Effective Ablation Settings that Predict Chronic Scar after Left Atrial Ablation

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Introduction: Automated annotation can be a useful tool while ablating in tagging areas that will result in scar but the effective settings that best predict chronic scar is still unknown. Our goal was to find effective parameters that can be used real-time that result in chronic scar verified by left atrial (LA) late gadolinium enhancement magnetic resonance imaging (LGE-MRI).

Methods: Patients underwent pulmonary vein isolation using a CARTO3 mapping system with VISITAG® Module and a 3-month post-ablation LGE-MRI. The electro-anatomical map (EAM) was used to retrospectively tag ablated areas varying five different parameters: catheter stability, stability duration, force-over-time, minimum contact force, and impedance drop. The ablation tags in the EAM were projected to the 3-month post-ablation LGE-MRI. Tags were divided into 2 groups depending on if they correlated with MRI based scar (STAG) or not (NTAG) and the effective parameters were estimated for the two groups at different power levels (Figure).

Result: This study assessed 70 consecutive patients and 28,939 ablation tags. Ablation time and force time integral (FTI) were significantly larger in the STAG group. Mean contact force, change of catheter tip temperature and impedance were not significantly different between STAG and NTAG. The minimum ablation time and FTI to make durable scar lesions were 17.6, 13.6, 11.0 sec and 226.1, 187.4, 161.4 gs at 25W, 35W, and 50W, respectively.

Conclusion: Minimum ablation time and force time integral values are critical parameters that determine durable atrial scar creation and their minimum values vary with ablation power setting.