Characteristics and feasibility of left bundle branch pacing via a novel intraseptal technique in patients with left bundle branch block

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Introduction: His bundle pacing can correct left bundle branch block (LBBB) but may be limited by suboptimal lead delivery and high thresholds. To assess the feasibility of left bundle branch pacing achieved by capture the left conduction system via a novel intraseptal technique (iLCS) to deliver cardiac resynchronization therapy (CRT).

Methods: Patients with LBBB from multicenters indicated for CRT or pacing therapy were included. iLCSP was performed by fixing 3830 lead into the left ventricular septal sub-endocardium targeting the region of the proximal left conduction system. Pacing characteristics, success rate, threshold and R-wave amplitude were assessed.

Result: A total of 94 patients with the native QRS duration of 167.2±17.2 ms were included. In 92 patients, iLCSP was achieved and demonstrated RBBB pattern with the paced QRS duration of 116.4±12.6 ms (Figure 1B, middle panel). Fusion of iLCSP and native conduction via the RBB eliminated RBBB and resulted in an average QRS duration of 103.2±10.1 ms (Figure 1C). In a subgroup that underwent a two-lead implantation technique (n=21), a Purkinje pre-potential was recorded during His corrective pacing from the intraseptal lead (Figure 1B, right panel). Output dependent selective and non-selective iLCSP were demonstrated in 52% patients, with the same stimulus to peak left ventricular activation time of 82 ms (Figure 1B, left and middle panel). Lead parameters remained stable at 1-year (threshold 0.61±0.17V/0.5ms, R wave 13±5.8mV, Figure 1D, E). During follow-up, only one patient had an increase in LBB capture threshold to 2.5V/0.5ms and there were no other complications such as dislodgment, infections, embolism or stroke associated with the implantation.

Conclusion: Permanent iLCSP is feasible and safe in patients with LBBB.