Model-based Point Scoring System for Predicting Risk of Stroke in the Era of Catheter of Atrial Fibrillation

Yun-Yu Chen
Yenn-Jiang Lin
Kuo-Liong Chien
Shih-Ann Chen

Introduction: Catheter ablation (CA) of atrial fibrillation (AF) is associated with a decreased risk of stroke/transient ischemic attack (TIA) in patients with a high CHA2DS2-VASc score. Currently, the stroke risk scoring system for AF can vary considerably, based on the status of receiving CA or not. The purpose of this study was to develop a clinical scoring system to predict the risk of stroke including the status of catheter ablation.

Methods: This study evaluated the stroke rates for AF patients by linking to the National Health Insurance Research Database (NHIRD) in Taiwan between 2003-2015 (Age ≥18 years), a total of 147225 AF patients in NHIRD were identified, in which 1897 (1.3%) patients had received AF CA at baseline. Overall 787 AF patients undergoing their first CA were matched to the same number of AF patients without CA and controls by the age-sex-, underlying diseases-identified propensity scores (PS). We estimated the 1-, 5-, 10-year stroke incidences, multivariate Cox model-derived coefficients were used to construct the simple points-based clinical model based on the PS-matched cohort. The developed novel model was validated by using the AF cohort in Taiwan.

Result: The 1-, 5-, 10-year cumulative stroke/TIA incidences were 2.9%, 9.4%, 18% in the PS-matched AF cohort, respectively (compared to matched controls without AF: 2.7%, 7.9%, 12.3%). Clinical factors of age (point=6), ablation status (point=4), diabetes mellitus (point=1), congestive heart failure (point=1), chronic kidney disease (point=2), and prior history of stroke (point=4) were found to significantly predict stroke events; The estimated area under the receive operating characteristic curve (AUC) of the model in the PS-matched cohort was 0.844 (95% confidence interval: 0.824-0.864). Prospective validation study using the AF cohort in Taiwan still showed significantly higher discrimination abilities than CHA2DS2-VASc scoring system (P<0.001).

Conclusion: A newly constructed clinic model-based point scoring system for predicting the stroke risks was constructed and validated by using the AF cohort in Taiwan. This score system is useful in identifying risk of stroke by the clinical factor and the status of AF CA, irrespective of the status of recurrence.