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EDITORIAL

Taiwan Atrial Fibrillation Score: A New Clinical Tool for Predicting New Onset Atrial Fibrillation in Asian Populations

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Atrial fibrillation (AF) is the most commonly sustained cardiac arrhythmia worldwide, affecting 1% to 2% of the overall population.[1] AF is associated with increased risk of stroke, coronary artery disease, heart failure, and all-cause death[2,3]; however, it is often asymptomatic and paroxysmal and can therefore go undiagnosed. The diagnosis of AF is sometimes established after a thromboembolic event. Recent efforts have focused on developing strategies for early detection of AF so that interventions may be implemented to decrease the associated morbidity and devastating sequelae of the disease. Prospective cohort studies are helpful in addressing knowledge gaps in disease risks.[4] Several risk scores have been derived to identify patients who are at high risk of developing AF and in whom frequent screening should be considered. Examples include the FHS (Framingham Heart Study) score,[5] the ARIC (Atherosclerosis Risk In Communities Study) score,[6] and the CHARGE-AF (Cohorts for Heart and Aging Research in Genomic Epidemiology- Atrial Fibrillation) score.[7] However, existing models in the literature have focused on White and Black populations with little emphasis being placed on Asian individuals.

See Article by Chao et al.

In this issue of the *Journal of the American Heart Association (JAHA)*, Chao and colleagues present a new clinical score—the Taiwan AF score—to identify patients at high risk of AF.[8] The score was developed using the NHIRD (National Health Insurance Research Database), which is a large nationwide registry with detailed healthcare data on >99% of the Taiwanese population. Data from patients aged ≥40 years who do not have a history of cardiac arrhythmias were used for model derivation. Patients were followed up for 16 years and the time to occurrence of AF was recorded. A total of 438 930 patients were included and a backwards Cox regression model was developed to identify the independent predictors of AF. The variables included in the model were age, sex, and the following comorbidities: hypertension, diabetes mellitus, heart failure, history of stroke, coronary artery disease, peripheral artery disease, chronic obstructive pulmonary disease, autoimmune disease, liver cirrhosis, cancer, hyperthyroidism, alcoholism, and gout. A point scoring system was developed ranging between –2 and 15, and the incidence of AF after 1-, 3-, 5-, 7-, 10-, 12-, and 16-year follow-up was computed for each value. Patients with a score between –2 and 3 were classified as low risk and had an annual risk of AF incidence of 0.21% per year, those with a score between 4 and 9 were classified as intermediate risk and had an annual risk of AF incidence of 1.31% per year, and those with a score ≥10 were classified as high risk and had an annual risk of AF incidence of 3.37% per year. The models were all robust and had areas under the curves

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ranging between 0.756 for 16-year follow-up and 0.857 for 1-year follow-up.

The authors must be commended on this study that has important clinical applications. The Taiwan AF score will help physicians identify patients who are at high risk of developing AF and who warrant more frequent disease screening and more aggressive management of risk factors. Importantly, the score was specifically developed for Asian patients whose risk of AF may not be as reliably assessed as Western patients if computed using existing scores (eg, FHS, ARIC, CHARGE-AF). The comorbidity profile and risk factors for AF differ between Westerners and Asian patients. Asian patients have a higher prevalence of hypertension and stroke, and a lower prevalence of AF, heart disease, and obesity.[9,10] In addition, chronic obstructive pulmonary disease and alcohol excess are more important risk factors for new onset AF in Asian patients than in Westerners whereas hypertension and obesity are more important risk factors in Westerners than in Asian patients.[11] A few scores have been previously derived using data from Asian populations. The coronary artery disease or chronic obstructive pulmonary disease, hypertension, elderly, systolic, thyroid score was developed using a large cohort of Chinese patients and was validated on an external cohort of Korean patients.[12] The authors demonstrated that their score outperforms that in the Korean study in predicting new onset AF, which highlights the nuances between different Asian populations since the incidence of AF is significantly lower in China and Korea than in Taiwan.[13,14] The Suita score was derived using data from Japanese patients and can predict the 10-year risk of new onset AF.[15] The hypertension, age >75 years, stroke or transient ischemic attack, chronic obstructive pulmonary disease, and heart failure score was initially developed to estimate the risk of progression from paroxysmal to permanent AF using data from Taiwanese patients and was later validated as an accurate predictive tool for new onset AF.[16] Further research is needed to compare the predictive accuracy of these scores to the Taiwan AF score. Another strength of the study is the simplicity of the score. It can be easily computed during general health examination and in outpatient clinics without the need for laboratory, electrocardiogram, or echocardiogram evaluation. The Suita score, in comparison, has a certain degree of complexity because information on high-density lipoprotein levels and cardiac murmurs is needed. Finally, the model leverages health insurance data from virtually all Taiwanese patients and the risk of selection bias is therefore very low.

Despite the utility of the findings, this study faces several limitations that should be acknowledged. First, well-established risk factors for AF such as body mass index and smoking were missing from the insurance registry used to derive the model. This also limited the ability of the authors to compare their score to ARIC, FHS, and CHARGE-AF. Second, the model was internally validated using bootstrapping methodology without cross-validation in an external cohort. Therefore, the findings may not be generalizable to other Asian populations. Finally, the prevalence of AF is likely underreported in the database because the disease is often asymptomatic and can go undiagnosed for a long period of time.

The incidence of AF in Asian populations is steadily increasing with an estimated rate of 5.38 per 1000 patient years.[17] The widespread application of the Taiwan AF tool may improve the detection rate of AF thereby mitigating the overall burden of the disease. Should the Taiwan AF score replace existing scores to predict new onset AF among Asian individuals? The score is simple and performs remarkably well in the cohort from which it was derived; however, further studies are needed to externally validate the tool in other Asian populations and to compare its predictive performance to that of other existing tools. Finally, further research is needed to assess whether the Taiwan AF score can accurately stratify the risk of thromboembolic events.

ARTICLE INFORMATION

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