The Presence of a His-Bundle Potential Predicts Optimal Pacing Configuration

Seth Goldberg
Joonhyuk Kim

Introduction: Direct His-bundle (HB) pacing offers advantages over traditional pacing. However, a frequent disadvantage is that a higher pacing output is often required to capture the HB. It was noted anecdotally that the presence of a HB potential during device implant and interrogation may be associated with lower unipolar pacing threshold compared to bipolar pacing.

Methods: Patients who had undergone implant of a direct His-bundle pacemaker were assessed during routine device interrogation visits. The intracardiac electrogram on the HB lead was inspected for the presence of a HB potential. Then, the HB pacing threshold was determined in both unipolar and bipolar configurations, with electrocardiographic guidance to accurately assess HB capture threshold. The first 10 patients with a HB potential and the first 10 patients without a HB potential were included for assessment.

Result: Patients with a HB potential on the HB lead had an average unipolar HB pacing threshold of 1.325 V at 1 msec and an average bipolar HB pacing threshold of 1.325 V at 1 msec; no difference was noted. The patients without a HB potential on the HB lead had an average unipolar HB pacing threshold of 1.075 V at 1 msec and an average bipolar HB pacing threshold of 1.4 V at 1 msec; the unipolar pacing threshold was on average 0.325 V lower compared to bipolar pacing (23% reduction).

Conclusion: In patients with a HB potential on the HB lead during device interrogation, capture threshold was similar in either unipolar or bipolar pacing configurations. However, when no HB potential is noted on the HB lead during device interrogation, the unipolar pacing threshold was found to be 23% lower compared to bipolar pacing. This finding may relate to variations in anatomical HB type or differences in fibrous sheath thickness; further study to determine whether a unipolar pacing configuration is preferable when a his potential is not present are needed.