**EDITORIAL**

**CHA2DS2-VASc: towards a universal risk assessment in cardiovascular diseases?**

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The CHA2DS2-VASc (congestive heart failure; hypertension; age ≥75 years [double score]; diabetes mellitus; previous stroke/transient ischemic attack [TIA; double score]; vascular disease; age, 65–74 years; sex category, female) score is a validated clinical prediction tool, which is currently used to estimate the risk of stroke in patients with atrial fibrillation (AF). This novel score has been reported to outperform the previous CHADS2 scoring system, which despite its simplicity did not include many common stroke risk factors.1-3 Therefore, even patients classified as low risk by CHADS2, in its original validation study had a stroke rate of 1.9%/year.4 In 2010, Lip et al.5 compared stroke risk stratification schemes in an anticoagulated AF cohort and demonstrated that the CHA2DS2-VASc score was characterized by the highest sensitivity. Additionally, the negative predictive value of this score was the highest among other scores with the level of about 99.5%.5 Given the high mortality and morbidity rates associated with AF-related thromboembolism, a stroke risk score that is more inclusive of common stroke risk factors such as CHA2DS2-VASc scheme would have “flagged up” more patients for anticoagulant treatment, which would have the potential to reduce stroke risk in these individuals.6

The CHA2DS2-VASc score is a simple clinical tool that consists of common cardiovascular risk factors related to thromboembolism; therefore, unsurprisingly, there have been recent reports about its use for prediction of stroke risk or even mortality in various cardiovascular diseases in patients in sinus rhythm.7-13 One of such cohorts are patients with acute coronary syndromes (ACS), as current guidelines recommend early risk stratification to plan appropriate treatment in those patients.3-10 This can be achieved using an established risk scoring system that predicts mortality, such as GRACE or TIMI scores.10 Whether the CHA2DS2-VASc scale can be that tool is a matter of debate. It has been demonstrated recently that both CHADS2 and CHA2DS2-VASc scores have a strong prognostic value in predicting mainly stroke in patients with ACS, regardless of whether the patient had AF.11,12 Michell et al.13 enrolled 20 000 patients with ACS without known AF in the APPROACH prospective registry and showed that both scores predicted ischemic stroke or TIA with similar accuracy to that observed in historical populations with nonvalvular AF, but with lower absolute event rates. Of note, CHA2DS2-VASc had a higher discrimination performance than the CHADS2 score.13 Podolec et al.14 showed in patients with acute myocardial infarction that not only the risk of stroke but also of death increased 4-fold in the high-risk group compared with the low-risk group (P < 0.001). In that study, every point in the CHA2DS2-VASc score was independently associated with an increase of 41% in stroke risk and an increase of 23% in mortality rates (P < 0.001 for both).

In the current issue of the Polish Archives of Internal Medicine, Kiliszek et al.15 reports a study in which they applied both the CHA2DS2-VASc and modified R CHA2DS2-VASc (additional 2 points for renal insufficiency, calculated estimated glomerular filtration rate ≤60 ml/kg/min) scores in patients with ACS. The assessment of renal function had been previously validated in the ROCKET-AF and ATRIA study cohorts and introduced into the R CHA2DS2 score. Moreover, Barra et al.17 showed that a similarly modified R CHA2DS2-VASc score has good calibration and high discriminative performance in the prediction of ischemic stroke and all-cause mortality in patients after myocardial infarction.

Kiliszek et al.15 studied 2557 individuals with ACS who were followed up for a median of about 5 years. The clinical data were pooled from 5 independent cardiac registries with long-term follow-up. About 75% of the patients had ST-segment elevation myocardial infarction (STEMI)
and most of the study population was treated invasively. The aim of the investigators was to assess the long-term predictive value of CHA₂DS₂-VASc and R₂CHA₂DS₂-VASc scores in ACS patients without a history of AF and to compare those scales with the TIMI and GRACE scores.

The investigators showed that both the CHA₂DS₂-VASc and R₂CHA₂DS₂-VASc scores were strongly significant predictors of total mortality. After correction for heart rate on admission, systolic blood pressure on admission, previous myocardial infarction and left ventricular ejection fraction, the scores were still significantly predictive of mortality. The Kaplan–Meier curves showed a gradually worsening prognosis as the R₂CHA₂DS₂-VASc score increased.

Kiliszek et al. also compared the CHA₂DS₂-VASc and R₂CHA₂DS₂-VASc scores to the widely used myocardial infarction GRACE, TIMI, STEMI, and TIMI NSTEMI risk scores in terms of predicting mortality in the analyzed population. They found that the GRACE and TIMI STEMI scores were superior to the CHA₂DS₂-VASc and R₂CHA₂DS₂-VASc scores, which was not surprising. However, when the GRACE score was compared with the R₂CHA₂DS₂-VASc the difference was significant only at 1-year follow-up. Moreover, the TIMI NSTEMI score was not different from the CHA₂DS₂-VASc score and even worse than the R₂CHA₂DS₂-VASc score. Of note, the R₂CHA₂DS₂-VASc score presented better predictive values than the CHA₂DS₂-VASc score. The most potent factors influencing mortality were age, chronic kidney disease, and previous stroke. An interesting observation of a "protective" effect of female sex in the multivariate analysis clearly requires further studies.

The results of Kiliszek et al. are similar to those reported by previous studies in patients with ACS. The major difference between those studies is the type of the study population. Contrary to previous studies, Kiliszek et al. enrolled most of the patients with STEMI who were treated invasively with primary percutaneous coronary intervention. Therefore, the observations were made in a contemporary population of ACS patients treated according to the current guidelines. Moreover, a major advantage of the analysis was the comparison of CHA₂DS₂-VASc and R₂CHA₂DS₂-VASc with the accepted and widely used GRACE and TIMI scores. Last but not least, it was the largest cohort of patients with ACS studied with a long-term follow-up.

In summary, the CHA₂DS₂-VASc and R₂CHA₂DS₂-VASc scores can predict mortality risk in patients with ACS who are in sinus rhythm. These scores are much easier to apply compared with the recommended and widely used GRACE or TIMI scores; therefore, they can be calculated directly at the bedside. The GRACE or TIMI risk score is more complicated and requires the user to input various risk factors into a special formula (which can be done online), where the estimated risk is calculated. Although the CHA₂DS₂-VASc and R₂CHA₂DS₂-VASc scores are simple to use and easy to remember, they should not be a substitute for a more robust risk stratification tools in the evaluation of ACS patients. However, it is a very interesting concept to use those scores as the simple and quick assessment of cardiovascular risk even in patients in sinus rhythm diagnosed with various cardiovascular diseases.

REFERENCES