Difference in acute effect of His-bundle pacing and conventional right ventricular septum pacing on left ventricular regional wall motion

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Introduction: There is continued debate regarding the optimal ventricular pacing site for the management of bradyarrhythmias. Previous studies demonstrated conventional right ventricular pacing has adverse effect on cardiac systolic function such as left ventricular (LV) dyssynchrony and LV regional asynergy. Although there are some reports that His-bundle pacing (HBP) is less likely to cause electrical and mechanical LV dyssynchrony compared to other ventricular pacing sites, the effect of HBP on LV regional wall motion is well unknown. The purpose of present study is to evaluate and compare the effect of HBP and conventional right ventricular septum pacing (RVSP) on LV regional wall motion by speckle tracking echocardiography.

Methods: Totally 16 patients newly implanted with dual-chamber pacemaker were enrolled. Nine patients underwent successful HBP (all cases were non-selective HBP), 7 patients underwent conventional RVSP. All atrial leads were placed in right atrial appendage. 12-leads electrocardiogram and echocardiography were conducted at 1 week after pacemaker implantation during own beats and ventricular pacing with atrio-ventricular synchronization, respectively. LV was divided in American Society of Echocardiography recommended 16 segments and the longitudinal strain (LS) of each segment was calculated by speckle tracking echocardiography.

Result: QRS width during RVSP was significantly longer than during HBP (152+/-9 msec vs. 124+/-24 msec, p=0.01). LS value during RVSP in 4 segments was significantly smaller than during own beats (septum-base; 9.1+/-3.9% vs. 16.3+/-3.7%, p=0.0006, septum-mid; 12.0+/-3.3% vs. 18.4+/-5.0%, p=0.001, inferior-base; 13.7+/-2.7% vs. 19.1+/- 3.2%, p=0.004, inferior-mid; 15.7+/-3.5% vs. 18.6+/-4.1%, p=0.005). However, there was no significant difference in the LS value between during HBP and during own beats in all 16 segments.

Conclusion: It was suggested that HBP may minimize LV regional asynergy caused by ventricular pacing for the management of bradyarrhythmias.