied the acute haemodynamic response to CRT but other predictors are not known. We investigated whether baseline invasive haemodynamic parameters predict acute haemodynamic response to CRT.

Methods: We performed a retrospective, single centre study of patients who had intra-arterial BP measurement via radial arterial line at baseline and acutely following CRT implantation. Of these patients, the majority additionally underwent right heart catheterization (RHC) immediately prior to CRT. We analysed the relationship between baseline haemodynamic parameters (pulse pressure (PP), pulmonary capillary wedge pressure (PCWP) and cardiac index (CI)) and acute pulse pressure change in response to CRT (delta PP).

Results: 224 patients had invasive arterial BP measurements recorded pre- and post-CRT. Of these patients, 180 had RHC. Baseline CI correlated with baseline PP (Pearson r=0.297, p<0.001). CI significantly increased PP from 54.8±15.6mmHg to 59.1±15.6mmHg (p<0.001), resulting in a mean delta PP of 4.4±1.5mmHg. There was inverse correlation between baseline PP and delta PP (r=-0.227, p=0.0006), and baseline CI and delta PP (r=-0.199, p=0.008), and a positive correlation between baseline PCWP and delta PP (r=0.281, p<0.0001, Figure 1).

Conclusions: Adverse baseline haemodynamic status, characterised by narrower PP, lower CI, and higher PCWP, is associated with greater increments in PP acutely following CRT.

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Impact of the left ventricular lead position for long-term prognosis after cardiac resynchronization therapy

Background: An important determinant of successful cardiac resynchronization therapy for heart failure is the position of the left ventricular (LV) pacing lead. The aim of the present study was to analyze the impact of the lead position on outcome in patients with cardiac resynchronization therapy (CRT).

Objective: We assessed the relationship between anatomic LV lead position and long-term mortality and morbidity in CRT patients.

Methods: The location of the LV lead was assessed by means of coronary venograms and chest X-rays recorded at the time of device implantation. The LV lead location was classified along the short axis into an anterior, lateral, or posterior position and along the long axis into a basal, midventricular, or apical region. Echocardiographic reduction of LV end-systolic volume, increase of LV ejection fraction and clinical outcomes were evaluated with respect to the LV lead position.

Results: Totally 91 patients implanted with CRT from July 2004 to July 2011 were included in this analysis, and median follow-up period was 34 months. The LV lead was placed in the LV apex in 3 (3%) patients, in the midventricular position in 64 (70%), in the basal position in 19 (21%), in the anterior position in 6 (7%), in the lateral position in 75 (82%), and in the posterior position in 1 (1%) patients. The lateral lead location compared with leads located in the nonlateral position was associated with a significantly decreased risk for death (hazard ratio (HR)=0.347; 95% confidence interval (CI), 0.165 to 0.727; P=0.014). The midventricular lead position was also associated with a decreased risk for death (HR=0.441; 95% CI, 0.226 to 0.862; P=0.002). Survival salvage analysis showed that cumulative hazard were significantly lower in those with lateral lead position (log-rank P=0.003), and mid ventricular lead position (log-rank P=0.014). Cox multivariate analysis showed lateral LV lead position was an independent positive factor of mortality (HR=0.346; 95% CI, 0.146 to 0.820; P=0.016). All 3 patients that a LV lead was placed in the LV apex were dead with heart failure. There was no significant difference in echocardiographic results among the positions of the LV lead.

Conclusion: CRT with the lateral and the midventricular LV lead positions are associated with decreased risk of death in comparison with other LV lead positions.

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Correlation of different pressure-volume loop parameters during biventricular pacing in heart failure patients
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Introduction: Cardiac resynchronization therapy (CRT) with biventricular pacing improves acute cardiac hemodynamics. We investigated the correlation of different hemodynamic parameters commonly used to assess acute response to CRT.

Methods: Forty-four patients (pts) receiving CRT implant with a quadripolar left ventricular (LV) lead and multisite LV pacing-enabled device underwent LV hemodynamic assessment using a PV loop system. PV loops were recorded during biventricular pacing with each of two single left sites, 4-7 multisite LV pacing settings, and RV pacing (BASELINE). Correlations between dp/dtmax, stroke work (SW), and volume (SV) during different pacing interventions were quantified for each patient with Spearman’s rank coefficient (ρ).

Results: Evaluative recordings were obtained in 42 pts. SW and SV were post-CRT (ρ = 0.52, p = 0.002) and pre-CRT (ρ = 0.37, p = 0.019) with the left ventricular lead position on outcome in patients with cardiac resynchronization therapy (CRT).

Echocardiographic reduction of LV end-systolic volume, increase of LV ejection fraction and clinical outcomes were evaluated with respect to the LV lead position.

Objective: We assessed the relationship between anatomic LV lead position and long-term mortality and morbidity in CRT patients.

Methods: The location of the LV lead was assessed by means of coronary venograms and chest X-rays recorded at the time of device implantation. The LV lead location was classified along the short axis into an anterior, lateral, or posterior position and along the long axis into a basal, midventricular, or apical region. Echocardiographic reduction of LV end-systolic volume, increase of LV ejection fraction and clinical outcomes were evaluated with respect to the LV lead position.

Results: Totally 91 patients implanted with CRT from July 2004 to July 2011 were included in this analysis, and median follow-up period was 34 months. The LV lead was placed in the LV apex in 3 (3%) patients, in the midventricular position in 64 (70%), in the basal position in 19 (21%), in the anterior position in 6 (7%), in the lateral position in 75 (82%), and in the posterior position in 1 (1%) patients. The lateral lead location compared with leads located in the nonlateral position was associated with a significantly decreased risk for death (hazard ratio (HR)=0.347; 95% confidence interval (CI), 0.165 to 0.727; P=0.014). The midventricular lead position was also associated with a decreased risk for death (HR=0.441; 95% CI, 0.226 to 0.862; P=0.002). Survival salvage analysis showed that cumulative hazard were significantly lower in those with lateral lead position (log-rank P=0.003), and mid ventricular lead position (log-rank P=0.014). Cox multivariate analysis showed lateral LV lead position was an independent positive factor of mortality (HR=0.346; 95% CI, 0.146 to 0.820; P=0.016). All 3 patients that a LV lead was placed in the LV apex were dead with heart failure. There was no significant difference in echocardiographic results among the positions of the LV lead.

Conclusion: CRT with the lateral and the midventricular LV lead positions are associated with decreased risk of death in comparison with other LV lead positions.