Visualization of Tricuspid Valve Annulus for Implantation of His Bundle Pacing in Patients with Symptomatic Bradycardia

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Introduction:  His bundle pacing (HBP) is a physiological pacing therapy, but the implantation of His bundle pacing remains a challenge. This study explored the feasibility of using visualization of tricuspid valve annulus (TVA) to locate the site for His bundle pacing.

Methods:  During the pacing lead placement of His bundle pacing in patients with symptomatic bradycardia and indicated for pacing therapy, the TVA and tricuspid septal leaflet were revealed by contrast injection in the right ventricle under the fluoroscopic RAO view and the target site for HBP was identified near the intersection of the tricuspid septal leaflet and the right ventricular border. Based on the revealed anatomic imaging marker, the pacing lead was purposely implanted for permanent HBP at either atrial or ventricular side (Figure A, B, C).

Result:  At the initial exploratory phase, the visualization of TVA was used for placing the pacing lead helix at the atrial side of HBP in one patient and at the ventricular side of HBP in another patient. When the pacing lead helix in the atrial side, the HBP was characterized with selective HBP with the capture threshold of 1.2V@1.0 ms and R-wave amplitude of 1.6 mV. The ventricular-side HBP was characterized with selective HBP at a low capture threshold (0.5V@1.0 ms) and non-selective HBP with an increased pacing output (1.1V@1.0 ms), R-wave amplitude of 4.9 mV. Echocardiograph at 3-month follow-up showed no changes in tricuspid valve function.

Conclusion:  Location of the TVA revealed by right ventriculography can be used as a landmark to identify the site of His bundle where the pacing lead helix could be purposely placed, making implantation outcome predictable.