Anatomical Characteristics of Permanent His-Bundle Pacing in Patients with Atrioventricular Block using the Unique Technique

Daisuke Yoshimoto
Yuichiro Sakamoto
Ryo Yamaguchi
Takahiko Suzuki

Introduction: His-bundle pacing (HBP) is known as a physiological pacing, and it has been reported that HBP could achieve lower heart failure hospitalization and mortality rate than right ventricular (RV) pacing with long-term follow-up. However, it is sometimes challenging for particularly inexperienced physicians to search a success site of permanent HBP in patients with atrioventricular block (AVB) within a limited time. We investigated the anatomical characteristics of the success sites of permanent HBP in patients with AVB and reported on-going prospective data of complete anatomical approach for HBP.

Methods: When we performed His-bundle mapping using an active-fixation pacing lead (3830 SelectSecure; Medtronic, Inc) through a preshaped sheath (C315 HIS delivery sheath; Medtronic, Inc), we inserted a retractable active-fixation lead which was implanted for right atrium later into coronary sinus (CS) by shaping stylet beforehand, that is named “the inserting the atrial lead into CS (iCS) technique”. Successful HBP points which were defined as HBP threshold<2V at 1ms were investigated retrospectively with a focus on the CS ostium visualized by iCS technique in the 20 degree right anterior oblique. We fixed the CS ostium as the vertex of the angle and measured the angle between the successful HBP point and the horizontal axis as “theta (θ) of HBP”.

Result: Twenty patients with AVB (complete AVB: 13, advanced AVB: 7) who achieved successful HBP using iCS technique were enrolled. Median θ of HBP was 53.5 during a diastole (interquartile range: 51.25-58.75) and 50 during a systole (interquartile range: 42.25-53.5). There were only 2 outliers defined as the value multiplying the interquartile range by 1.5. In on-going prospective study using θ of HBP during a diastole that was more convergent, all patients, even in 5 patients, achieved HBP by θ of HBP guided complete anatomical approach without a conventional approach using the unipolar electrogram of the pacing lead displayed on electrophysiological laboratory system.

Conclusion: The anatomical distribution of successful HBP points with a focus on CS ostium using iCS technique tended to converge and might be useful to predict the success sites of permanent HBP in patients with AVB.