

Status of CHADS₂ and CHA₂DS₂-VASc Scores in Predicting Risk of Stroke and its Prevention in Iraqi Patients with Atrial Fibrillation

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Abstract

Atrial fibrillation is associated with elevated risk of stroke. The simplest stroke risk assessment schemes are CHADS₂ and CHA₂DS₂-VASc score. Aspirin and oral anticoagulants are recommended for stroke prevention in such patients.

The aim of this study was to assess status of CHADS₂ and CHA₂DS₂-VASc scores in Iraqi atrial fibrillation patients and to report current status of stroke prevention in these patients with either warfarin or aspirin in relation to these scores.

This prospective cross-sectional study was carried out at Tikrit, Samarra, Sharqat, Baquba, and AL-Numaan hospitals from July 2017 to October 2017. CHADS₂ and CHA₂DS₂-VASc scores were manually calculated.

One hundred patients were participated, 48 were men and 52 were women. Their mean age was 62.56 ± 14.36 years. Permanent type of atrial fibrillation, palpitation, and hypertension were the most diagnosed type, symptom and comorbidity recorded in this study respectively. Average scores of CHADS₂ and CHA₂DS₂-VASc were 2.34 ± 1.39 and 4.1 ± 2.05 , respectively. These scores were not calculated for these patients in hospital setting. Aspirin and warfarin were prescribed regardless to these scores.

The result of this study indicated that CHADS₂ and CHA₂DS₂-VASc scores were often neglected in hospitals; and aspirin is still widely used as a strategy to minimize the risk of stroke.

Keywords: Atrial fibrillation, CHADS₂, CHA₂DS₂-VASc, aspirin, warfarin.

حالة درجات CHADS₂ و CHA₂DS₂-VASc في توقع خطر السكتة الدماغية والوقاية منها في المرضى العراقيين المصابين بالرجفان الأذيني

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الخلاصة

يرتبط الرجفان الأذيني بزيادة خطر الإصابة بالسكتة الدماغية. أبسط مخططات تقييم خطر السكتة الدماغية هي درجة CHADS₂ و CHA₂DS₂-VASc. للوقاية من السكتة الدماغية في مرضى الرجفان الأذيني عادة ما ينصح باستعمال الأسبرين ومضادات التخثر الفموية. كان الهدف من هذه الدراسة هو تقييم حالة درجات CHADS₂ و CHA₂DS₂-VASc في المرضى العراقيين المصابين بالرجفان الأذيني وتحديد مستوى الوقاية من السكتة الدماغية لدى هؤلاء المرضى باستخدام الأسبرين أو الوارفارين نسبة إلى هذه الدرجات. أجريت هذه الدراسة المستعرضة المقطعية في مستشفيات تكريت وسامراء وشرقاط وبعقوبة والنعمان من تموز ٢٠١٧ إلى تشرين الأول ٢٠١٧. تم احتساب درجات CHADS₂ و CHA₂DS₂-VASc يدويًا.

شارك في هذه الدراسة مئة من مرضى الرجفان الأذيني، منهم ٤٨ رجل و ٥٢ امرأة. متوسط أعمارهم كان 62.56 ± 14.36 سنة. كان النوع الدائم من الرجفان الأذيني، الخفقان وارتفاع ضغط الدم هم النوع الأكثر تشخيصاً، الأعراض والاعتلال المشترك الأكثر توثيقاً في هذه الدراسة على التوالي. متوسط الدرجات CHADS₂ و CHA₂DS₂-VASc 2.34 ± 1.39 و 4.1 ± 2.05 ، على التوالي. لم يتم العمل بهذه الدرجات لهؤلاء المرضى في المستشفيات المذكورة وتم وصف الأسبرين والوارفارين بغض النظر عن هذه الدرجات.

أظهرت الدراسة ان درجات CHADS₂ و CHA₂DS₂-VASc غالباً ما تهمل في المستشفيات؛ ولا يزال الأسبرين يستخدم على نطاق واسع كاستراتيجية لتقليل خطر الإصابة بالسكتة الدماغية.

الكلمات الافتتاحية: الرجفان الأذيني، CHADS₂، CHA₂DS₂-VASc، الأسبرين، الوارفارين.

Introduction

Atrial fibrillation (AF) is a type of supraventricular arrhythmia that is characterized by uncoordinated activation in trial electricity with irregular and often fast ventricular response triggering hemodynamic compromise⁽¹⁾. Roughly, 1 in 100 of general population is thought to develop AF, while in elderly cohorts, the prevalence usually exceeds 1 in 10⁽²⁾.

Atrial fibrillation is related with expanded rates of death, thromboembolic events, heart failure and hospitalizations, reduced quality of life, reduced exercise capacity, and left ventricular dysfunction⁽³⁾. It is unfortunately associated with a five-fold elevated stroke risk, besides it is the most common type of arrhythmia^(2,4,5).

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Identification of numerous stroke risk factors has resulted in development of numerous stroke risk schemes. Artificially most of these schemes have classified risk of stroke into high, moderate, and low risk classes⁽⁶⁾. CHADS₂ score is the most straightforward risk assessment tool. CHADS₂ [cardiac failure, hypertension, age (>75 years), diabetes, stroke (doubled)] risk index, which is a point system, was developed by the AF Investigators and Stroke Prevention in Atrial Fibrillation (SPAF) Investigators criteria⁽⁷⁾. A newly adjusted scheme that was recommended by European Society of Cardiology (ESC) is CHA₂DS₂-VASc [cardiac failure, hypertension, age \geq 75 (doubled), diabetes, stroke (doubled), vascular disease, age 65–74, and sex category (female)], that is also a point system⁽⁸⁾.

According to the guidelines of the American College of Cardiology (ACC) and the Heart Rhythm Society (HRS) in collaboration with the American Heart Association (AHA) issued in 2014 patients are classified into low (score = 0), intermediate (score =1), and high-risk (score \geq 2) groups for a stroke based on their CHADS₂ scores. The same categorization also applies to CHA₂DS₂-VASc⁽⁹⁾. For the most of AF patients, the backbones of treatment to decrease stroke risk are antithrombotic medicines (antiplatelet and anticoagulants). The effect of these medicines in decreasing stroke risk is well established. Aspirin and oral anticoagulants (OACs) are usually suggested for preventing AF patients from developing stroke⁽¹⁰⁾.

The current study was designed to assess the status of CHADS₂ and CHA₂DS₂-VASc scores in predicting risk of stroke in Iraqi patients with AF, as well as, to report the status of stroke prevention in these patients with aspirin or warfarin in relation to these scores.

Subjects, materials, and methods

This prospective cross-sectional study was carried out at Tikrit, Samarra, Sharqat, Baquba, and AL-Numaan general hospitals from July 2017 to October 2017. The study protocol was approved by the local ethics committee in the College of Medicine, Tikrit University, Iraq, with verbal informed consent from patients. Inclusion criteria involved any patient who introduced to intensive care unit with documented symptoms of AF (chest pain, palpitation, etc.) at admission and any of the following stroke risk factors: an age of \geq 75 years, a previous stroke or transient ischemic attack, diabetes mellitus (DM), recognized peripheral arterial disease (PAD), hypertension, or a left ventricle ejection fraction of 35 – 45% or less. Exclusion criteria involve inadequate data, renal failure, and recent symptoms of bleeding.

Information on demographic characteristics was obtained through patient interview. Types and family history of AF and the presence of comorbidities including coronary artery disease

(CAD), hypertension, DM, and heart failure were reported with the aid of patient's specialist. Data were collected via face to face structured interview. Each patient was given explanation about the purpose of study in details and confidentiality was ensured.

For each patient enrolled, CHADS₂ score was calculated by assigning 1 point for cardiac failure, age >75 years, DM, and hypertension and 2 points for a prior stroke, while CHA₂DS₂-VASc score was calculated by assigning 1 point for female gender, cardiac failure, age of 65 – 74 years, DM, hypertension, vascular disease (complex aortic plaque, myocardial infarction, and PAD; including amputation because of PAD, prior revascularization, or angiographic evidence of PAD) and 2 points for a previous stroke and age \geq 75 years.

The objective of stroke prevention determination focused on the current antiplatelets and oral anticoagulant therapy that was offered by the specialist to these patients at the time of hospital discharge. Therefore, results regarding this issue reported how many patients were receiving aspirin and how many patients were receiving warfarin at time of discharged. Statistical analysis was made using the Microsoft excel 2010, and continuous variable are expressed as mean \pm standard deviation.

Results

One hundred patients were participated in this study (20 participants from each hospital), 48 were men and 52 were women. Their mean age was 62.56 ± 14.36 years. Current smoking was reported in 42 patients, while the remaining patients were nonsmokers.

Permanent type of AF (abnormal heart rhythm can't be restored) was reported in 32 patients followed by paroxysmal type (symptoms reported occasionally) that was reported in 27 patients, while persistent type (symptoms don't go back to normal on their own and treatment with electrical shock or medications are required) was occurred in 26 patients. Only 15 patients were diagnosed to have long-standing persistent type (AF is continuous and lasts longer than 12 months) of AF. Figure 1 summarizes these data.

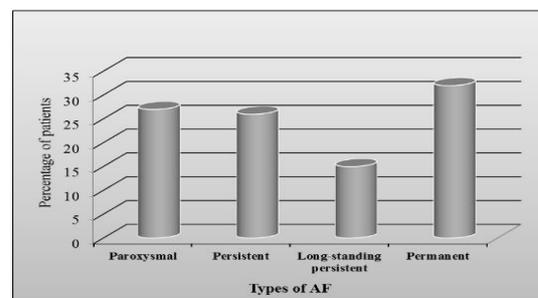


Figure (1) Types of AF recorded in this study.

The most common symptom that was associated with AF and reported by all patients was palpitations. Other symptoms reported were chest

pain, weakness, lightheadedness, and shortness of breath. Many of these symptoms concomitantly occurred in the same patient. Figure 2 summarizes all these data.

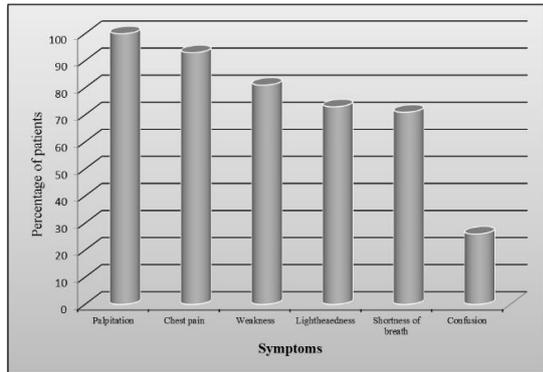


Figure (2) Symptoms of AF reported in this study. Many of these symptoms concomitantly occurred in the same patient

Patient comorbidities are demonstrated in figure 3. Hypertension was the most prevalent chronic illness (89% of patients) followed by ischemic heart disease, heart failure, PAD, DM and prior stroke attack. Many of these comorbidities concomitantly occurred in the same patient

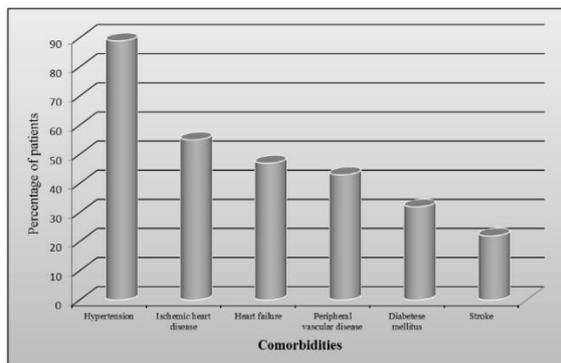


Figure (3) Comorbidities reported in this study. Many of these comorbidities concomitantly occurred in the same patient.

Figure 4 shows CHADS₂ and CHA₂DS₂-VASc scores level of utilization in patients enrolled in this study. Unfortunately, these scores were often neglected for these patients and clinicians did not use/rely on these scores.

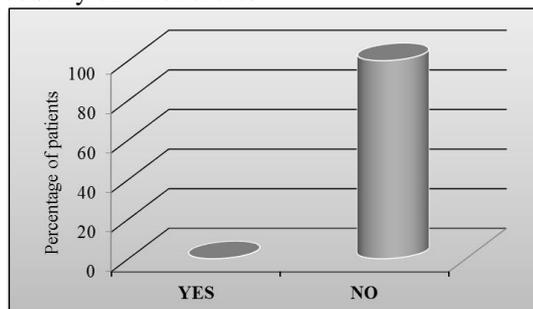


Figure (4) Utilization of CHADS₂ and CHA₂DS₂-VASc scores in this study.

Average scores of CHADS₂ and CHA₂DS₂-VASc in this study were 2.34 ± 1.39 and 4.1 ± 2.05 , respectively. CHADS₂ score categorized 5% of patients as low risk (score=0), 26% as intermediate risk (score=1), and 69% as high risk (score ≥ 2). On the other hand, CHA₂DS₂-VASc score categorized 0% of patients as low risk (score=0), 10% as intermediate risk (score=1) and 90% as high risk (score ≥ 2). Distribution of these scores in patients is demonstrated in Figure 5.

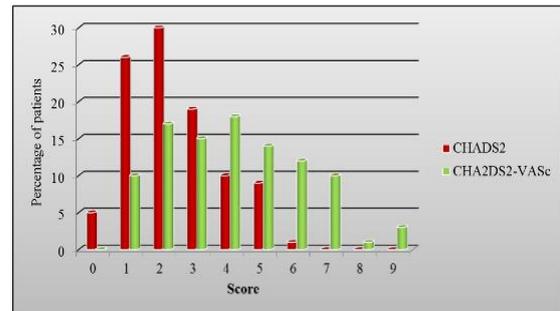


Figure (5) Distribution of CHADS₂ and CHA₂DS₂-VASc scores in this study.

Figure 6 represents the antithrombotic medications that had being given for these patients at hospital discharge in relation to CHADS₂ score. At score zero, 3 and 2 patients were received aspirin and warfarin respectively. At score one, 24 and 2 patients were received aspirin and warfarin respectively, while at score two and greater, 56 and 12 patients were received aspirin and warfarin respectively.

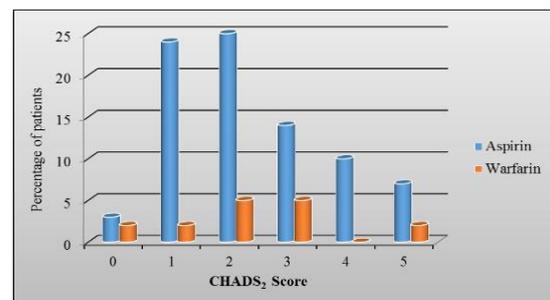


Figure (6) Antithrombotic medications that had being given for patients at hospital discharge in relation to CHADS₂ score.

Figure 7 represents the antithrombotic medications that had being given for these patients at hospital discharge in relation to CHA₂DS₂-VASc score. No patients were present at score zero. At score one, 6 and 4 patients were received aspirin and warfarin respectively. At score two and greater, 78 and 12 patients were received aspirin and warfarin respectively.

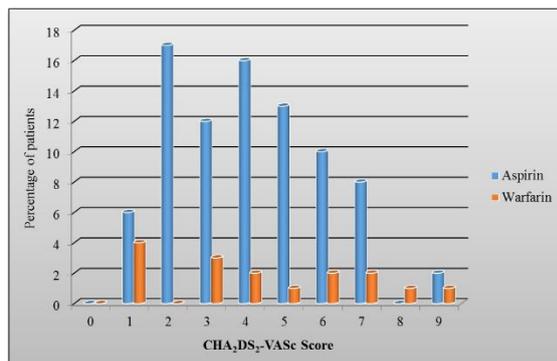


Figure (7) Antithrombotic medication that had been given for patients at hospital discharge in relation to CHA₂DS₂-VASc score.

Discussion

Atrial fibrillation is a common type of arrhythmia that can elevate the risk of stroke by five-fold. OACs and aspirin can diminish stroke risk by 64% and 22%, respectively⁽¹¹⁾. Despite the fact that OACs treatment is more effective than aspirin at preventing ischemic stroke, its use is offset by an elevated risk of hemorrhage. Hence, the initiation of OACs treatment needs recognizing patients in whom ischemic stroke risk without anticoagulant agents is adequately high to outweigh an elevated risk of major extracranial and intracranial hemorrhage related to OACs treatment⁽¹²⁾.

As shown in figure 1, permanent type of AF was the most common as presented in 32% of patients followed by paroxysmal (occasional) type that was reported in 27% of patients, persistent type was occurred in 26% of patients, and only 15% patients were diagnosed to have long-standing persistent type of AF. In study of Coppens et al., 52% of patients had permanent AF and 28% had paroxysmal AF, while 19% had persistent AF⁽¹²⁾.

As shown in figure 2, the most common symptom that was associated with AF and reported by all patients was palpitations. Other symptoms were chest pain, weakness, lightheadedness, and shortness of breath respectively. In comparison, the chief complaints that were reported by Barrett et al. involved palpitations in 41% of patients, chest pain 16%, dyspnea 12%, tachycardia 13%, and syncope in 3% of patients⁽¹³⁾.

As shown in figure 3, hypertension was the most prevalent chronic illness reported in this study as 89% of patients had it followed by ischemic heart disease, heart failure, PAD, DM and prior stroke attack respectively. In a study of Mason et al., hypertension was recorded in 56% of the patients followed by cardiovascular diseases (PAD and CAD), DM and heart failure respectively⁽¹⁴⁾. All these differences may be attributed mainly to different ethnic groups.

As shown in figure 4, application of CHADS₂ and CHA₂DS₂-VASc scores, unfortunately, was often neglected for Iraqi patients

with AF. 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⁽⁹⁾. For example, a substantial portion of patients are classified as moderate risk, and it is uncertain whether antiplatelet or anticoagulant therapy should be recommended for those patients. Furthermore, the scale ignores some potential risk factors for thromboembolism⁽¹⁵⁾. 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. Therefore, the CHA₂DS₂-VASc score is now recommended in recent guidelines instead of the CHADS₂ score for stroke assessment in patients with AF⁽⁹⁾.

As shown in figure 6 and 7, aspirin was the most prescribing antithrombotic agent for Iraqi AF patients regardless to CHADS₂ and CHA₂DS₂-VASc scores. The Main reason for this strategy is to minimize the risk of bleeding that is related to warfarin treatment as the physicians realize that international normalized ratio (INR) cannot be easily titrated.

Generally, aspirin is recommended for CHADS₂ score = 0, and oral anticoagulant is highly recommended for a score of ≥ 2 , while either aspirin or oral anticoagulant is considered suitable for patients with intermediate-risk at a score = 1⁽¹⁶⁾. On the other hand, the ESC guidelines recommend OACs for a CHA₂DS₂-VASc score ≥ 2 and aspirin or OACs for a score = 1, with OACs “preferred” and for CHA₂DS₂-VASc score = 0 no therapy or aspirin (no therapy preferred)⁽¹⁴⁾. Completely all guidelines recommend that any patient with CHADS₂ score of ≥ 2 should receive an OAC treatment as the ischemic stroke risk outweighs the elevated risk of bleeding that induced by OAC treatment. Management recommendations were unchanged regardless of CHA₂DS₂-VASc score⁽¹²⁾. Although OACs have numerous therapeutic benefits, they have certain risks: major bleeding risk that associates with warfarin treatment is expected to be at (1% – 3%) per year, and may be as high as 7% in elderly AF patients per year⁽¹⁷⁾. A meta-analysis trial reported that OACs therapy had a relative risk (RR) reduction of 62% (95% CI, 0.48 – 0.72) as compared with placebo or usual care. On the other hand, some trials have compared warfarin with aspirin, and a meta-analysis reports that warfarin has the ability to reduce the risk of stroke (RR reduction, 36%; 95% CI, 0.14 – 0.52). However, warfarin benefit is usually associated with an elevated rate of hemorrhage risk. Comparing with aspirin, a meta-analysis reported that warfarin had a risk for intracranial hemorrhage (RR, 2.1; 95% CI, 1.0-4.6) and a double risk for a major extracranial hemorrhage (RR, 2.0; 95% CI, 1.2 – 3.4; absolute risk rise, 0.2% per year)⁽¹⁸⁾.

This study had several limitations. First, this study was limited by its small sample size from few hospitals. Second, it examined patients at only one point in time and patient's risk scores may change over time. Third, it examined the hypothetical effect of these scores and cannot make determination as to which scoring system is best.

Conclusion

CHADS₂ and CHA₂DS₂-VASc scores were often neglected in assessing Iraqi AF patients in hospitals; in addition to that, aspirin is still widely used as a strategy to minimize stroke risk in patients with AF regardless to these scores. Therefore, it will be important to determine by a randomized trial whether the use of antiplatelets and/or OACs in relation to these scores will result in improved outcomes, without increased morbidity/mortality due to bleeding complications.

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