Upgrading to His-Purkinje system pacing in heart failure patients after chronic right ventricular pacing

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Abstract

Background: Chronic right ventricular pacing (RVP) is associated with an increased incidence of heart failure and mortality. His-Purkinje system (HPS) pacing, including His bundle (HB) and left bundle branch (LBB) pacing could produce favorable electrical and mechanical activation, leading to recovery of cardiac function in heart failure patients.

Objectives: We aimed to report the effects of upgrading to HPS pacing in heart failure patients after chronic RVP in our center.

Methods: Totally 23 patients with an average ventricular pacing percentage of 66.7% were included. According to left ventricular ejection fraction (LVEF) at upgrading ≥ or < 50%, patients were divided into Group 1 (n = 11, mean LVEF 60.2 ± 4.8%) and Group 2 (n = 12, mean LVEF 36.8 ± 8.5%). HB pacing was performed using the pacing lead (model 3830, Medtronic Inc.) delivered through a C315 HIS sheath (Medtronic Inc.) and fixed at HB area. LBB pacing was achieved by penetrating the interventricular septum into the LV sub-endocardium with the same pacing lead. All patients underwent clinical and echocardiographic evaluation before replacement and at 6-month follow-up.

Results: After upgrading to HPS pacing, paced QRS duration was significantly shortened from 176.6 ± 43.1ms to 122.8 ± 28.2ms (p < 0.001). For patients in Group 1, serum brain natriuretic peptide (BNP) levels significantly decreased and cardiac status of NYHA classification improved from 2.6 ± 0.6 to 1.5 ± 0.5 (p < 0.001). For patients in Group 2, NYHA classification decreased from 2.7 ± 0.5 to 1.9 ± 0.7 (p = 0.003) and LVEF increased from 36.8 ± 8.5% to 43.5 ± 9.3% (p = 0.02). Similar outcome was found in patients with HB and LBB pacing.
Conclusion: Upgrading to HPS pacing was feasible and effective with improved cardiac function in heart failure patients with both reduced and preserved LVEF after chronic RVP.

Key words: His bundle pacing, left bundle branch pacing, heart failure, pacing-induced cardiomyopathy