Effect of Ablation on Dominant Frequency during Atrial Fibrillation: Association with Its Terminating Effect

Daisuke Horiuchi, Yuji Ishida, Taihei Itoh, Kenichi Sasaki, Shingen Owada, Masaomi Kimura, Shingo Sasaki, Ken Okumura
Department of Cardiology, Hirosaki University School of Medicine, Hirosaki, Japan

The mechanisms for termination of atrial fibrillation (AF) during ablation are not clarified. We reported that dominant frequency (DF) decrease to <4.0 Hz after pilsicainide is related to AF termination. To examine the effect of stepwise pulmonary vein isolation and left atrial linear ablation on DF during AF, the chronological changes in mean DF of 5 electrograms in coronary sinus were investigated. In the consecutive 30 patients (21 with paroxysmal and 9 with persistent AF) undergoing stepwise ablation during AF, fast Fourier transform analysis was performed for 5-second segments. AF was terminated at 69 ± 50 minutes during ablation in 13 patients (Group A) with mean DF decrease from 5.55 ± 0.50 to 4.29 ± 0.62 Hz (P < 0.01). In 6 of them, AF was converted to atrial tachycardia/flutter, showing organization of CS electrograms. AF was not terminated in the other 17 (Group B) despite mean DF decrease from 5.95 ± 1.04 to 5.36 ± 0.84 Hz (P < 0.01). DF after ablation in Group A was smaller than that in Group B (P < 0.01). When DF in the CS decrease to <4.8 Hz, AF is terminated with 71% positive predictive values. Thus, the degree of DF decrease and atrial electrogram organization during ablation were related to AF termination as we previously observed after pilsicainide. DF change may be used in predicting AF termination.

Keywords: atrial fibrillation, dominant frequency, pulmonary vein isolation