EDITORIAL

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

Grzegorz Gajos¹, Renata Gołębiowska-Wiatrak²

1 Department of Coronary Disease and Heart Failure, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland

2 John Paul II Hospital, Kraków, Poland

The CHA₂DS₂-VASc (congestive heart failure; hypertension; age \geq 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 fac-

tors related to thromboembolism; therefore, un-

surprisingly, there have been recent reports about

its use for prediction of stroke risk or even mortal-

ity in various cardiovascular diseases in patients

in sinus rhythm.^{7,10-13} One of such cohorts are pa-

tients with acute coronary syndromes (ACS), as

current guidelines recommend early risk stratifi-

cation to plan appropriate treatment in those pa-

tients.⁸⁻¹⁰ 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.

Grzegorz Gajos, MD, PhD, Klinika Choroby Wieńcowej i Niewydolności Serca, Instytut Kardiologii, Uniwersytet Jagielloński, Collegium Medicum, ul. Pradnicka 80, 21-202 Kraków, Poland, phone: +48 797 188 726, fax: +48 12 614 22 19, e-mail: grzegorz.gajos@uj.edu.pl Received: August 10, 2015. Accepted: August 11, 2015. Conflict of interest: none declared. Pol Arch Med Wewn, 2015: 125 (7-8): 500-501 Copyright by Medycyna Praktyczna, Kraków 2015

Corresponcence to:

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 AP-PROACH 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 Podolecki 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 mortalitv rates (P < 0.001 for both).

In the current issue of the *Polish Archives of Internal Medicine*, Kiliszek et al.¹⁵ reports a stud y in which they applied both the CHA₂DS₂-VASc and modified R₂CHA₂DS₂-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 R₂CHADS₂ score.² Moreover, Barra et al.¹² showed that a similarly modified R₂CHA₂DS₂-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 CHA_2DS_2 -VASc and $R_2CHA_2DS_2$ -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.¹⁵ also compared the CHA₂DS₂--VASc and R₂CHA₂DS₂-VASc scores to the widely used in 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 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.¹⁵ 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.¹⁵ 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 CHA_2DS_2 -VASc and R_2CHA_2 -DS₂-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.

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