Locations of recovery of conduction with the high power short duration approach in radiofrequency catheter ablation for atrial fibrillation

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Introduction: Creating a durable radiofrequency lesion depends upon the power and the duration of RF energy delivery, the degree of catheter tissue contact and catheter stability. Several studies have reported the feasibility of catheter ablation using high power, short duration (HPSD) delivery of RF energy. We evaluated the locations of recovered conduction following HPSD ablation, in patients undergoing repeat catheter ablation (CA) for recurrent atrial fibrillation (AF).

Methods: Consecutive AF patients undergoing repeat CA at our center were screened and those who received HPSD ablation at the prior procedure were included in the current series. HPSD ablation was defined as ablation with maximum temperature setting at 420°C and power delivery at 45 W for 10-15 seconds (reduced to 5 seconds near the esophagus) with contact force of <15 grams. A temperature probe was routinely used to monitor the luminal esophageal temperature. Ablation was performed using 3.5-mm irrigated-tip catheter guided by circular mapping catheter, intra-cardiac echocardiography and a 3-D mapping system.

Result: A total of 1359 AF patients (age: 66.1±9.5 years, male: 911, 67%, non-paroxysmal AF: 869, 64%) receiving redo ablation were included in this analysis. At the prior procedure with the HPSD approach, mean duration of ablation was significantly shorter in the area facing the esophagus compared to elsewhere (5.2±1.5 vs 12.5±1.7 seconds, p<0.001). At the redo, PV and posterior wall reconnection was identified in 190 (14%) patients of which 175 (92%) had the recovered conduction detected in the area facing the esophagus.

Conclusion: Following the high power short duration energy delivery approach, recovery of PV and posterior wall conduction was frequently seen in the area facing the esophagus, which could be attributed to the significantly shorter duration of energy delivery in that region. Thus, strategies to displace the esophagus to enable the operators to increase the duration of energy delivery should be considered to improve ablation outcome.