Comparison of procedural characteristics for de novo and redo persistent atrial fibrillation ablation using a high-density grid-style catheter with orthogonal bipolar algorithm

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Introduction: Efficacy of catheter ablation is suboptimal especially in patients with persistent AF, as compared to paroxysmal AF. Although pulmonary vein isolation (PVI) remains the standard approach of AF ablation, various ablation strategies have been developed to target additional substrate and triggers to improve ablation outcomes. Use of a high-density multielectrode, grid-style mapping catheter in the HD Wave configuration may increase the speed of point collection by simultaneously sampling bipolar electrograms in two directions thus accounting for wavefront directionality in developing an AF ablation strategy. The ablation strategy and procedural details for both de novo and redo persistent AF ablations were examined when a multielectrode, high-density, grid-style mapping catheter was utilized in a Japanese population.

Methods: Procedural data was collected prospectively in AF cases utilizing a high-density, grid-style mapping catheter in 2018 from 37 centers in Japan. Procedural data including electrode configuration, mapping time, points acquired, ablation targets, and acute outcomes were recorded.

Result: Procedural data were collected from 72 cases for persistent AF (47 de novo and 25 redo cases). The HD Wave configuration was utilized in 68 cases (45 de novo and 23 redo procedures). Out of 45 de novo cases, 43 cases reported ablation of PVs and additional targets most commonly CTI, posterior wall, and roofline. For redo cases, 20 out of 23 cases reported a PVI plus ablation strategy, common additional ablation sites include SVC, CTI, and roofline. For de novo ablation, similar mapping times (9.5±0.7 minutes vs. 11.5±4.7 minutes) with faster points collection speed was observed in a PVI only strategy compared to cases using a PVI plus strategy (1344.2 points/minute vs. 945.0 points/minute). The opposite trend was observed for redo procedures, PVI only cases showed longer mapping times (19.3±1.2 minutes vs. 14.8±4.3 minutes) and slower point collection speed (539.7 points/minute vs. 805.6 points/minute) (Table). Out of 53 reported attempts to induce AF at the end of the procedure, non-inducibility was reported in 13 out of 38 (34%) de novo cases (1 using PVI only strategy, 12 using PVI plus) and 4 out of 15 (26%) redo cases (1 using PVI only strategy, 3 using PVI plus).

Conclusion: Shorter mapping time and faster point collection speed were observed for de novo
compared to redo cases using a high-density grid-style catheter in persistent AF ablation. Procedural characters were different depending on the ablation strategy between de novo and redo persistent AF ablations. Regardless of the ablation strategy, maps can be created in under 15 minutes for de novo procedures and 20 minutes for redo procedures.