

Where is the Location of Ablation Lesions Delivered via Balloon-based Cryo-, Laser- or Focused Ultrasound Ablation Catheters?

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Introduction: Unlike the initial balloon ablation catheters (BACs), which were designed to deliver ablation lesions within the pulmonary veins (PVs), the current prototypes of BACs are fashioned to deliver lesions at the PV ostia. However, the actual locations of the ablation lesions using these devices are not known. In this study, detailed electroanatomical mapping was performed pre- and post- ablation using cryo-, laser- or ultrasound- based BACs.

Methods: In a total of 21 patients with paroxysmal atrial fibrillation and LA size < 4.5 cm, PV isolation was performed using either a cryo- (11 patients), laser- (9 patients) or ultrasound- BAC (2 patients). All patients underwent pre-procedural CT/MR imaging. During all procedures, an intracardiac ultrasound catheter was used to aid in positioning the BAC at the PV ostium or antrum. In all patients, sinus rhythm bipolar voltage amplitude maps (using either CARTO with CT/MR image integration or NavX mapping) were generated at baseline and after electrical PV isolation as confirmed by use of a circular mapping catheter.

Results: Electrical isolation was achieved in 100% of the PVs. Electroanatomical mapping revealed that after ablation with any of the 3 BACs, the extent of isolation included the tubular portions of each PV to the level of the PV ostia. However, the PV antral portions were left largely un-ablated with all 3 BAC designs (example in **Figure**).

Conclusions: Using the current generation of balloon ablation catheters, electrical isolation occurs at the level of the PV ostia, but the antral regions are relatively spared.

