Hypertension Research (2014) 37, 699–700

www.nature.com/hr

CORRESPONDENCE

Assess bleeding risk with HAS-BLED and assess stroke risk with CHA_2DS_2-VASc in patients with atrial fibrillation

Hypertension Research (2014) **37,** 699–700; doi:10.1038/hr.2014.63; published online 1 May 2014

Toyoda *et al.*[1] used two stroke risk scores (that is, the $CHADS_2$ (Congestive heart failure, Hypertension, Age over 75 years, Diabetes mellitus and prior Stroke or TIA) and CHA_2DS_2-VASc (Congestive heart failure, Hypertension, Age over 75 years (doubled), Diabetes mellitus and prior Stroke or TIA (doubled), Vascular disease, Age 65–74 years and sex category)) as bleeding risk indices for Japanese patients with atrial fibrillation (AF). Stroke and bleeding risks are closely related. However, although there is an increased risk of bleeding with higher $CHADS_2$ and CHA_2DS_2-VASc scores,[2,3] this increase is not significant. In contrast, bleeding rates significantly increase with higher values on a specific bleeding risk score, the HAS-BLED (hypertension, abnormal renal/liver function, stroke, bleeding history or predisposition, labile international normalized ratio, elderly, drugs/alcohol concomitantly).[2]

The HAS-BLED score was developed and validated to predict bleeding events in anticoagulated AF patients; it adds one point for hypertension, abnormal renal/liver function (one point each), stroke, bleeding history or predisposition, labile International Normalized Ratio (INR), age older than 65 years and drugs/alcohol concomitantly (one point each).[4] Furthermore, it has been validated in several external 'real world' cohorts.[5] Importantly, the HAS-BLED outperforms the $CHADS_2$ and CHA_2DS_2-VASc when c-indices, net reclassification or discrimination indices are compared.[2,3]

Note that a high HAS-BLED score is not a reason to withhold anticoagulation, as such patients derive even greater net clinical benefits from anticoagulation (particularly with the novel oral anticoagulants) when balancing the reduced risk of ischemic stroke against the risk of serious bleeding.[6,7]

Note also that the risk of bleeding for patients administered vitamin K antagonists (VKAs) is largely dependent upon the quality of the anticoagulation control, which can be defined by the time in therapeutic range (TTR). A higher TTR (>70%) is associated with lower risks of thromboembolism and bleeding.[8,9] Recently, Apostolakis *et al.*[10] have identified several clinical and demographic factors that are useful in predicting patients who will potentially have poor INR control. This new score, the $SAMeTT_2R_2$ score, aids clinical decision making by identifying those patients who would not perform well on warfarin and for whom an NOAC would be a better option.

For stroke risk, the CHA_2DS_2-VASc performs better than the $CHAD_2$ in predicting stroke and thromboembolism, and it is particularly good in identifying 'low-risk' patients.[11] Composite scores for a combined end point of thromboembolism and bleeding offer good predictive values but limited incremental benefits over the established individual scores.[12]

In summary, bleeding risk should be assessed with a well-validated specific bleeding risk score (HAS-BLED), and stroke risk should be assessed with well-validated stroke scores (for example, the CHA_2DS_2-VASc). The use of scoring systems to predict end points for which they were not designed nor adequately validated is strongly discouraged.

Yee C Lau, Gregory YH Lip and Pilar Gallego

Centre for Cardiovascular Sciences, City Hospital, University of Birmingham, Birmingham, UK
E-mail: pilargallegoh@yahoo.es

1 Toyoda K, Yasaka M, Uchiyama S, Iwade K, Koretsune Y, Nagata K, Sakamoto T, Nagao T, Yamamoto M, Gotoh J, Takahashi JC, Minematsu K and The Bleeding with Antithrombotic Therapy Study Group. $CHADS_2$ and CHA_2DS_2-VASc scores as bleeding risk indices for patients with atrial fibrillation: the Bleeding with Antithrombotic Therapy Study. *Hypertens Res* 2014; **37**: 463–466.
2 Apostolakis S, Lane DA, Buller H, Lip GY. Comparison of the CHADS2, CHA2DS2-VASc and HAS-BLED scores for the prediction of clinically relevant bleeding in anticoagulated patients with atrial fibrillation: The AMADEUS trial. *Thromb Haemost* 2013; **110**: 1074–1079.
3 Roldán V, Marín F, Manzano-Fernández S, Gallego P, Vílchez JA, Valdés M, Vicente V, Lip GY. The HAS-BLED score has better prediction accuracy for major bleeding than the CHADS2 or CHA2DS2-VASc scores in anticoagulated patients with atrial fibrillation. *J Am Coll Cardiol*. 2013; **62**: 2199–2204.
4 Pisters R, Lane DA, Nieuwlaat R, de Vos CB, Crijns HJ, Lip GY. A novel user-friendly score (HAS-BLED) to assess 1-year risk of major bleeding in patients with atrial fibrillation: the Euro Heart Survey. *Chest* 2010; **138**: 1093–1100.
5 Gallego P, Roldán V, Torregrosa JM, Gálvez J, Valdés M, Vicente V, Marín F, Lip GYH. Relation of the HAS-BLED bleeding risk score to major bleeding, cardiovascular events and mortality in patients with atrial fibrillation. *Circ Arrhythm Electrophysiol* 2012; **5**: 312–318.
6 Banerjee A, Lane DA, Torp-Pedersen C, Lip GY. Net clinical benefit of new oral anticoagulants (dabigatran, rivaroxaban, apixaban) versus no treatment in a 'real world' atrial fibrillation population: a modelling analysis based on a nationwide cohort study. *Thromb Haemost* 2012; **107**: 584–589.
7 Pisters R, Nieuwlaat R, Lane DA, Crijns HJ, Lip GY. Potential net clinical benefit of population-wide implementation of apixaban and dabigatran among European patients with atrial fibrillation. A modelling analysis from the Euro Heart Survey. *Thromb Haemost* 2013; **109**: 328–336.
8 Lip GY, Andreotti F, Fauchier L, Huber K, Hylek E, Knight E, Lane D, Levi M, Marín F, Palareti G, Kirchhof P. European Heart Rhythm Association. Bleeding risk assessment and management in atrial fibrillation patients. Executive Summary of a Position Document from the European Heart Rhythm Association [EHRA], endorsed by the European Society of Cardiology [ESC] Working Group on Thrombosis. *Thromb Haemost* 2011; **106**: 997–1011.
9 Gallego P, Roldan V, Marín F, Romera M, Valdés M, Vicente V, Lip GY. Cessation of oral anticoagulation in relation to mortality and the risk of thrombotic events in patients with atrial fibrillation. *Thromb Haemost* 2013; **110**: 1189–1198.

10 Apostolakis S, Sullivan RM, Olshansky B, Lip GY. Factors affecting quality of anticoagulation control among patients with atrial fibrillation on warfarin: the SAMe-TT2R2 score. *Chest* 2013; **144**: 1555–1563.

11 Olesen JB, Torp-Pedersen C, Hansen ML, Lip GY. The value of the CHA2DS2-VASc score for refining stroke risk stratification in patients with atrial fibrillation with a CHADS2 score 0-1: a nationwide cohort study. *Thromb Haemost* 2012; **107**: 1172–1179.

12 Lip GY, Lane DA, Buller H, Apostolakis S. Development of a novel composite stroke and bleeding risk score in patients with atrial fibrillation: The AMADEUS study. *Chest* 2013; **144**: 1839–1847.