Impact of early improvement in the left ventricular systolic function on the long-term prognosis in patients undergoing atrial fibrillation ablation

Kyoichiro Yazaki  
Koichiro Ejima  
Miwa Kanai  
Shohei Kataoka  
Satoshi Higuchi  
Daigo Yagishita  
Morio Shoda  
Nobuhisa Hagiwara

Introduction: Although catheter ablation of atrial fibrillation (AF) may facilitate reverse remodeling of the left ventricle, the impact on the long-term prognosis is still unknown.

Methods: One hundred forty patients with an impaired left ventricular ejection fraction (LVEF) of less than 50% who underwent AF ablation from August 2009 to May 2016 were included. We measured the LVEF changes 3, 6, and 12 months, and later after the index procedure. We defined an “LVEF improvement” as a post-procedural LVEF of more than 50% or a change in the LVEF of more than 20%, and an “early improvement” (EI) as an LVEF improvement within a year. The primary endpoint was the composite of heart failure hospitalizations (HFHs) or death from any cause.

Result: A total of 92 (66%) patients achieved an EI and 5 (4%) achieved a late improvement (LI; > 1 year) after the index procedure. During a median follow-up of 41 (25–69) months, 18 (13%) patients experienced the primary composite endpoint, including 18 (13%) with HFHs and 9 (6%) deaths from any cause. The causes of death consisted of 4 (44%) with cardiac issues, 2 (22%) with malignancies, and 3 (33%) with other issues. In the patients who achieved the primary endpoint (group A), a higher prevalence of structural heart disease (SHD) and history of an HFH for AF were observed (66% versus 39%, p = 0.04 and 56% versus 16%, p = 0.0002, respectively), while the EI, pre-procedural LVEF, and sinus rhythm maintenance in the others (group B without the primary endpoint) were higher than in group A (72% versus 22%, p < 0.0001, 41±8% versus 34±9%, p = 0.0004, and 70% versus 39%, p = 0.02, respectively). The number of total sessions did not significantly differ between the two groups (1.4±0.6 versus 1.5±0.6, p = 0.49). The long-term survival significantly differed (p < 0.0001) between the patients with an EI and those without (figure) with a cumulative ratio of the primary outcome of 1% versus 4% at one year and 1% versus 20% at two years. A multivariate analysis using a Cox proportional hazard model revealed the following independent predictors: past history of an HFH for AF (HR: 11.45, 95% CI: 1.58–82.88, p = 0.01), age ≥ 65 (HR: 3.28, 95% CI: 1.19–9.66, p = 0.02), absence of an EI (HR: 7.43, 95% CI: 2.11–23.58, p = 0.002) after adjusting for the confounders of the presence of SHD, pre-procedural LVEF < 35%, and atrial tachyarrhythmia recurrence after the final procedure.

Conclusion: Although a high age (>65 years) at the time of the procedure and past history of an HFH for AF were associated with a poor prognosis, the EI was a predictor of a better long-term survival in patients with systolic dysfunction at the time of the AF ablation procedure.