Feasibility and Efficacy of His-Purkinje Conduction System Pacing Combined with Atrioventricular Node Ablation in Patients with Persistent Atrial Fibrillation and Implantable Cardioverter Defibrillator Therapy

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Introduction: Persistent atrial fibrillation (AF) may lead to higher probability of inappropriate shocks in heart failure (HF) patients with implantable cardioverter defibrillator (ICD) implantation. The aim of the study was to evaluate the impact of His-Purkinje conduction system pacing (HPSP) combined with atrioventricular node (AVN) ablation in preventing inappropriate shock therapy and improving heart function in these patients.

Methods: 96 consecutive patients with persistent AF and HF who had indications for ICD implantation were enrolled from Jan, 2010 to Mar, 2018. With patients consent, HPSP with dual chamber ICD and AVN ablation was attempted in 62 patients, while the remaining patients underwent single chamber ICD implantation only. Left ventricular ejection fraction (LVEF), left ventricular end-systolic volume (LVESV), New York Heart Association (NYHA) heart failure classification, shock therapies and use of drugs were assessed during follow-up.

Result: 36 patients received only ICD therapy, 1 of them failed AVN ablation (Group 1). AVN ablation combined with HPSP was successfully achieved in 62 patients (Group 2), 4 of who had prior single chamber ICD implantation (Figure 1). During follow-up, patients in group 2 had lower incidence of inappropriate shock ($P<0.01$) and adverse event ($P=0.011$). Meanwhile, improvements in LVEF (37.89±14.41% to 43.61±14.36% vs. 35.15±11.66% to 48.79±14.39%, $P=0.01$) and LVESV (138.27±68.37ml to 127.37±82.86ml vs. 126.03±67.35ml to 82.11±58.01ml, $P<0.01$) were significantly higher in group 2 (Figure 2). NYHA class improved from a baseline 2.57±0.68 to 1.73±0.74 in group 1, from a baseline 2.73±0.59 to 1.42±0.53 in group 2.

Conclusion: HPSP combined with AVN ablation is feasible and safe with high success rate in persistent AF patients with HF and ICD implantation. It can significantly reduce the incidence of inappropriate shocks and improve left ventricular function.