

Gage BF, van Walraven C, Peace L, et al. Selecting patients with atrial fibrillation for anticoagulation: Stroke risk stratification in patients taking aspirin. *Circulation* 2004;110:2287-2292. An 80-year-old man with hypertension, DM 2, and NYHA Class II Heart Failure, with no prior history of stroke, presents to your clinic and asks about whether the aspirin he takes is sufficient to prevent a stroke, or whether he should take coumadin as well. CHADS₂, among other risk stratification schemes, was validated prospectively for patients' stroke risk based on clinical factors (CHADS₂ = 1 point for each of the following: CHF, HTN, Age >75, Diabetes, and prior stroke/TIA (2 points)). CHADS₂ was particularly effective at stratifying people at high risk for stroke, while still being as effective as other schemes in classifying patients as low-risk, in whom the risks of anticoagulation outweigh the potential benefits. Regarding the clinical scenario, this patient has 4 points by CHADS₂ and would be classified as high-risk, with a risk of 5.3 strokes per 100 patient-years in those without a prior history of stroke (primary prevention). The benefits of anticoagulation outweigh the risks and this patient should be started on coumadin. Of note, this validation study only included clinical factors. TTE results were not available, which may have helped to improve the predictive accuracy of those schemes that use LV systolic dysfunction as a predictor of stroke risk.

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Selecting Patients With Atrial Fibrillation for Anticoagulation Stroke Risk Stratification in Patients Taking Aspirin

Brian F. Gage, MD, MSc; Carl van Walraven, MD, FRCPC, MSc; Lesly Pearce, MS; Robert G. Hart, MD;
Peter J. Koudstaal, MD; B.S.P. Boode, MD; Palle Petersen, MD, PhD

Background—The rate of stroke in atrial fibrillation (AF) depends on the presence of comorbid conditions and the use of antithrombotic therapy. Although adjusted-dose warfarin is superior to aspirin for reducing stroke in AF, the absolute risk reduction of warfarin depends on the stroke rate with aspirin. This prospective cohort study tested the predictive accuracy of 5 stroke risk stratification schemes.

Methods and Results—The study pooled individual data from 2580 participants with nonvalvular AF who were prescribed aspirin in a multicenter trial (Atrial Fibrillation, Aspirin, Anticoagulation I study [AFASAK-1], AFASAK-2, European Atrial Fibrillation Trial, Primary Prevention of Arterial Thromboembolism in patients with nonrheumatic Atrial Fibrillation in primary care study, and Stroke Prevention and Atrial Fibrillation [SPAF]-III high risk or SPAF-III low risk). There were 207 ischemic strokes during 4887 patient-years of aspirin therapy. All schemes predicted stroke better than chance, but the number of patients categorized as low and high risk varied substantially. AF patients with prior cerebral ischemia were classified as high risk by all 5 schemes and had 10.8 strokes per 100 patient-years. The CHADS₂ scheme (an acronym for Congestive heart failure, Hypertension, Age >75, Diabetes mellitus, and prior Stroke or transient ischemic attack) successfully identified primary prevention patients who were at high risk of stroke (5.3 strokes per 100 patient-years). In contrast, patients identified as high risk by other schemes had 3.0 to 4.2 strokes per 100 patient-years. Low-risk patients identified by all schemes had 0.5 to 1.4 strokes per 100 patient-years of therapy.

Conclusions—Patients with AF who have high and low rates of stroke when given aspirin can be reliably identified, allowing selection of antithrombotic prophylaxis to be individualized. (*Circulation*. 2004;110:2287-2292.)

Key Words: anticoagulants ■ aspirin ■ atrial fibrillation ■ risk factors ■ stroke

The rate of stroke in nonvalvular atrial fibrillation (AF) ranges widely and depends on the presence of prior cerebral ischemia, comorbid conditions, and use of antithrombotic therapy. Without antithrombotic therapy, the rate varies from fewer than 2 to more than 10 strokes per 100 patient-years.¹⁻⁷ Although adjusted-dose warfarin is superior to aspirin for reducing stroke in AF patients, the absolute risk reduction is determined by the stroke risk with aspirin therapy.^{8,9}

Thus, quantifying the risk of stroke is crucial for determining which AF patients would benefit most from warfarin therapy. Patients whose risk is less than ≈2 strokes per 100 patient-years with aspirin have little to gain from warfarin therapy; for these patients, the risks of warfarin tend to outweigh any benefits.⁹⁻¹¹ A risk stratification scheme that reliably identified these low-risk patients could spare them the risks, inconvenience, and costs associated with anticoag-

ulation. In contrast, for AF patients whose risk exceeds 4 strokes per 100 patient-years of aspirin therapy, warfarin therapy consistently improves quality-adjusted survival.^{4,10,12} Between these 2 extremes are patients for whom the key issue is whether stroke risk can be quantified reliably so that antithrombotic therapy can be judiciously selected on the basis of stroke risk, hemorrhage risk, and individual preferences.^{10,13,14}

Risk stratification schemes that accurately and reliably stratify stroke risk could influence the antithrombotic management of millions of people who have AF. Because patients with a prior stroke or transient ischemic attack (TIA) are at high risk of stroke, the greatest need is to quantify stroke risk in the AF primary prevention population. Here, we use prospective data to test the predictive accuracy of 5 widely available stroke risk stratification schemes and provide reliable guidance to clinicians selecting antithrombotic therapy.

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From the Division of General Medical Sciences, Washington University School of Medicine, St. Louis, Mo (B.F.G.); Departments of Medicine and of Epidemiology and Community Medicine, University of Ottawa, and Ottawa Health Research Institute, Ottawa, Canada (C.v.W.); Biostatistical Consultant, Minot, ND (L.P.); Department of Medicine (Neurology), University of Texas Health Science Center, San Antonio, Tex (R.G.H.); Department of Neurology, Erasmus Medical Center, Rotterdam, the Netherlands (P.J.K.); Department of General Practice, University of Maastricht, Maastricht, the Netherlands (B.S.P.B.); and Department of Neurology, Copenhagen University Hospital, Copenhagen, Denmark (P.P.).

Correspondence to Brian F. Gage, MD, MSc, Division of General Medical Sciences, Washington University School of Medicine Campus Box 8005, 660 S Euclid Ave, St. Louis, MO 63110. E-mail bgage@im.wustl.edu

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TABLE 1. Stroke Risk Stratification Schemes

Scheme	Strokes Per 100 Patient-Years in Original Cohorts, Stratified by Risk		
	Low	Moderate	High
AFI	0.3–3.1	3.5–4.3	4.9–8.1
SPAF	0.5–2.3	1.7–4.7	4.5–7.8
ACCP
CHADS ₂	1.2–3.0	2.8–4.0	5.9–18.2
Framingham	1.0–1.9	2.3–4.0	4.2–27.7

AFI: Ranges reflect different stroke rates at different ages in 1593 participants assigned to no antithrombotic therapy. SPAF: Ranges are 95% CIs from 854 participants prescribed aspirin. ACCP: Rates were not available; CHADS₂: A score of 0 was low risk, 1–2=moderate risk, and 3–6=high risk; ranges are expected stroke rates without antithrombotic therapy from 1733 patients. Framingham: Scores of 0 to 7 were classified as low risk, 8 to 13 as moderate risk, and 14 to 31 as high risk; ranges are expected stroke rates from 705 patients not receiving warfarin.

Methods

Risk Stratification Schemes

Multivariate analyses of prospective cohorts of AF patients who were prescribed aspirin or no antithrombotic therapy yielded independent predictors of stroke that formed the basis of 5 previously published risk stratification schemes (Appendix).^{2,4,15,16} In 1994, the Atrial Fibrillation Investigators (AFI) conducted a multivariate analysis of pooled data from 1593 untreated AF participants in 5 randomized clinical trials.⁴ Participants with prior cerebral ischemia (either stroke or TIA), hypertension, or diabetes mellitus were at high risk of stroke; patients without these risk factors were at moderate risk of stroke if older than 65 years and at low risk otherwise (Table 1).

The Stroke Prevention and Atrial Fibrillation (SPAF) investigators developed a classification scheme from 854 SPAF I and II participants treated with aspirin.¹⁵ Four factors independently predicted a high risk of stroke: prior cerebral ischemia, the combination of age greater than 75 years plus female gender, left ventricular dysfunction (defined as recent clinical heart failure or left ventricular fractional shortening $\leq 25\%$ by echocardiography), and systolic blood pressure >160 mm Hg (Table 1). SPAF participants with a history of hypertension but blood pressure ≤ 160 mm Hg were found to have a moderate risk (≈ 3 strokes per 100 patient-years),^{5,15} and participants with none of these factors were at low risk of stroke (Table 1).

In 1998 and 2001, the American College of Chest Physicians (ACCP) Consensus Conference on Antithrombotic Therapy classified patients as high risk if they had prior cerebral ischemia (or systemic embolism), hypertension, congestive heart failure (either clinical heart failure or poor systolic function on echocardiography), age >75 years, or at least 2 moderate-risk factors.^{16,17} The moderate-risk factors were age 65 to 75 years, diabetes mellitus, and coronary artery disease. Patients with 1 moderate-risk factor were classified as moderate risk, and patients with none of the risk factors were classified as low risk.

In 2001, an amalgamation of the AFI and SPAF schemes led to the CHADS₂ scheme.² The CHADS₂ acronym was derived from the individual stroke risk factors: Congestive heart failure, Hypertension, Age >75 years, Diabetes mellitus, and prior Stroke or TIA. Two points were given for prior stroke or TIA (hence, the subscripted "2"), and 1 point was assigned for each of the other factors. The point system was designed to simplify the determination of stroke risk in general practice. CHADS₂ stroke rates (Table 1) were calculated in 1733 Medicare beneficiaries in the National Registry of Atrial Fibrillation using International Classification of Diseases codes 434 (occlusion of cerebral arteries), 435 (transient cerebral ischemia), and 436 (acute, but ill-defined, cerebrovascular disease). The expected stroke rate (95% CI) per 100 patient-years without antithrombotic therapy increases by a factor of 1.5 for each 1-point increase in

TABLE 2. Study Participants

Prescribed aspirin	2580 (100)
Women	943 (37)
Mean age, y (SD)	72 (9)
Age >75 y	1003 (39)
Hypertension	1188 (46)
SBP ≥ 160 mm Hg	645 (25)
Heart failure	655 (25)
Diabetes mellitus	346 (13)
Prior stroke or TIA	566 (22)
Prior MI or angina	464 (18)

SBP indicates systolic blood pressure; MI, myocardial infarction. Values are n (%), except for age.

the CHADS₂ score: 1.9 (1.2 to 3.0) for a score of 0; 2.8 (2.0 to 3.8) for 1; 4.0 (3.1 to 5.1) for 2; 5.9 (4.6 to 7.3) for 3; 8.5 (6.3 to 11.1) for 4; 12.5 (8.2 to 17.5) for 5; and 18.2 (10.5 to 27.4) for 6.

In 2003, Wang et al¹⁸ developed a risk classification scheme based on 868 Framingham participants, some of whom were taking warfarin or aspirin therapy. Using the coefficients from a Cox proportional survival model, they developed a point system based on age (0 to 10 points), gender (6 points for female; 0 for male), blood pressure (0 to 4 points), diabetes mellitus (4 points), and prior stroke or TIA (6 points) to develop a scheme to predict the combination of ischemic plus hemorrhagic stroke (Table 1). Whether the Framingham scheme will predict ischemic stroke in other AF populations is not clear.

For a variety of reasons, we evaluated only these 5 risk stratification schemes and excluded others. We excluded schemes that were based entirely on retrospective data.^{19,20} We excluded 2 schemes^{21,22} that were based on data used in the present analysis and another because the other study focused exclusively on secondary prevention.⁷ We excluded the initial SPAF I scheme⁶ because it was superseded by the subsequent SPAF and AFI schemes, both of which used SPAF I data. We excluded schemes that required the use of echocardiography to risk-stratify patients^{23–27} because we did not have echocardiographic results on all participants and because we wished to validate a scheme that could predict stroke on the basis of clinical risk factors.

Description of the Validation Population

Participants with nonvalvular AF who took aspirin at dosages ranging between 75 and 325 mg daily in 6 prospective trials made up the validation cohort (Table 2). To validate the risk stratification schemes in an independent cohort of AF patients, patient data that were used to derive any of the 4 classification schemes were excluded from this analysis.

We used patient data from 6 prospective randomized trials. In 4 trials, participants were prescribed aspirin alone: the Atrial Fibrillation, Aspirin, Anticoagulation I (AFASAK-I; n=336) study,²⁸ the Primary Prevention of Arterial Thromboembolism in patients with nonrheumatic Atrial Fibrillation in primary care study (PATAF; n=319),²⁹ the European Atrial Fibrillation Trial (EAFT; n=404),³⁰ and the low-risk SPAF III study (n=891; 1 additional SPAF patient was excluded for missing information).⁵ From the fifth trial, AFASAK-2, we included participants who were prescribed aspirin, either alone (n=169) or in combination with an ineffective, 1.25-mg dose of warfarin (n=171).³¹ From the sixth trial, high-risk SPAF-III,³² we included participants (n=290) who were prescribed aspirin in combination with low-dose warfarin (median dose 2 mg/d) if their international normalized ratio never exceeded 1.4 during follow-up. Adherence to aspirin therapy exceeded 85% in the studies in which it was reported.^{5,29,33}

Research coordinators and physicians recorded baseline patient characteristics at the time of enrollment in the original trials. We classified participants into the appropriate strata of each scheme

TABLE 3. Validation of Stratification Schemes for Primary Prevention of Stroke in 2014 Participants Prescribed Aspirin

Scheme	Strokes Per 100 Patient-Years, Stratified by Risk		
	Low	Moderate	High
AFI	0.9 (0.3–2.3; n=235)	1.7 (1.1–2.5; n=781)	3.5 (2.7–4.5; n=998)
SPAF	1.1 (0.7–1.8; n=668)	2.7 (1.8–4.0; n=462)	3.6 (2.7–4.7; n=884)
ACCP	0.5 (0.1–2.2; n=175)	1.0 (0.4–2.2; n=296)	3.0 (2.5–3.8; n=1543)
CHADS ₂	0.8 (0.4–1.7; n=469)	2.7 (2.2–3.4; n=1322)	5.3 (3.3–8.4; n=223)
Framingham	1.4 (1.0–2.1; n=983)	3.2 (2.4–4.3; n=700)	4.2 (2.8–6.1; n=331)

Table excludes participants (n=566) who previously had a stroke or TIA. Stroke rates (with 95% CIs) are from strata identified by clinical factors alone; echocardiographic results were not available.

using baseline clinical characteristics (Appendix). These characteristics included age, previous stroke or TIA, hypertension, cardiac disease, and diabetes. Patients were classified as hypertensive if they were taking medications given to lower blood pressure or if blood pressure exceeded 140/90 mm Hg. Because echocardiographic information was not available, we were unable to apply one of the stroke risk factors (decreased systolic function) of the ACCP and SPAF schemes. Likewise, because we could not ascertain the duration of congestive heart failure, we substituted any congestive heart failure for recent heart failure in the SPAF and CHADS₂ schemes.

During follow-up in these trials, physicians assessed patients with suspected stroke. To identify etiology, a brain CT scan was done in 98% of incident neurological events. Strokes were defined as neurological deficits that persisted for more than 24 hours and that were not associated with an intracranial hemorrhage.

Statistical Analysis

Incidence rates for ischemic stroke were calculated as the number of strokes per 100 patient-years of observation.³⁴ For this calculation, observation started when participants were randomized to aspirin and ended when they experienced an ischemic stroke or were censored. Participants were censored for nonstroke death or study termination. To calculate 95% CIs, we used the Poisson distribution.

We used the weighted κ -statistic to compare the agreement between schemes corrected for chance agreement.³⁵ Because the κ -statistic requires the same number of risk strata for all schemes, we collapsed CHADS₂ scores into 3 strata (0, 1 to 2, and 3 to 6) and the Framingham scores into 3 strata (0 to 7, 8 to 13, and >13) for this comparison.

We quantified the discrimination of each stratification scheme using the log-rank test, the Wald χ^2 statistic from a Cox proportional hazards model, and the c-statistic.³⁶ Discrimination is the ability of the stratification schemes to separate the AF population into strata that have distinct stroke rates.³⁷ A c-statistic of 1.0 indicates perfect discrimination, which means that patients with different stroke risks are always correctly distinguished, whereas a value of 0.5 is noninformative. We bootstrapped 200 samples (with replacement) of the χ^2 and c-statistic values using a publicly available macro (<http://ftp.sas.com/techsup/download/stat/>) and compared the differences values between schemes by paired *t* tests. Statistical analyses were done with SAS software (SAS Institute Inc). All statistical tests were 2 sided, and probability values <0.05 were considered significant.

The Institutional Review Board of participating institutions approved the study.

Results

Characteristics of the Validation Cohort

The 2580 participants had a mean age of 72 years, 38% were female, and 22% had suffered a prior stroke or TIA (Table 2). The most frequent risk factor was hypertension, which was present in 46%, and the least common was diabetes, with a

13% prevalence. Participants were followed up for a mean of 1.9 years (maximum 6.6 years). During 4887 patient-years of follow-up, there were 207 ischemic strokes, for an overall incidence rate of 4.2 strokes per 100 patient-years during aspirin therapy. The rate among the 2014 primary prevention participants without prior cerebral ischemia was 2.5 strokes per 100 patient-years of aspirin; for the 566 participants with a prior stroke or TIA, the rate was 10.8 per 100 patient-years of aspirin.

Stroke Rates According to Predicted Risk for Each Scheme

All schemes stratified the risk of ischemic stroke significantly better than chance (log-rank $P<0.001$ for all schemes), but the number of AF patients categorized as at high, moderate, and low risk varied substantially (Table 3). The agreement between schemes was variable, with weighted κ -values ranging from a low of 0.13 (ACCP versus Framingham) to a high of 0.58 (ACCP versus AFI).

Comparison of the Classification Schemes

The stroke rates (95% CI) per 100 patient-years of aspirin rose with increasing CHADS₂ scores: 0.8 (0.4 to 1.7; n=469) with 0 points; 2.2 (1.6 to 3.1; n=752) with 1 point; 4.5 (3.5 to 5.9; n=670) with 2 points; 8.6 (6.8 to 11.0; n=428) with 3 points; 10.9 (7.8 to 15.2; n=200) with 4 points; 12.3 (6.6 to 22.9; n=56) with 5 points; and 13.7 (2 to 97; n=5) with 6 points. Rates (95% CI) per 100 patient-years of aspirin in other high-risk patients were lower than in the highest CHADS₂ cohorts: 6.1 (5.3 to 7.1) by AFI criterion, 6.5 (5.6 to 7.6) by SPAF, 5.1 (4.4 to 5.8) by ACCP, and 7.9 (6.5 to 9.7) for Framingham score >13.

Among primary prevention participants, CHADS₂ identified participants at high risk for stroke: primary prevention participants with 3 or 4 points averaged 5.3 (95% CI 3.3 to 8.4) strokes per 100 patient-years. In contrast, patients identified by other schemes as high risk had rates of 3.0 to 4.2 strokes per 100 patient-years (Table 3). The use of a higher Framingham threshold (>15 rather than >13 points; Table 3) identified 144 participants whose stroke rate was only 3.9.

A Cox proportional hazards model quantified the ability to discriminate between low- and high-risk patients by the likelihood ratio χ^2 test. The χ^2 (SD) was 67 (16) for AFI, 73 (16) for SPAF, 44 (11) for ACCP, 98 (19) for CHADS₂, and 89 (20) for Framingham ($P<0.001$ for CHADS₂ versus the other schemes).

Collapsing CHADS₂ into 3 strata (0, 1 to 2, and 3 to 6) yielded a χ^2 value of 86, and collapsing Framingham into 3 strata (0 to 7, 8 to 13, and >13) yielded a value of 69. When only primary prevention patients were analyzed, χ^2 values were lower, but the pattern was similar: AFI 18, SPAF 17, ACCP 17, CHADS₂ 22 (20 with 3 strata), and Framingham 16 ($P < 0.001$ for CHADS₂ versus other schemes).

The c-statistics (SD) were 0.63 (0.01) for AFI, 0.64 (0.01) for SPAF, 0.58 (0.01) for ACCP, 0.70 (0.02) for CHADS₂, and 0.69 (0.02) for Framingham ($P < 0.001$ for CHADS₂ versus other schemes). When participants with a prior stroke or TIA were excluded, c-statistics (SD) were 0.61 (0.02) for AFI, 0.61 (0.02) for SPAF, 0.58 (0.02) for ACCP, 0.63 (0.03) for CHADS₂, and 0.62 (0.03) for Framingham.

Identification of Patients Whose Stroke Rate Was Low With Aspirin Therapy

ACCP criteria classified the fewest participants as low risk ($n = 182$). In contrast, SPAF classified 668 participants as low risk (Table 3). Primary prevention participants with a Framingham score of 4 or less ($n = 502$) or 7 or less ($n = 983$) both averaged 1.4 strokes per 100 patient-years. Primary prevention participants with 7 or fewer Framingham points who were not considered low risk by SPAF averaged 2.2 strokes per 100 patient-years; primary prevention participants with 7 or fewer Framingham points who had 1 or more CHADS₂ points averaged 1.9 strokes per 100 patient-years.

Discussion

This study of 2580 participants to whom aspirin had been prescribed confirms that AF populations with high and low stroke risks can be identified prospectively. Patients with a prior stroke or TIA averaged 10.8 strokes per 100 patient-years despite aspirin therapy. For these patients, it is clear that the benefits of anticoagulant therapy outweigh the risks.^{30,32,38}

Primary prevention patients whose stroke risk exceeds ≈ 4 per 100 patient-years of aspirin also benefit from warfarin therapy.^{4,10,12} These patients were reliably identified by a CHADS₂ score ≥ 3 . Such patients averaged 5.3 strokes per 100 patient-years of aspirin. The number needed to treat with warfarin instead of aspirin for 1 year to prevent 1 stroke would be ≈ 30 for these patients.^{9,12} High-risk primary prevention patients identified by the other schemes had stroke rates of only 3.0 to 4.2.

In contrast, all schemes successfully identified low-risk patients whose stroke rate was 1.4 or lower per 100 patient-years of aspirin, but the agreement between schemes was poor. Experts and patients typically prefer aspirin to warfarin when the risk is less than ≈ 2 strokes per 100 patient-years of aspirin.⁹⁻¹¹ For these AF patients, the number needed to treat with warfarin for 1 year to prevent 1 stroke exceeds 100. The ability to characterize low-risk AF patients with confidence allows clinicians to identify patients who can safely be treated with aspirin, sparing them the risk of bleeding, cost, and inconvenience from anticoagulant therapy.^{39,40} Although the Framingham scheme identified the largest fraction of low-risk patients (almost half of the primary prevention cohort had a Framingham score of 7 or less), the additional low-risk patients identified had ≈ 2 strokes per 100 patient-years, a rate substantially greater than other low-risk cohorts.

For patients whose stroke risk is 2 to 4 per 100 patient-years of aspirin therapy, many experts offer warfarin,^{41,42} whereas others offer aspirin,^{43,44} depending on risk of hemorrhage and patient preferences. In clinical trials, warfarin increased the risk of major hemorrhage 1.7-fold compared with aspirin.⁹ Outside of trials, the risk of hemorrhage was greater,^{45,46} depending on how warfarin was monitored⁴⁷ and risk factors for hemorrhage.⁴⁸ How patients trade off the risk of stroke, risk of hemorrhage, and the aggravation of taking and monitoring anticoagulant therapy depends on individual preferences.^{10,13,14}

The use of data from clinical trial cohorts confers both strengths and limitations to the present study. One strength is that similar sets of comorbid conditions were collected at baseline across different trials. A second strength is that ischemic strokes were identified prospectively by clinical examination and confirmed by computerized tomography. A third is that all patients received aspirin, which allowed us to quantify the stroke rate with this ubiquitous, inexpensive therapy. A fourth strength is that none of the patients included in these analyses were included as part of the derivation cohorts for any of the schemes. Finally, because the schemes were derived primarily from patients assigned to no antithrombotic therapy, the present study demonstrates that the schemes (especially CHADS₂) are valid predictors of stroke in patients prescribed aspirin.

One limitation is that participants with contraindications to warfarin therapy were included in only 1 of the 6 trials. The inclusion of more of these patients would have provided greater generalizability, but such patients were excluded from clinical trials. Second, echocardiographic results were not available, which would have allowed us to assess whether they would have improved the predictive accuracy of the schemes that consider left ventricular systolic dysfunction as a stroke risk factor. Thus, the SPAF criteria for impaired left ventricular function could not be tested, and a history of heart failure was used instead. A finding of significant systolic dysfunction by echocardiography primarily would be relevant to patients at low risk of stroke on the basis of clinical factors.^{24,49}

Recent retrospective studies of other AF populations further validate CHADS₂. For example, enrollees of Kaiser Permanente (Northern California) who were not prescribed warfarin (4% of whom had a prior stroke) had a very low stroke rate (0.5 per 100 patient-years) if their CHADS₂ score was 0. Their stroke rates were greater with greater CHADS₂ scores: 1.5 for 1 point, 2.5 for 2 points, 5.3 for 3 points, 6.0 for 4 points, and 6.9 for 5 or 6 points.⁴⁶ Although other schemes were not evaluated by these studies, it confirms the ability of CHADS₂ to identify low- and high-risk patients reliably.

In the future, a more accurate prediction rule for stroke may be possible by incorporating additional factors. For example, left ventricular systolic dysfunction detected by 2D transthoracic echocardiography is an independent risk factor for stroke in AF.²⁴ Also, it seems likely that hormone replacement therapy^{21,50} and cigarette smoking⁵¹ increase the risk of stroke in AF, whereas modest alcohol consumption may decrease it.²¹ Finally, future studies will determine whether biochemical markers of inflammation (eg, C-reactive protein) or endothelial dysfunction (eg, von Willebrand factor) will help clinicians predict stroke in the AF population.

Appendix

TABLE 4. Definitions Used by Stroke Risk Stratification Schemes

Scheme	Low	Moderate	High
AFI (1994)	Not moderate or high risk	Age >65 years but not high risk	Prior ischemia, HTN, DM
SPAF (1995, 1998)	Not moderate or high risk	HTN but not high risk	Prior ischemia, women aged >75 years, recent CHF or LV fractional shortening $\leq 25\%$, SBP >160 mm Hg
ACCP (1998, 2001)	Not moderate or high risk	1 of the following: age 65–75 years, DM, or CAD but not high risk	Prior ischemia, HTN, CHF, age >75 years, or 2 or more moderate risk factors
CHADS ₂ (2001)	Score = +1 for CHF, +1 for HTN, +1 for age >75 years, +1 for DM, +2 points for a prior stroke or TIA		
Framingham (2003)	Score = +6 for prior ischemia, +0 to 4 for blood pressure, +4 for diabetes mellitus, +0 to 10 for age, +6 for female gender		

HTN indicates hypertension; DM, diabetes mellitus; CHF, congestive heart failure; LV, left ventricular; SBP, systolic blood pressure; and CAD, coronary artery disease.

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Disclosure

Several of the authors were involved in the development of the risk stratification schemes tested in these analyses: AFI (Drs Hart and Petersen), SPAF (Drs Hart and L. Pearce), and CHADS₂ (Dr Gage).

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