

Conduction gaps after pulmonary vein isolation due to high contact force ablation in patients with atrial fibrillation

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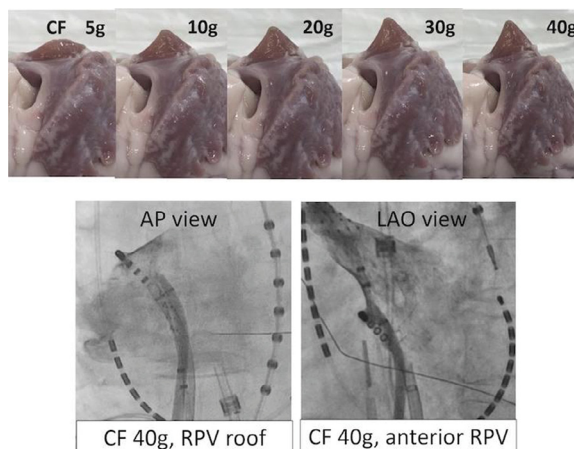
Background: Catheter ablation for atrial fibrillation (AF) with high contact force (CF) has been reported to lead to the gaps after pulmonary vein isolation (PVI), and the appearance of the gaps depends on the site in the left atrium (LA).

Purpose: The aim of this study is to clarify the relationship between the gaps appearance and high CF.

Methods: In the clinical study, 74 consecutive patients (39 males, age 71 ± 9 , 46 with paroxysmal AF) underwent conventional PVI with a point-by-point radiofrequency (RF) ablation using a CF sensing catheter (TactiCath SETM). RF energy (J), number of RF point, Lesion index (LSI), force-time integral (FTI), average CF (g), and the degree of LA depression with high CF were evaluated. In the experimental study (figure), the relationship between the ablation area and the degree of depression with high CF using bovine left ventricular wall.

Results: In the clinical study, the gaps were found in 175 of 1182 sites after first path PVI ablation. The CF in the gap sites was higher than without the gap sites in RPV roof, anterior RSPV and anterior RPV carina (18.9 ± 6.8 vs 15.0 ± 5.7 g $p=0.0262$, 26.4 ± 11.6 vs 19.5 ± 6.0 g $p=0.0029$, 22.7 ± 6.4 vs 19.1 ± 5.5 g, $p=0.0161$). Meanwhile, there were no differences in RF energy, number of RF point, LSI, FTI. High CF (≥ 30 g) showed a depression of 3 mm or more in only RPV roof and anterior RPV (figure). In the experimental study, the ablation range narrowed as the indentation deepened with more than 30g CF ($r=0.6417$, $p=0.0625$).

Conclusion: Catheter ablation for AF with high contact force might lead to the gaps in RPV roof and anterior RPV site by the reduction of the ablation area due to depression caused by the pressure.



Extension of each contact force