The application of 4S atrial fibrillation scheme in predicting atrial arrhythmia recurrence after catheter ablation

L. Kuo1, T.F. Chao1, S.L. Chang1, Y.J. Lin1, F.P. Chung1, L.W. Lo1, Y.F. Hu1, T.C. Duan1, J.N. Liao1, T.Y. Chang1, C.Y. Lin1, C.M. Liu1, S.H. Liu1, C.I. Wu1, S.A. Chen1

1Taipei Veterans General Hospital, Heart Rhythm Center and Division of Cardiology, Department of Medicine, Taipei, Taiwan

Funding Acknowledgements: Type of funding sources: Public hospital(s). Main funding source(s): Taipei Veterans General Hospital (V111B-035)

Background: Atrial fibrillation (AF) is the most common chronic cardiac arrhythmia. Recently, there is a new scoring system - 4S (Stroke Risk; Symptoms; Severity of Burden; Substrate), proposed in 2020 European Society of Cardiology AF guideline to identify the characteristics of AF patients in details and provide precise guidance for the AF management.

Purpose: We aimed to report the disease severity of AF patients who received first time catheter ablation (CA) using 4S-AF scoring system, and further discover the value of 4S-AF scheme in the prediction of atrial arrhythmia recurrence after CA.

Methods: We conducted a retrospective study of 350 AF patients between 2015 and 2017 referred for first time CA. The components of 4S-AF scheme including the following: (1) ischemic stroke risk (score 0 or 1), (2) symptoms (score 0 to 2), (3) severity of AF burden (score 0 to 2), (4) substrate (cardiovascular risk factors-score 0 to 2; left atrial enlargement-score 0 to 2). The 4S-AF score ranges from 0 to 9, and the study population was stratified into three groups as mild (score 0 to 2), moderate (score 3 to 4) and severe (score 5 to 9) disease. The 3-year risk of recurrence of atrial arrhythmias was studied using the Cox regression analysis. Atrial arrhythmias at follow-up were reported with a time-to-event analysis, and survival curves were created utilizing the Kaplan–Meier method with differences between groups compared with the log-rank test.

Results: The mean age of patients was 56 ± 11 years, 260 (74%) were men, and 82 (23%) had non-paroxysmal AF. Over the 3-year follow-up, 168 (47%) patients experienced recurrence. The recurrence rates were 32%, 47% and 62% for mild, moderate, and severe disease groups, respectively (Figure A). Non-paroxysmal AF (hazard ratios [HR]: 2.1, 95% confidence interval [CI]:1.5-2.9, p<0.001), larger left atrial dimensions (HR: 1.0, 95% CI:1.0-1.1, p=0.03) and a higher 4S-AF score (HR: 1.2, 95% CI:1.1-1.3, p=0.001) were significantly associated with a higher risk of recurrence of atrial arrhythmia. After the multivariate adjustment, a higher 4S-AF score (HR: 1.1, 95% CI:1.0-1.2, p=0.006) remained as the independent predictor of recurrence. The recurrence-free survival curves after CA are shown in Figure B. The severe disease group was associated with a 1.9-fold higher risk of atrial arrhythmia recurrence compared to mild disease group (HR 1.9, 95% CI:1.3-2.9, p =0.002).

Conclusions: The disease severity of AF patients characterized using 4S-AF scheme could predict the risk of atrial arrhythmia recurrence after CA.