When to Ablate the Carina during Pulmonary Vein Isolation in Atrial Fibrillation?

**TOMOYUKI SHIOZAWA**  
Hidemori Hayashi  
Gaku Sekita  
Hiroki Matsumoto  
Yuki Kimura  
Haruna Tabuchi  
Satoru Suwa  
Masataka Suniyoshi  
Yuji Nakazato  
Hiroyuki Daida

**Introduction**: The isolation of pulmonary veins (PV) have been a major issue for the ablation of atrial fibrillation (AF). Encircling the PVs in an extensive way is a standard procedure, but in some cases, the complete isolation of the PVs is difficult when only ablating by this procedure, especially in the carina. The objective of our study is to evaluate the predictor when carina conduction remains, and linear ablation of the carina for complete isolation should be considered.

**Methods**: We studied 73 consecutive patients with AF performing extensive encircling PV isolation by radiofrequency catheter ablation using the CARTO 3D-mapping system (mean age, 65±9 years; males, 66%; paroxysmal atrial fibrillation, 53%). After PV isolation was confirmed by ring catheters for a bilateral block, all patients were remapped by multi electrode mapping (with PENTARAY catheter) for the confirmation of PV isolation, and cases with conduction in the PV carina were evaluated, and linear ablation of the carina was proceeded. All patients were performed with a contrast cardiac CT before ablation for the merge with the 3D-mapping system, and the anatomy of the left atrium was measured for CT by the CARTO system for left atrium volume, and carina size, diameter, and perimeter.

**Result**: Patients with PV carina conduction after extensive encircling PV isolation was 45% (14% in the right carina, 19% in the left carina, and 12% in both carinas). Cases with carina conduction had larger left atrium volumes (201 ± 40 mL vs 179 ± 37 mL, P < 0.05). When left PV carina conduction remained, left PV carina size tended to be larger (1.6 ± 0.6 cm² vs 1.3 ± 0.7 cm², P = 0.08), and when right PV carina conduction remained, right PV carina size was significantly larger (2.0 ± 1.1 cm² vs 1.6 ± 0.7 cm², P < 0.05).

**Conclusion**: Larger carina size and larger left atrium was associated with PV carina conduction after encircling extensive PV isolation. These results suggest that the linear ablation of the PV carina should be considered in cases with larger left atrium and larger PV carina size. Especially when the right PV carina size is more than 1.5 cm², carina ablation should be considered for the perfection of PV isolation in AF ablation therapy.