Impact of the type of electroanatomic mapping systems on the incidence of cerebral embolisms after radiofrequency ablation of left atrial tachycardias

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Introduction: This study aimed to investigate the incidence of symptomatic and silent cerebral embolisms after radiofrequency catheter ablation of left atrial tachycardia (ATs) guided by 3-dimensional electroanatomic mapping (3D-EAM) systems, and compare that between the different 3D-EAM systems.

Methods: We prospectively enrolled 59 patients who underwent a left AT ablation and brain magnetic resonance (MR) imaging after the ablation procedure: 30 were guided by the Rhythmia™ system (Boston Scientific) and 29 by the CARTO® system (Biosense Webster). The target activated clotting time during the procedure was 300-400 seconds by an intravenous heparin infusion.

Result: One transient ischemic attack occurred in the Rhythmia™-guided group, and no symptomatic embolisms in the CARTO®-guided group. Silent cerebral ischemic lesions (SCILs) were observed on MR imaging in 35 patients (59.3%), and the Rhythmia™-guided group had a significantly higher incidence of SCILs than the CARTO®-guided group (86.2% vs. 33.3%; P<0.001). In a multivariate logistic regression analysis, the use of the Rhythmia™ system and left atrial linear ablation were independent positive predictors of SCILs (odds ratios 12.822 and 8.668, 95% confidence intervals, 2.945-55.815 and 1.920-39.133, P=0.001 and 0.005). The incidence of bleeding complications was comparable between the Rhythmia™- and CARTO®-guided groups (0% vs. 3.3%, P=0.508).

Conclusion: The Rhythmia™-guided ablation of the left ATs exhibited a higher incidence of post-ablation cerebral embolisms than the CARTO®-guided ablation. The use of the Rhythmia™ system and left atrial linear ablation may present a risk of silent cerebral embolisms after a left AT ablation.