Backmann Bundle Impairment in Patients with Atrial Fibrillation Undergoing Left Atrial Anterior Wall Linear Ablation

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Introduction: Pulmonary vein isolation (PVI) has become a favor strategy during atrial fibrillation ablation, but occasionally additional linear ablation would be performed to achieve a better outcomes. When left anterior wall linear ablation (LAWA) was taken, it might impair the Backmann Bundle (BB) eventually. This study aims to investigate those features of surface electrocardiogram (EKG) and clues to indicate the impairment of BB after LAWA.

Methods: Thirty-one persistent atrial fibrillation patients who underwent catheter ablation were included from 2017 to 2019, of whom 12 lead ECG and echocardiogram were obtained after ablation. All electrocardiograms were analyzed by 2 observers to determine P wave duration, amplitude and morphology. To evaluate left atrial dyssynchrony, the intervals from the onset of P-wave to a'(P-a") were measured at the septal, lateral, anterior and inferior of left atrium. Meanwhile, the standard deviation (SD) of all 4 values were calculated.

Result: Totally 31 patients were investigated. The median follow-up is 8.6 ± 0.83 months. All patients maintained sinus rhythm after ablation. 15 of patients underwent PVI+LAWA, 16 of patients underwent PVI only. 80% (14/15) of patients underwent PVI + LAWA were female with advance age (67.9 ± 5.615 vs 56.47 ± 8.33, 95%CI, p=0.000). 7 (46.67%) patient presented with Biphasic wave morphology change in inferior lead after ablation, there was no morphology change presented in PVI group (Figure 1). In PVI+LAWA group, P wave duration in lead III is longer than PVI group (116.53 ± 34.11 vs 90.87 ± 14.80, 95%CI, p=0.010). The activation of left atrium anterior wall was obviously delayed (177.4 ± 34.08 vs 151.46 ± 24.72, 95%CI, p=0.037) and dyssynchrony of left atrium also had statistical significance 26.31 ± 7.23 vs 19.27 ± 8.24, 95%CI, p=0.039). However, 2 of patients in LAWA group has suffered from stroke in sinus rhythm with low CHA2DS2-VASc score. The CHA2DS2-VASc score for 2 patient were 0 and 1 point respectively.

Conclusion: LAWA could impair BB partially or completely. These impairment of BB could be represented including wider P wave and Biphasic morphology in inferior leads on EKG, longer LA activation time, and dyssynchrony movement of LA wall.