The Difference of Left Atrial Volume Index: Can It Predict the Occurrence of Atrial Fibrillation after Radiofrequency Ablation of Atrial Flutter?

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Abstract

Background: The occurrence of atrial fibrillation after ablation of atrial flutter is clinically important. We investigated variables predicting this evolution in ablated patients without a previous atrial fibrillation history.

Materials and Methods: Thirty-six patients (Male=28) who were diagnosed as atrial flutter without previous atrial fibrillation history were enrolled in this study. Group 1 (n=11) was defined as those who developed atrial fibrillation after atrial flutter ablation during 1 year follow-up. Group 2 (n=25) was defined as those who has not occurred atrial fibrillation during same follow-up term. Echocardiogram was performed to all patients. We measured left atrial size, left ventricle end diastolic and systolic dimension, ejection fraction and left atrial volume index before and after flutter ablation. The differences of each variables were compared and analyzed between two groups.

Results: The preablation left ventricular ejection fraction (preLVEF) and postablation left ventricular ejection fraction (postLVEF) are 54±14%, 56±13% in group 1 and 47±16%, 52±13% in group 2. The differences between each two groups are statistically insignificant (2.2±1.5 in group 1 vs 5.4±9.8 in group 2, p=0.53). The preablation left atrial size (preLA) and postablation left atrial size (postLA) are 40±4 mm, 41±4 mm in group1 and 44±8 mm, 41±4 mm in group 2. The atrial sizes of both groups were increased but, the differences of left atrial size between two groups before and after flutter ablation were statistically insignificant (0.6±0.9
mm in group 1 vs -3.8±7.4 mm in group 2, p=0.149). The left atrial volume index before flutter ablation was significantly reduced in group 1 than group 2 (32±10 mm³/m², 35±10 mm³/m² in group 1 and 32±10 mm³/m², 29±8 mm³/m² in group 2, p<0.05).

**Conclusion**: The difference between left atrial volume index before and after atrial flutter ablation is the robust predictor of occurrence of atrial fibrillation after atrial flutter ablation without previous atrial fibrillation.

**Key Words**: Atrial flutter, Ablation, Atrial fibrillation, Left atrium, Volume

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**Introduction**

Radiofrequency catheter ablation targeting the isthmus between the tricuspid annulus and the inferior vena cava is an established therapy for typical atrial flutter (AFL). It is successful in more than 90% of patients. But, in the clinical setting, AFL and atrial fibrillation (AF) often coexist, and the follow up of patients successfully treated with transisthmic ablation is complicated by the occurrence of AF in 10~47% of patients. We already have known that the presence of preablation AF is the most significant predictor of postablation AF. However, clinical and procedural predictors of postablation AF occurrence has always been evaluated in the mixed group of AFL patients with AF and rarely in the group of patients without history of AF. This study aimed that better identification of patients who are at risk for the development of AF may help to optimize the antiarrhythmic strategy during or after AFL ablation. So, we investigated variables predicting this evolution with echocardiography in ablated patients without a previous AF History.

**Materials and Methods**

1. **Study population**

The study group consisted of 36 consecutive patients who were diagnosed as AFL without previous history of paroxysmal AF and underwent radiofrequency catheter ablation for recurrent typical AFL from January 2000 to June 2005 at Yeungnam university hospital. Typical AFL was diagnosed when the surface ECG showed flutter waves that were predominantly negative in leads II, III, aVF and positive in lead V1 and defined as a macroreentrant atrial tachycardia that exhibited either counterclockwise or clockwise activation around the tricuspid annulus and atypical AFL was defined as an atrial flutter other than typical AFL. Previous episodes of AF were all excluded from this study. Postablation AF development during 1 year follow-up was defined as the documentation of AF during ECG or Holter ECG monitoring of at