Comparison of efficacy and safety between high-powered ablation guided by ablation index and conventional powered ablation for pulmonary vein isolation in patients with atrial fibrillation

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Introduction: We evaluated the efficacy and safety of high-powered ablation with surround flow (SF) catheter guided by ablation index (AI) compared with conventional powered AI-guided strategy for pulmonary vein isolation (PVI) in patients with atrial fibrillation (AF).

Methods: Drug refractory symptomatic AF patients were consecutively enrolled. For conventional powered AI-guided (CPAI) group, using SmartTouch catheter (Biosense Webster Inc., CA, US), point-by-point RF ablation was delivered at 30W on the anterior/roof segments and 25W on the posterior/inferior/carina segments. For high powered AI-guided (HPAI) group, RF energy was delivered at 40W on the anterior/roof segments and 30W on the posterior/inferior/carina segments using SmartTouch SF catheter (Biosense Webster Inc., CA, US). AI targets were more than 450 on the anterior/roof segments and 350 on the posterior/inferior/carina segments. After PVI achievement, early reconnection was evaluated as acute pulmonary vein reconnection (PVR).

Result: A total of 98 patients were included (32 in the CPAI group and 66 in the HPAI group, mean age $61\pm9$ years, paroxysmal AF, 67%). Although we applied the same target AI between 2 strategies, HPAI group showed similar but slightly lower mean AI than CPAI group (anterior/roof, $458\pm21$ vs. $461\pm15$, $p=0.044$; posterior/inferior/carina, $354\pm26$ vs. $359\pm19$, $p=0.012$). HPAI group showed shorter ablation time per point and per segment, and necessarily had lower FTI than CPAI group (anterior/roof, $350\pm96$ g·sec vs. $271\pm53$ g·sec; posterior/inferior/carina, $162\pm38$ g·sec vs. $244\pm47$ g·sec, respectively, all $p<0.001$). Impedance drop was greater in the CPAI group than HPAI group (11.7±4.4 ohm vs. $8.3\pm3.2$ ohm, $p<0.001$). There was no significant difference in acute PVR rate between CPAI vs. HPAI group (4.2% vs. 3.7%, $p=0.613$) with 33% reduction of ablation time for PVI ($66\pm14$ min vs. $44\pm10$ min, $p<0.001$) and 20% reduction of procedure time ($199\pm42$ min vs. $160\pm37$ min, $p<0.001$) (Figure). There were no major complications in both CPAI and HPAI groups.

Conclusion: HPAI can be safely performed using AI-guided strategy. High-powered AI-guided strategy reduced procedure and ablation time for PVI and showed similar acute PVR rate without significant complications compared to conventional powered AI-guided PVI.