Original Article

Assessment and comparison of CHADS2, CHA2DS2-VASc, and HAS-BLED scores in patients with atrial fibrillation in Saudi Arabia

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Abstract:

AIMS: No previous reports on the utilization of CHADS2, CHA2DS2-VASc, and HAS-BLED scores in atrial fibrillation (AF) patients in Saudi Arabia have been identified in the literature. The main objectives of this study were to assess and compare the distribution of CHADS2, CHA2DS2-VASc, and HAS-BLED scores and to identify the most common risk factors for stroke and bleeding among AF patients attending clinical pharmacists managed anticoagulation clinic.

SETTINGS AND DESIGN: This cross-sectional study was conducted over 2 months period at clinical pharmacists managed anticoagulation clinic.

METHODS: CHADS2, CHA2DS2-VASc, and HAS-BLED scores were calculated and compared for all eligible patients.

RESULTS: Two hundred and sixty-four patients with AF were included in the analysis. The number of patients at low risk for stroke was found to be 14 (5.3%) using CHADS2 and only 4 (1.5%) using CHA2DS2-VASc. On the other hand, 64 patients (24.2%) were found at moderate risk for stroke using CHADS2 compared with 17 patients (6.4%) using CHA2DS2-VASc. Most of the patients were found to be at high risk for stroke using either the CHADS2 (70.5%) and CHA2DS2-VASc (92%). The study also revealed that most of the patients were at moderate (63.3%) to high (27.7%) risk of bleeding.

CONCLUSIONS: The results of this study show that the percentage of patients at high risk for stroke and bleeding is very high. The study revealed that this could be attributed to the high prevalence of modifiable risk factors for stroke and for bleeding in Saudi patients with AF.

Key words:
Atrial fibrillation, CHADS2, CHA2DS2-VASc and HAS-BLED, Saudi Arabia

Atrial fibrillation (AF) is the most common type of arrhythmias affecting 0.95% of the population, especially the elderly. One of the major issues in AF patients is the increased risk of stroke, which is five times higher than patients without AF.[1,2]

The CHADS2 and CHA2DS2-VASc score are a validated stroke assessment tools that clinicians use to assess the risk of stroke in patients with nonvalvular AF.[3-6] Although the CHADS2 score has been available for many years and is simple to calculate, it does not include several important risk factors and suffers from important limitations.[7] CHA2DS2-VASc score overcame many of the limitations of the CHADS2 score including its ability to reliably identify "truly low risk" patients, who could be managed with no antithrombotic therapy.[8,9] Therefore, the CHA2DS2-VASc score is now recommended in recent guidelines instead of the CHADS2 score for stroke assessment in patients with AF.[9]

Clinicians' main concern after starting warfarin or other anticoagulant therapy is the risk of major

bleeding. In a large cohort study, in 2013, it was found that the incidence of hospital admission due to hemorrhage was 3.8% per patient per year for a patient receiving warfarin, and 18.1% of those patient die in the hospital or within 7 days after discharge.[10] HAS-BLED is a validated assessment tool that estimates the risk of bleeding.[11-13] Clinicians should consider comparing the risk for major bleeding as calculated by the HAS-BLED score to the risk for thromboembolic events by the CHADS2 or CHA2DS2-VASc to determine if the benefit of anticoagulation outweighs the risk.

No previous reports on the utilization and comparison of CHADS2, CHA2DS2-VASc, and HAS-BLED scores in AF patients in Saudi Arabia have been identified in the literature. Only few studies were published on the clinical characteristics, management, and cardiovascular risk factors in Saudi patients with AF.[14,15]

The main objectives of this study were to assess and compare the distribution of CHADS2, CHA2DS2-VASc, and HAS-BLED scores and to identify the most common risk factors for stroke and bleeding among AF patients attending a clinical pharmacists managed anticoagulation clinic. The incidence of major bleeding episodes among the study sample was also investigated.

Methods

Subjects and settings
This cross-sectional study was conducted at the anticoagulation clinic at King Abdulaziz Medical City (KAMC). KAMC is a 1025 bed Tertiary Care Hospital in Riyadh, Saudi Arabia.

At the study site, all patients who are started on warfarin for different indications including AF, either during admission or during ambulatory care, are referred to a clinical pharmacist-managed anticoagulation clinic for evaluation and monitoring.

The study was conducted on patients attending the clinic between March and April 2014. All patients who were receiving warfarin, diagnosed with valvular or nonvalvular AF, had at least ten international normalized ratio (INR) readings in the hospital information system and were undergoing laboratory testing at KAMC were included. Patients were excluded if they met one of these criteria: Receiving anticoagulants other than warfarin, not followed at KAMC anticoagulation clinic, diagnosed with the end stage liver disease, on chronic hemodialysis, and on warfarin therapy for <4 weeks.

The Institutional Review Board approval from the King Abdullah International Medical Research Center was obtained before launching the study.

Data collection
A data collection sheet was designed to collect all the demographic and clinical information required for calculation of CHADS2, CHA2DS2-VASc, and HAS-BLED scores including age, gender, current and previous medical history including hypertension, diabetes, heart failure, liver disease, kidney disease, vascular diseases, bleeding history, and history of stroke. Current medications and pertinent laboratory values were also recorded including INR values, blood pressure, and liver and kidney function tests.

CHADS2, CHA2DS2-VASc, and HAS-BLED scores
The CHADS2 score calculation requires adding one point for each of the following risk factors: Congestive heart failure (C), hypertension (H), age ≥75 years (A), and diabetes mellitus (D), and two points for a history of stroke or transient ischemic attack (S).[6] CHA2DS2-VASc on the other hand gives an additional point if the patient is >74 years old and one point for each of the following risk factors: Vascular disease, age 65–74 years, and female sex.[9] According to the guidelines of the American Heart Association (AHA) in collaboration with the American College of Cardiology (ACC) and the Heart Rhythm Society (HRS) published in 2014 patients are categorized into low (score = 0), intermediate (score = 1), and high-risk (score ≥2) groups for stroke based on their CHA2DS2-VASc.[9] The same categorization also applies to CHADS2 scores.[6]

HAS-BLED score calculation require adding one point for each of the following risk factors: Uncontrolled hypertension (H), abnormal renal or liver function (A), history of stroke (S), history of major bleeding (B), labile INR (L), elderly (age >64 years) (E), use of nonsteroidal anti-inflammatory drugs (NSAIDs), and antiplatelet or alcohol (D).[11,12] The American College of Chest Physicians guidelines (2012) classifies patients based on their HAS-BLED score as having low risk for bleeding (score 0), moderate risk for bleeding (score 1–2), or high risk for bleeding (score ≥3).[6]

Statistical analysis
Data were coded and entered into SPSS 21.0 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). Continuous variables were presented as the mean ± standard deviation (SD). Categorical variables including CHADS2, CHA2DS2-VASc, and HAS-BLED score distributions were presented as frequencies (%). Chi-square test was used to tests the difference between CHADS2 and CHA2DS2-VASc in classifying patients' risk for stroke. $P < 0.05$ was considered statistically significant.

Results

Clinical characteristics and risk factors for stroke and bleeding
During the study period, 308 patients were screened, 264 patients were eligible to be enrolled in the study, and 44 were excluded (twenty patients were doing laboratory assessment outside of the study hospital, 18 patients had <10 INR readings, one patient was not on warfarin, two patients were on chronic dialysis, and three patients had liver cirrhosis).

Clinical characteristics of the study sample are shown in Table 1. The mean ± SD age of the study sample was 68.4 ± 10.8 years; 45.5% of the subjects were male. Hypertension (79.5%), diabetes mellitus (54.5%), female gender (54.5%), and age (38.6%) were the most common risk factors for stroke in the study sample. On the other hand, age (66.7%), labile INR (84.5%), medications (36.7%), and abnormal renal function (18.9%) were the most common risk factors for bleeding.

Distribution and comparison of CHADS2 and CHA2DS2-VASc scores

Distribution of CHADS2 and CHA2DS2-VASc scores are shown in Table 2 and Figure 1. The mean CHADS2 score was 2.09 (±1.11), and 186 patients (70.5%) were classified as high risk of stroke. The mean CHA2DS2-VASc score was 3.55 ± 1.5,
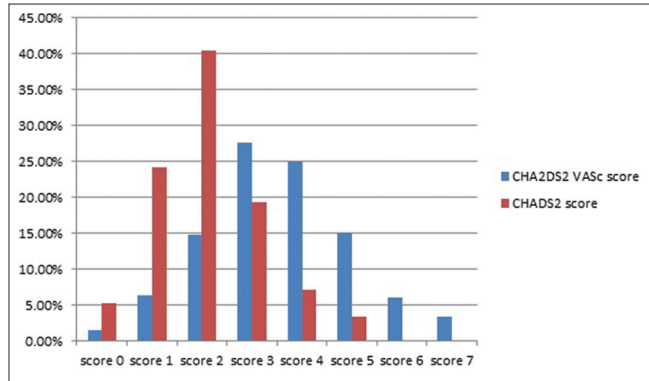

Figure 1: Distribution and comparison of CHADS2 and CHA2DS2-VASc scores

Table 1: Clinical characteristics and risk factors for stroke and bleeding

	n (%)
Demographic data	
Age	
Mean (SD)	68.4 (±10.8)
≥75	75 (28.4)
≥65	177 (66.7)
65-74	102 (38.6)
Male	120 (45.5)
Female	144 (54.5)
Labile INR	128 (48.5)
Medication increase risk of bleeding	97 (36.7)
Comorbidity	
Hypertension	210 (79.5)
Diabetes mellitus	144 (54.5)
Congestive heart failure	47 (17.8)
Vascular disease	64 (24.2)
History of stroke or TIA	38 (14.4)
Abnormal renal function	50 (18.9)
Previous incidence of major bleeding	16 (6.1)
Previous incidence of minor bleeding	29 (11)
Uncontrolled blood pressure	14 (5.3)
Abnormal liver function	5 (1.9)

SD = Standard deviation; TIA = Transient ischemic attack; INR = International normalized ratio

Table 2: CHADS2 and CHA2DS2-VASc risk categories in the study sample

	CHA2DS2-VASc score, *n* (%)	CHADS2 score, *n* (%)	*P*
Low risk	4 (1.5)	14 (5.3)	<0.00001
Moderate risk	17 (6.4)	64 (24.2)	
High risk	243 (92)	186 (70.5)	
CHA2DS2-VASc score mean (SD)	3.55 (±1.5)	2.09 (±1.11)	

SD = Standard deviation

and 243 patients (92%) were classified at high risk of stroke. Only four patients (1.5%) were found to be at low risk of stroke with CHA2DS2-VASc score of 0 compared to 14 (5.3%) patients using the CHADS2 score. The difference between CHADS2 and CHA2DS2-VASc in classifying patients for stroke risk was statistically significant.

Distribution of the HAS-BLED scores

Distribution of HAS-BLED scores is shown in Table 3. Seventy-three patients (27.7%) were at high risk for bleeding (HAS-BLED score ≥3). The most common risk factors for bleeding in patients at high risk for stroke (CHA2DS2-VASc score ≥2) [Table 4] were age >64 years (71.6%), followed by labile INR (49%), then medications use (antiplatelet or NSAID) (37.86%).

Occurrence of major bleeding events

Twenty-seven (35.6%) major bleeding events occurred in patients who were identified to be at high risk of bleeding.

Discussion

This study assessed and compared the distribution of CHADS2, CHA2DS2-VASc, and HAS-BLED scores among Saudi patient attending a clinical pharmacist's managed anticoagulation clinic. The results of this study show that the percentage of patients at high risk for stroke is very high. The high prevalence of modifiable risk factors for stroke including diabetes, hypertension, and congestive heart failure could explain the prevalence of the high-risk category. These results are in concordance with the results of a recent study on Saudi patients.[15] These findings highlight the urgent needs for health promotion activities in Saudi population that focus on reducing and preventing the modifiable risk factors for stroke and cardiovascular diseases. These health promotion activities should focus on lifestyle modification including physical activities,

Table 3: HAS-BLED risk categories in the study sample

HAS-BLED score	*n* (%)
Low risk	24 (9.1)
Moderate risk	167 (63.3)
High risk	73 (27.7)
HAS-BLED score mean (SD)	1.98 (±1.11)

SD = Standard deviation

Table 4: Risk factors for bleeding in patients at high risk for stroke

Risk factors of bleeding among patients with CHA2DS2-VASc ≥2	*n* (%)
Uncontrolled BP	14 (5.76)
Abnormal renal function	48 (19.75)
Abnormal liver function	2 (0.8)
Previous stroke or TIA	38 (15.6)
Previous bleeding	14 (5.76)
Labile INR	119 (49)
Antiplatelet or NSAID use	92 (37.86)
Age >64	174 (71.6)

NSAID = Nonsteroidal anti-inflammatory drugs; TIA = Transient ischemic attack; INR = International normalized ratio; BP=Blood pressure

healthy eating, and weight reduction. In support of this, a large international study highlighted the epidemic of poor physical activities in the Saudi population as compared to other countries.[16]

The prevalence of low-risk category was reduced substantially from 5.3% when using CHADS2 score to 1.5% when using the CHA2-DS2-VASc score in estimating stroke risk. This increased the number of patient eligible for warfarin therapy more than three times. These results confirm the limitations and drawback of relying on CHADS2 score which is highlighted in the recent literature.[7] Therefore, deciding regarding anticoagulant use based on a CHADS2 score as is still recommended in some guidelines may lead to patients being provided suboptimal stroke prophylaxis and being at high risk for stroke.[6] Accordingly, the recent AF guideline published in 2014 by AHA/ACC/HRS recommend using CHA2-DS2-VASc score instead of CHADS2 score that gives a better prediction about patients who are truly at low risk compared with the CHADS2 score.[4,5]

In an observational study from 19 countries, 10,614 patients with AF were studied, 38.7% of the population with CHA2DS2-VASc score of zero (low risk) received anticoagulant therapy, and 40.7% with CHA2DS2-VASc score ≥2 (high risk) did not receive anticoagulation.[17] In the current study, the number of patients in the low-risk category (CHA2DS2-VASc score = 0) who are prescribed warfarin is low (1.5%). The low incidence of the inappropriate use of anticoagulation therapy at the current study may indicate the importance of clinical pharmacists' managed anticoagulation clinic.

The percentage of patients who were at high risk of bleeding was relatively high in the study sample (27.7%) compared to similar studies such as the report by Marcucci *et al.* (8.6%).[18] This also could be attributed to the high prevalence of modifiable risk factors in the study sample. On the other hand, a high parentage of patients was using medications that may increase bleeding risk.

Conclusions

The results of this study show that the percentage of patients at high risk for stroke and bleeding is very high in Saudi patients with AF (92% and 27.7%, respectively). The study revealed that this could be attributed to the high prevalence of modifiable risk factors for stroke and for bleeding. Nationwide campaigns should address this important issue and start implementing serious measures to reduce these risk factors. A specialized anticoagulation clinic is required for close follow-up of these patients to reduce bleeding risk and for continuous monitoring of high-risk patients.

Conflicts of interest
There are no conflicts of interest.

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