Evaluation of Cardiac Synchrony in Patients with Left Bundle Branch Pacing: Insight From Echocardiographic Research

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Introduction: LBBP may be a new physiological pacing strategy, whether LBBP can both maintain cardiac electrophysiological and mechanical synchrony remains unclear. In this study, we aim to assess cardiac synchrony of LBBP by comparing the differences of QRS duration and some echocardiographic indicators between cardiac electrical self-conduction and LBBP in sick sinus syndrome (SSS) patients with normal cardiac function and narrow QRS duration.

Methods: Patients diagnosed with sick sinus syndrome (SSS) and implanted dual chamber pacemaker from a single center with normal cardiac function and narrow QRS were included in the study. We selected 40 patients received LBBP and 38 patients received right ventricular pacing (RVP) as control. Patients with pacemaker implantation were programmed to ventricular pacing-on (LBBP capture or RVP capture) and ventricular pacing-off (self-conduction) modes for echocardiographic and electrocardiogram examinations. The QRS duration, the LV systolic dyssynchrony index (SDI) and Tsd-12-LV were measured to evaluate cardiac synchrony. Stroke Volume (SV) and degree of MR/TR were also assessed.

Result: The QRS duration in LBBP capture is slightly wider than that in self-conduction mode (91.70±14.88ms vs. 100.15±9.98ms, p=0.020). All echocardiographic parameters of synchronization in the LBBP group showed no significant difference (P>0.05) between LBBP capture and self-conduction mode, while the RVP group showed significantly larger intraventricular synchronization parameters in the RVP mode than in the self-conduction mode (P<0.0001), represents poor synchronicity. LBBP capture have no significant difference in SV and degree of MR/TR compared with self-conduction (65.45±18.68ml vs 64.08±16.97ml P=0.24), while RVP capture mode have significant decreased SV (66.43±14.33ml vs 63.51±13.72ml P=0.005) and more degree of MR/TR compared with self-conduction.

Conclusion: This study showed that LBBP maintains a satisfactory cardiac electrical and intraventricular synchrony with no significant change in SV or degree of MR/TR when compared with self-conduction. So we confirmed that LBBP is a new physiological pacing strategy.