The comparison of characteristics of intraseptal pacing with and without left bundle branch capture confirmed by direct recruited proximal or distal conduction system

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Introduction: Recent studies demonstrated that left bundle branch pacing (LBBP) to capture proximal left conduction system (LCS) can optimize physiological LV synchronous activation with a low and stable threshold. However, how to confirm LCS capture and its characteristics are not well established. We aimed to identify LCS capture using anterograde and/or retrograde potentials.

Methods: The intraventricular septal pacing lead was fixed in the left ventricular sub-endocardium around the region of the proximal LCS. An additional His lead or multipolar electrodes catheter located at left ventricular septum were used to record anterograde and/or retrograde potentials. The characteristics of anterograde and/or retrograde potentials were established in LCS capture during selective and non-selective pacing. The features of the EKG and stimulus to peak LVAT (Sti-LVAT) in intraseptal pacing with and without LCS capture were studied and compared.

Result: Intrinsic LBB potential were only recorded in patients with intact His-ventricle conduction (n=6) with the His to LBB potential interval of 28.3±5 ms and during His corrective pacing, LBB potential could be recorded in LBBB patients (n=3) with the interval of 19.7±2.4 ms (Figure 1B). In 9 patients with an additional His lead, when Sti-LVAT shortened abruptly with increasing output, retrograde His potential only occurred in patients with intact His-ventricle conduction (n=6) with stimulus to retrograde His potential (Sti-RH) interval of 28.2±4.6 ms. Output dependent selective and non-selective LBBP were achieved with the same Sti-RH interval of 28.8±5.2 ms. In 5 patients with an additional multipolar electrodes catheter when Sti-LVAT shortened abruptly with increasing output, anterograde distal LCS potential from multipolar electrodes catheter occurred in all cases with stimulus to anterograde distal LCS potential (Sti-ALCS) interval of 20.8±4.1 ms (Figure 1C). Output dependent selective and non-selective LBBP were achieved with the Sti-ALCS interval of 20.6±5.2 ms and 21.4±4.5 ms, respectively (Figure 1D).

Conclusion: In intact His-ventricle patients, when LCS directly captured, LBB potential was recorded in all cases, with Sti-RH interval identical to the intrinsic His to LBB potential interval, and the distal LCS potential recorded in front of the ventricle, which could also be observed in LBBB corrected by HBP. The characteristics of LCS capture could be summarized as: 1) paced QRS as a RBBB pattern; 2) Sti-LVAT abruptly shortening from LVSP to LBB pacing and achieving shortest and constant.