Predictors of prognosis and recurrence of atrial fibrillation after pulmonary vein isolation in patients with heart failure

Yuichi Toyama

Introduction: Prognosis for Atrial Fibrillation (AF) in patients with heart failure is worse than AF only. Catheter ablation for AF in patients with heart failure improved prognosis compared with medical therapy. Predictors of prognosis and recurrence of AF after pulmonary vein isolation (PVI) in patients with heart failure are not apparent. We aimed to clarify prognostic factors and predictors of recurrence of AF after PVI in patients with heart failure.

Methods: Of the 1207 patients undergoing initial PVI at our hospital from January 2012 to December 2018, 222 patients with symptomatic heart failure (NYHA class II, III, or IV, and BNP $\geq$ 100 pg/mL) followed at least three months after PVI were analyzed. The primary endpoint was the composite of morbidity (all-cause death, heart failure hospitalization, stroke, and major bleeding). The secondary endpoint was the recurrence of AF. Recurrence was defined as any episode of atrial arrhythmia (documented by electrocardiograms or Holter recordings) lasting for at least 30 seconds after the 3 months blanking period. Univariate and multivariate analysis with Cox proportional hazard models were performed to identify the predictors of the primary endpoint and the secondary endpoint after initial PVI in patients with heart failure. For all comparisons, a p-value of $<$ 0.05 was considered significant.

Result: The mean age at the time of PVI was 66 years, and 64% of the patients were men. One hundred ten patients (50%) had paroxysmal AF. One hundred ninety-two patients (86%) were performed only PVI, and 183 patients (82%) underwent radiofrequency ablation. The median BNP was 166 (IQR, 128 to 252). The mean duration of the follow-up period was 370±299 days. The primary endpoint occurred in seven patients. One patient died, two patients with cerebral infarction (including one patient suffered within one month after PVI), one patient with cerebral hemorrhage, one patient with hemoptysis, two patients with the hospitalization of heart failure were admitted. In the univariate analysis, significant predictor of prognosis were BNP ($P < 0.001$), hemodialysis ($P = 0.002$), renal function ($P = 0.008$), and moderate mitral regurgitation ($P = 0.009$). In the multivariate analysis, BNP was significant predictor of prognosis (hazard ratio [HR], 1.004; 95% confidence interval [CI], 1.002 to 1.006; $P = 0.001$). AF recurrence was observed in 48 patients (22%). A history of myocardial infarction was a significant predictor of recurrence of AF in univariate analysis ($P = 0.035$) and in multivariate analysis (HR, 3.18; 95% CI, 1.23 to 7.23; $P = 0.019$).

Conclusion: BNP is a prognostic factor, and history of myocardial infarction is a predictor of AF recurrence after PVI in patients with heart failure.