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SKMC Class of 2022: SI/DH Abstract

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Evaluation of Ventricular Repolarization in Patients Undergoing Cardiac Resynchronization Therapy (CRT) Using Two Modalities: Conventional Biventricular Pacing vs. His-Bundle Pacing

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Introduction:

Permanent His-bundle pacing (HBP) is being used as an alternative to biventricular pacing (BiVP) for CRT. HBP preserves the physiologic pattern of ventricular activation and markedly reduces ventricular dyssynchrony. While ventricular depolarization with HBP vs. BiVP has been studied, the effects of the 2 modalities on repolarization have not been compared. The purpose of this study was to compare ventricular repolarization in patients with HBP and BiVP. We hypothesize that HBP provides more physiologic repolarization as compared to BiVP.

Methods:

ECG repolarization parameters were analyzed in patients who underwent HBP and BiVP using the first available ECG post implant. Parameters included:

- 1) T Peak – T End (Tp-Te_{Apical}): Tp-Te in lead V5, and if not measurable, then in V4/V6
- 2) Tp-Te_{Total}: Earliest T peak to the latest T end across all precordial leads
- 3) T Peak Dispersion: Absolute difference between the earliest and latest T peaks across all precordial leads

Data was compared using a two-tailed unequal variance Student's t-test.

Results:

Data from 23 HBP patients and 23 BiVP patients was analyzed. The average HBP Tp-Te_{Apical} of 74 ± 7 ms was less than the BiVP Tp-Te_{Apical} of 112 ± 15 ms ($p < 0.01$). Similarly, average HBP Tp-Te_{Total} of 106 ± 11 ms was smaller than the BiVP Tp-Te_{Total} of 145 ± 17 ms ($p < 0.01$). The difference between Tpeak dispersion between the two groups was not significant.

Conclusion:

Tp-Te interval, a known measure of dispersion of repolarization and marker of arrhythmic risk, is more physiologic (lower) with HBP as compared to BiVP. These data suggest that in addition to physiologic depolarization, HBP also provides physiologic repolarization and potentially lower arrhythmic risk compared to BiVP.