Impact of high-density grid-style catheter wave mapping on ablation strategy in de novo and redo paroxysmal atrial fibrillation

Masao Takemoto  
Shunichiro Warita  
Takanao Mine  
Satoru Sakagami  
Taku Asano  
Asumi Takei  
Masahito Suzuki  
Satoshi Higa  
Fumiharu Miura  
Yoshifumi Okano  
Caroline Tao  
Shinji Kaneko

Introduction: While pulmonary vein isolation (PVI) is a standard approach for atrial fibrillation (AF) ablation, additional ablation may be performed at the discretion of experienced physicians. Use of a high-density multielectrode, grid-style mapping catheter and unique HD Wave solution configuration to characterize substrate may provide different insights than conventional bipolar mapping to guide AF ablation strategy. Across 37 participating centers in Japan, ablation strategy and procedural details for both de novo and redo paroxysmal AF ablation were examined when a multielectrode, high-density, grid-style mapping catheter was utilized.

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

Result: Approximately half of the total AF case reports received were for paroxysmal AF (58 de novo and 20 redo cases). Maps were created using the HD Wave configuration in 69 cases (53 cases for de novo and 16 cases for redo procedures). Among the 69 cases which utilized HD Wave, 53 (76.8%) cases involved PVI plus additional ablation sites (40 in de novo and 13 in redo). Common additional lesion targets were CTI, SVC and roofline for de novo ablation and CTI and roofline for redo procedures. All but 4 de novo cases had all 4 PVs isolated, whereas only 5 redo cases recorded lesions set on all four PVs. The average mapping time, points collected, and procedural time were similar between de novo and redo cases (Table). Similar procedural time (149.1±56.7 minutes vs. 145.6±42.1 minutes) were observed in de novo cases between PVI only and PVI plus, whereas the procedure time for PVI plus was two times longer than PVI only in redo procedures (72.5±17.7 minutes vs. 156.6±36.9 minutes). Out of 48 reported attempts to induce AF at the end of the procedure, non-inducibility was reported in 32 out of 38 (84%) de novo cases (9 using PVI only strategy, 23 using PVI plus) and 8 out of 10 (80%) redo cases (3 using PVI only strategy, 5 using PVI plus). 21 procedures reported the use of HD wave changed the ablation strategy in 17 de novo cases (4 in PVI only and 13 in PVI plus) and 4 redo cases (1 PVI only and 3 PVI plus).
Conclusion: In participating Japanese centers, 76.8% of paroxysmal AF cases reported additional lesion sets beyond PVI. Procedural characteristics were different depending on ablation strategy between de novo and redo cases. Nevertheless, the use of the high-density, grid-style catheter with the HD Wave mapping configuration were reported to affect the ablation strategies in 33% de novo and 21% redo paroxysmal AF procedures of those who compared this configuration against standard mapping.