Optimal Assessment of the Atrial Substrate to Guide Persistent AF Ablation

Li-Wei Lo1,2, Shih-Ann Chen1,2

1Taipei Veterans General Hospital, Taipei, Taiwan, 2Institute of Clinical Medicine, and Cardiovascular Research Institute, National Yang-Ming University, Taipei

Catheter ablation is an established therapy for the patients with atrial fibrillation (AF). However, the reported success rates are not high compared with those for other ablation indication, particularly for persistent AF. It is well-known that AF depends on the interaction between the triggers and substrate. Isolation of the pulmonary veins (PVs) and ablation of the non-PV triggers have become the cornerstone of the paroxysmal AF ablation. Substrate modification is considered to be necessary in the patients with nonparoxysmal AF. Electrogram-guided ablations are the most common substrate targeted ablation approach. Identification of the critical substrate is important before application of the radiofrequency energy. There are several techniques for the substrate mapping, such as voltage mapping, complex fractionated electrogram (CFE) mapping and dominant frequency (DF) mapping. Adequate use of the substrate mapping can lead to procedural termination. DF gradient is prominent in the patients with paroxysmal AF and arrhythmogenic thoracic veins might harbor the highest DF. In the non-paroxysmal AF, DF gradient may not be evident. In the long lasting persistent AF, identification of the critical CFE using the nonlinear analysis with continuous CFEs manifesting higher similarity index correlated with procedural termination and sinus rhythm maintenance.

Keywords: atrial fibrillation, ablation, substrate