CHA₂DS₂-VASc Risk Scheme
Not Ready for Clinical Use

To the Editor:

In a recent issue of CHEST (February 2010), Lip et al assert that their “novel … schema could improve our approach to stroke risk stratification in patients with AF [atrial fibrillation].” We respectfully disagree because the following limitations, among others, substantially undercut this assertion:

1. Most importantly, the scheme’s predictive ability was poor, with a C statistic of 0.606. Although the authors suggest that their model was better than the widely used CHADS₂ (an acronym for Congestive heart failure, Hypertension, Age ≥ 75, Diabetes, prior Stroke/transient ischemic attack) scheme, they provide no evidence that the two were statistically significantly different. Indeed, in one analysis, the authors note that their scheme did not predict thromboembolism “better than chance.” The study’s clearest finding was that the Framingham scheme performed best in their limited cohort.

2. Modern prognostic model building demands validation of the exact model to avoid deterioration in performance when used outside the original data. The authors claim that their study provides a validation for their Birmingham 2009 scheme. However, we were unable to identify any formal validation of the model (eg, through testing in an independent sample). The authors should make clear what they mean by validation.

3. The statistical approach described in “Methods” was not followed in the analyses. The “Methods” state, “Variables were removed stepwise from the model when the \( P \) value exceeded .10.” In the final model, six of the eight variables included did not meet the \( P < .10 \) criterion.

4. The authors claim that a distinctive feature of their scoring system is that their low-risk patients sustained no strokes during follow-up. They report a rate of 0 with a CI of (0-0). First, we note that this is an impossibly precise CI. The true upper bound actually includes stroke rates > 3% per year. The low observed rate is largely the consequence of setting a very low threshold for categorizing patients as more than low risk. As a result, the scheme also categorizes 75% of their patients as high risk. It is particularly important to validate the performance of these thresholds since the threshold can be chosen post hoc.

5. The Euro Heart Survey had limitations that could bias the reported analyses. Most importantly, follow-up for thromboembolism was missing for a substantial (31%) portion of the cohort. An earlier report from Euro Heart conceded that some patients might have been lost because of stroke events.

In sum, we need better stroke-risk prediction schemes for patients with AF, but the analysis reported by Lip et al is too premature for clinical application.

Response

Singer et al feel that the CHA₂DS₂-VASc (Cardiac failure or dysfunction, Hypertension, Age ≥ 75[Doubled], Diabetes, Stroke