Comparative study of the effects of left ventricular and biventricular pacing on indices of cardiac function and clinical status of heart failure patients: preliminary results of READAPT study

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Funding Acknowledgements: Type of funding sources: Private company. Main funding source(s): MEDTRONIC

Nonresponse to cardiac resynchronization therapy (CRT) has been related with right ventricular dysfunction. Preferential left ventricular pacing (pLVP) can overcome iatrogenic right ventricular dysfunction by achieving left ventricle resynchronization and by allowing for intrinsic activation of the right side, with ramifications extending beyond cardiac output and atrial fibrillation occurrence. Moreover, the AdaptivCRT® algorithm also automatically adjusts interventricular (V-V) delay every minute, optimizing it by means of comparing relative activation delay between right and left ventricles (electrically – driven optimization).

In the present study we evaluated the effects of a pLVP algorithm on 50 heart failure patients (all Caucasians, 49% male; 66 +/- 8 years old; 46% ischemic cardiomyopathy; 41% diabetics; NYHA II-III) following randomization to standard biventricular pacing and pLVP, on echocardiographic and cardiopulmonary exercise test indices of functional status, as well as a self-reported quality of life questionnaire. Device programming was based on echocardiography-evaluated maximization of stroke volume and subsequent interventricular and atrioventricular delay adjustments delegated to the device. The follow-up consisted of 6 and 12-months visits; after the 1rst month of optimizing maximum CRT response.

Results: Significant comparative effects of LVP over optimized CRT were noted regarding RV systolic velocity in TDI even from 6-months from baseline (6% increase, \( p=0.01 \)); while end-systolic diameter of left ventricle was increased by 4% in 6-months in CRT group (\( p=0.01 \)), while no significant difference was observed in LVP group. At 12 months endsystolic volume was significantly decreased (16%, \( p=0.01 \)) and left ventricular systolic longitudinal strain was improved in 12 months in LVP group compared to CRT group (\( p \)- for interaction =0.001). Additionally, in cardiorespiratory exercise test LVP group showed improved inotropic reserve compared to CRT group according to maximum SBP achieved (20% increase, \( p<0.01 \) for interaction); while all other cardiorespiratory indices showed borderline significant changes at 12 -months. Minnesota score was significantly reduced in LV-P group by 70% at 6-months; whereas no significant change was observed in CRT group (\( p \) for interaction <0.01).

Conclusions: In the preliminary findings of READAPT study, it seems that LV pacing optimized by a standardized echocardiographic protocol in patients with preserved AV conduction, LBBB, can achieve a higher percentage of synchronized LV pacing associated with improved patient quality of life; right ventricular function and endsystolic volume at 6 and 12-months of follow-up, over echo-optimized CRT pacing.