Catheter ablation of parahisian premature ventricular contraction: the value of ablation underneath the septal leaflet of tricuspid valve

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Introduction: Objective The efficacy of parahisian premature ventricular contraction (PVC) ablation is compromised due to the high risk of atrioventricular (AV) conduction injury. Compared with the conventional direct proximity technique, the catheter inversion technique may improve the efficacy of ablation.

Methods: Thirty symptomatic patients with parahisian PVC (17 males; average age 51.4 ±7.9 years) were enrolled from Jan 2017 to Nov 2018. There were 11 patients with hypertension, 5 with type 2 diabetes mellitus and 2 with coronary artery disease and PCI therapy. The average number of PVC per day was 14375 ±648. Surface ECG showed the morphology of QRS was R, Rs, rS or RS pattern in the inferior leads (II/III/aVF), R pattern in lead I and aVL, and QS (n=29) or QR pattern (n=1) in lead V1. The precordial transitional lead was in V2 / V3. According to the time of enrollment, the patients were divided into two groups: direct proximity (Group 1, n = 14) and catheter inversion (Group 2, n = 16). In Group 1, the catheter was advanced directly and reached the right-sided parahisian area. In Group 2, the catheter was curved underneath the septal leaflet of tricuspid valve and back toward the annulus. Three-dimensional activation and pacing mapping was carried out to localize the origin of PVC. The most preceding local activation with the coincidence of paced QRS with clinical PVC in at least 11 to 12 leads was targeted for ablation. For each lesion, saline irrigated radiofrequency (RF) energy was delivered at 25-40 W and lasted for 60s. The procedural success was defined as disappearance of PVC at the end of 30 mins' observation by isoproterenol (2-5ug/min) challenge. Clinical success was defined as no recurrence of homomorphic PVC 2 months after the procedure. The reduction of 24-hour PVC burden by more than 80% was deemed effective.

Result: There was no significant difference in PVC burden and other baseline characteristics between the two groups prior to ablation. In Group 1, the ablation target was located within 5mm above His bundle in 2 cases and within 5mm below His in 12 cases. The average time preceding the onset of the QRS was 25.2 ±4.3 ms, and the average RF delivery times were 3.5 ±1.2. Procedural success was achieved in 8 patients, while clinical success was achieved in in 5 (35.7%). In the remaining 3 patients, the PVC burden decreased by more than 80%. In Group 2, and the ablation target was located within 2mm above His bundle in 1 case and within 4mm below His bundle in 15 cases. The average time preceding the onset of the QRS was 26.3 ±5.1 ms. The average RF ablation times were 2.5 ±1.4. Procedural success was achieved in 14 cases, and clinical success was achieved in 12 cases (75%). In 1 case, PVC burden decreased by more than 80%. The clinical success rate was higher in Group 2 than that in Group 1 (P < 0.03). Transient 2:1AV block developed in 1 case during ablation in Group 1, and resolved by immediate suspension of RF delivery.
Conclusion: RF ablation for parahisian PVC by catheter inversion technique yielded better clinical results than by conventional direct proximity technique, which can be considered as the first-line choice.