

Conduction System Pacing Versus Biventricular Pacing for Cardiac resynchronization

Tadej Žlahtič, David Žižek, Dinko Zavrl Džananović, Marta Cvijić, Anja Zupan Mežnar, Vito Starc*

University Medical Centre Ljubljana, Slovenia

Aims: Cardiac resynchronization therapy (CRT) with biventricular pacing (BiV) is the cornerstone treatment for heart failure patients with ventricular dyssynchrony. Recently, conduction system pacing (CSP) has been explored as a potential alternative to conventional BiV-CRT in heart failure patients. We aim to compare the effects of CSP and BiV pacing on electrocardiographic and echocardiographic parameters and clinical outcomes in patients with heart failure with reduced ejection fraction ($\leq 35\%$), sinus rhythm, and left bundle branch block.

Methods: The study is an ongoing single-center randomized controlled trial with predicted 60 enrolled patients. They are randomized into a BiV pacing arm with BiV CRT implantation or an experimental CSP arm with the implantation of a CSP device. They are followed with echocardiographic parameters of left ventricular reverse remodeling and non-invasive myocardial work assessment and clinical evaluation. Pre-implantation and follow-up, we record 12-lead ECGs and compare QRS complex width and repolarization lability markers (difference in Tpeak-end duration, QT interval ratio, and absolute QRST integral). Moreover, we calculate equivalent dipoles using an adaptable human torso model (the inverse model) and compare differences in the trajectory direction and length (Fig. 1).

Results and Discussion: Preliminary data in included six patients show significant shortening of QRS width and dipole trajectory after implantation in both arms with an average difference of 41 ms (min. 23, max. 71) and 1.8 cm (min. 0.2, max. 5.3), respectively, as is expected for the cardiac impulse propagation in both CSP and BiV arms.

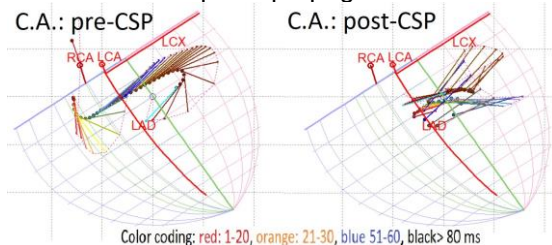


Figure 1. Equivalent dipoles and trajectories in the frontal plane with the biventricular heart model