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An Overview on CHA_2DS_2-VASc Score and CHA_2DS_2 - VASc-HSF Score

Islam Ghanem[1], Ahmed A. Abelmeged[2], Salwa M. ghoneim[1], Ahmed S. sherief[1]*

[1]*Cardiology Department, Zagazig University, Egypt*

[2]*Mahalla Cardiac Centre, Egypt*

Abstract

The CHA2DS2-VASc score has been widely adopted as a risk stratification tool for strokes in patients with atrial fibrillation and to help in deciding when anticoagulation therapy for stroke prophylaxis may be beneficial. The score as a whole has been well validated and has been included in the current major practice guidelines. An advantage of the CHA2DS2-VASc score is its ease of use, allowing clinicians to quickly estimate risk based on a short set of criteria. However, the benefit of simplicity may also be a weakness. Studies on individual components of the score suggest that only a subset of patients deemed to be at risk based on the current definition are actually at risk for stroke. CHA2DS2-VASc score consists of congestive cardiac failure (C), Hypertension (H), Age > 75 years(A), Diabetes Mellitus (D), Stroke (S), with addition to Vascular diseases(V), Age 65–74 years (A) and Sex Category (Sc), both these scoresCHADS2and CHA2DS2-VASc include similar risk factors as coronary artery disease (CAD). These scores may be useful even to assess the severity of CAD. These scores being similar to the risk factors for CAD are easy to remember and apply by various physicians at primary level.

Keywords: CHA_2DS_2-VASc score, CHA_2DS_2 - VASc-HSF Score, CAD.

Mini review article **Corresponding Author*, e-mail*: ahmed01152855011@gmail.com*

1. Introduction

CHA_2DS_2 and CHA_2DS_2-VASc score models are widely used to predict the risk of subsequent thromboembolic events in patients with atrial fibrillation (AF) and include similar risk factors for the development of CAD [1]. Recent evidence has shown that the $CHADS_2$ score has prognostic ability in CAD, regardless of the presence of AF, and has suggested the power of $CHADS_2$ and CHA_2DS_2-VA to assess major adverse cardiovascular outcomes in setting of ACS [2]. Moreover, a retrospective study found that the CHA_2DS_2-VASc score was associated with a higher risk of in-hospital mortality rates in patients who underwent primary percutaneous coronary intervention (PCI) for STEMI [3]. There is a new score, the CHA_2DS_2-VASc-HSF, which includes variables hyperlipidemia (H), smoking (S), and family history of CAD (F), in addition to previous risk factors to assess the risk of CAD [4]. The CHA2DS2-VASc score is a clinical risk assessment tool commonly used in field of cardiology, particularly in context of atrial fibrillation (AF). It is designed to estimate risk of stroke in patients with AF, helping healthcare providers make informed decisions about anticoagulation therapy [5]. Atrial fibrillation is a common cardiac arrhythmia characterized by irregular and often rapid heartbeats. It poses a significant risk of stroke due to formation of blood clots in atria, which can then travel to brain and cause a stroke. The CHA2DS2-VASc score emerged as a systematic approach to assess risk of stroke in AF patients, guiding clinicians in determining the appropriate use of anticoagulant therapy [6].

2. Components of CHA2DS2-VASc Score

The CHA2DS2-VASc score comprises various clinical parameters, each assigned a specific score based on its association with the risk of stroke. These parameters include:

1. Congestive Heart Failure (1 point): Presence of heart failure contributes to an increased risk of stroke. It reflects the compromised ability of the heart to pump blood effectively [7].
2. Hypertension (1 point): Elevated blood pressure is a wellestablished risk factor for stroke. The inclusion of hypertension in the score acknowledges its importance in predicting adverse cardiovascular events [8].
3. Age ≥75 years (2 points): Advancing age is an independent risk factor for stroke. The scoring system assigns higher points for individuals aged 75 or older, recognizing heightened risk associated with aging [5].

4. Diabetes Mellitus (1 point): Diabetes is a metabolic disorder that contributes to vascular complications, including an increased risk of stroke. It is an important component of the score, emphasizing the need for comprehensive risk assessment [3].
5. Stroke or Transient Ischemic Attack (2 points): A history of stroke or transient ischemic attack (TIA) significantly elevates the risk of future stroke. The higher point allocation underscores the gravity of this history in predicting subsequent events [4].
6. Vascular Disease (1 point): Presence of vascular disease, such as a history of myocardial infarction, peripheral artery disease, or aortic plaque, adds to the overall risk of stroke. This component broadens the scope of the score to encompass different aspects of vascular health [1].
7. Age 65-74 years (1 point): While age is already considered in the score, a separate point is assigned for individuals aged 65 to 74, recognizing the increasing risk associated with this age range [9].
8. Sex Category (Female Gender) (1 point): Female gender is included as a component, acknowledging that women with AF may have a slightly elevated risk of stroke compared to men [10].

The total score, ranging from 0 to 9, categorizes patients into different risk groups, guiding clinicians in determining the need for anticoagulant therapy [4].

3. Clinical Relevance

The CHA2DS2-VASc score holds paramount importance in clinical practice for several reasons:

1. Anticoagulation Decision-Making: One of the primary applications of the CHA2DS2-VASc score is aiding clinicians in deciding whether anticoagulation therapy is warranted. Higher scores indicate a greater risk of stroke, prompting a more aggressive approach to prevent thromboembolic events [11].
2. Guidance for Thromboprophylaxis: The score provides clear guidance on the use of oral anticoagulants for stroke prevention. Patients with a CHA2DS2-VASc score of 2 or higher are generally recommended for anticoagulant therapy, while those with a score of 0 or 1 may be candidates for antiplatelet therapy [12].
3. Risk Stratification: The score allows for risk stratification, enabling healthcare providers to tailor treatment plans based on individual patient profiles. This personalized approach is crucial for optimizing therapeutic outcomes while minimizing potential risks associated with anticoagulation [7].
4. Incorporation into Guidelines: The CHA2DS2-VASc score has widely incorporated into clinical guidelines for management of atrial fibrillation. Various guidelines, including those from the American College of Cardiology (ACC) and the American Heart Association (AHA), recommend its use for risk assessment [6].
5. Patient Education: The score serves as a valuable tool for patient education. By explaining the components and significance of the CHA2DS2-VASc score, healthcare providers can empower patients to actively participate in decision-making regarding their treatment plan [8].

4. Limitations

While the CHA2DS2-VASc score is a valuable tool, it is essential to recognize its limitations:

1. Limited Predictive Power: While the score provides a systematic approach to risk assessment, it is not infallible. Some patients may experience stroke despite having a low CHA2DS2-VASc score, highlighting need for ongoing research to refine risk prediction models [3].
2. External Factors: The score does not account for certain external factors that may influence stroke risk, such as lifestyle factors, genetic predispositions, and specific comorbidities not included in the score [1].
3. Static Nature: The score provides a snapshot of risk at a specific point in time. It does not dynamically adjust to changes in a patient's health status, potentially leading to underestimation or overestimation of risk over time [11].
4. Limited Utility in Low-Risk Patients: In patients with a CHA2DS2-VASc score of 0 or 1, the utility of anticoagulation remains a topic of debate. The score may not provide a clear consensus in these cases, necessitating careful consideration of individual patient characteristics and preferences [12].
5. Evolution of Knowledge: Medical knowledge is dynamic, and advancements in research may lead to updates in risk assessment models. CHA2DS2-VASc score, widely accepted, may undergo modifications as our understanding of stroke risk in AF evolves [4].

4. CHA2DS2-VASc-HSF Score

A new score CHA2DS2-VASc-HSF was formulated to be included more variables like Hyperlipidemia (H), Smoking (S) and Family history of CAD(F) in addition to the previous risk factors to assess the risk of CAD. These scores can be evaluated as multivariable risk assessment tools to determine the severity of the CAD in all patients undergoing coronary angiography (CAG) [13]. The CHADS2 and CHA2 DS2 -VASc scores are clinical predictors used to evaluate the risk of cardiac thromboembolism and to guide antithrombotic therapy. The CHADS2 and the CHA2 DS2 -VASc scores are widely used in clinical practice and include similar risk factors for development of coronary artery disease (CAD) [14]. These scores have demonstrated to have the predictive value in terms of risk of death after stroke, risk of stroke or death after the coronary artery bypass grafting (CABG), and the risk of stroke and death in patients with stable CAD and acute coronary syndrome. Recently, reported that the CHADS2, the CHA2DS2-VASc, and newly defined the CHA2DS2-VASc-HSF scores could predict CAD severity using the Gensini score in patients who underwent the diagnostic coronary angiography [15].

The CHA2 DS2 -VASc-HSF score formulated [heart failure (signs/symptoms of heart failure confirmed with objective evidence of cardiac dysfunction), hypertension (HT) (defined as measurements of systolic and diastolic blood pressure ≥ 140/90 mmHg or taking antihypertensive medications), age, diabetes mellitus (DM) (as a fasting blood glucose level > 126 mg/dL or random blood glucose ≥ 200 mg/dL or using anti diabetic drugs), previous ischemic stroke or transient ischemic attack (TIA), vascular disease (defined as myocardial infarction [MI] and peripheral artery disease including prior revascularization, amputation or angiographic evidence or aortic plaque), male, female sex, hyperlipidemia (defined as increased level of low density lipoprotein

cholesterol (LDL-C) according to National Cholesterol Education Program-3 recommendations and history of using lipid lowering medications), smoking status (defined as smoking > 10 cigarettes a day for at least 1 year without a quit attempt), and family history of CAD (as MI before 55 years of age for men or 65 years of age for women in first-degree relatives) [16]. Compared to CHA2 DS2 -VASc score, male gender instead of female as sex category, hyperlipidemia, smoking, and family history of CAD added in this score [17].

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