Short-term clinical outcomes in left bundle branch pacing in patients with heart failure and complete left bundle branch block

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Introduction: Bi-ventricular pacing (Bivpacing) for cardiac synchronization therapy (CRT) effectively corrects indoor conduction block, especially complete left bundle branch block (CLBBB) - induced ventricular systolic dyssynchrony, reducing patients’ morbidity and mortality. However, 30% of patients with Bivpacing showed complete non-response status. His Bundle pacing (HBP) can achieve complete physiological pacing, shorten the QRS width, and even correct the patient's indoor conduction and improve the patient's heart function, but HBP still has an acute threshold. Significant shortcomings such as low perception and long-term threshold increase. The new technique of levitation of left bundle branch area pacing (LBBAP) penetrates the ventricular septum through the electrode at the right ventricular septum, reaching the LBB region of the left ventricular surface, thereby pacing the LBB region. Fiber can achieve a similar physiological pacing effect analogous to HBP. LBBAP has better parameters such as perception and pacing than HBP, and it is a safe and effective physiological pacing technique. For the first time, we performed permanent LBBAP in patients with CLBBB complicated with heart failure to further evaluate the clinical efficacy and safety of LBBAP.

Methods: This was a prospective study of pacing therapy in patients with typical heart failure and CLBBB who were consecutively enrolled from a single center. Follow-up parameters were measured after implantation of the pacemaker: QRS wave width, left ventricular ejection fraction, left ventricular end diastolic diameter, and New York cardiac function grading.

Result: A total of 16 patients (mean 64.56±6.45 years, 12 males) were registered. Eleven patients successfully corrected CLBBB (67.85%), 5 patients did not completely rectify CLBBB, and 16 patients completed more than 3 months of follow-up. The average follow-up was 6.94±3.91 months. After LBBAP, the QRS width of 16 patients narrowed from baseline 174.63±13.12 ms to 123.81±29.52 ms (p=0.000), and left ventricular ejection fraction increased from baseline 31.00±7.17% to 44.50±12.25% (p=0.000), left ventricular end diastolic diameter decreased from baseline 66.81±7.24 mm to 57.06±8.58 mm (p=0.000) and New York heart function grade improved from 2.88±0.72 at baseline to 1.94±0.77 (p=0.002). The CLBBB correction threshold remained stable and showed a decreasing trend from 0.79±0.28 V / 0.4 ms to 0.54±0.14 V / 0.4 ms, (p<0.01).

Conclusion: LBBAP can improve QRS width, left ventricular ejection fraction, left ventricular end diastolic diameter, and New York cardiac function grading in patients with heart failure and type CLBBB.