Journal of
Cardiology & Cardiovascular Therapy
ISSN: 2474-7580

Juniper Publishers
key to the Researchers

Opinion
Volume 6 Issue 2 – June 2017
DOI: 10.19080/JOCCT.2017.06.555681

J Cardiol & Cardiovasc Ther

Usefulness of CHA_2DS_2-Vasc Score for Hyperthyroid Patients with Atrial Fibrillation

Marcus VL de Souza* and Sharon J S Faria

Division of Endocrinology, Clementino Fraga Filho University Hospital, Brazil

Submission: May 11, 2017; **Published:** June 21, 2017

***Corresponding author:** Marcus VL de Souza, Assistant Professor, Division of Endocrinology, Clementino Fraga Filho University Hospital, Federal University of Rio de Janeiro, Brazil, Tel: 55-21-39382748; Email: marcusleitao@hucff.ufrj.br

Abstract

Anticoagulation in hyperthyroid patients with atrial fibrillation (AF) remains a controversial issue, especially due to the absence of randomized controlled trials defining the impact of warfarin therapy on vascular complications. The current clinical risk score (CHA_2DS_2-VASc) seems to be a useful tool for defining anticoagulation among most AF patients. However, AF related to hyperthyroidism may have distinct characteristics that are not considered by clinical risk scores. Notable examples include the younger age of most patients with Graves disease, factors related to hyperthyroidism (severity, time without treatment, T3 predominant thyrotoxicosis), pro-coagulant status due to higher serum thyroxine levels, and the fact that some of the items of the risk score may be reversible with hyperthytroidism treatment. Recent data has shown an incongruence of the CHA_2DS_2-VASc score with critical atrial abnormalities (thrombogenic milieu) in transesophageal echocardiographs (TEEs), which suggests that a TEE-based approach may be more appropriate for managing and defining proper anticoagulation for AF related to hyperthyroidism.

Keywords: Hyperthyroidism; Atrial fibrillation; Transesophageal echocardiography; CHA_2DS_2-VASc; Thrombogenic milieu

Introduction

Atrial fibrillation (AF) is a well-established complication of hyperthyroidism with prevalence that can vary between 0.3% and 37.3%, depending on age, sex, and associated diseases [1]. However, one of the intriguing questions is the real risk of embolic events in patients with this condition. Evidence warranting anticoagulation treatment with warfarin for all patients with AF related to hyperthyroidism comes predominantly from case series or retrospective cohort trials [2,3]. Nowadays, this decision usually relies on the clinical risk score, CHA_2DS_2-VASc, which does not take into account any aspect of hyperthyroidism as a risk factor for an embolic event [4].

Hyperthyroidism and Coagulation Status

The influence of hyperthyroidism on coagulation status and especially on thrombotic risk is always a matter of debate. It seems that there may be a slight tendency for thrombotic status in relation to higher thyroxine levels with a rise in factors VIII and IX, fibrinogen, von Willebrand factor, and plasminogen activator inhibitor-1 [5]. Autoimmunity associated with Graves´ disease may also affect coagulation status with the induction of specific pro-coagulant proteins or interleukin imbalances that shift hemostasis towards a hypercoagulable and hypofibrinolytic state [6]. The clinical consequence of this hemostasis imbalance can be seen in case reports with central venous thrombosis, cerebral vasculitis, and disseminated intravascular coagulation, which support the concept of a pro-coagulant status related to hyperthyroidism, particularly in Graves disease [7].

Atrial Fibrillation, CHA_2DS_2-Vasc Score, and Hyperthyroidism

AF is the leading cause of arterial embolic events [1]. As a common disease, several controlled trials provide guidelines on how to manage frequency control, the need for sinus rhythm restoration, and particularly thrombus prophylaxis [4]. Validated clinical risk scores can provide effective guidelines for anticoagulation, but sdue to the absence of prospective and randomized trials, hyperthyroidism is not considered as an additional risk factor for embolic events. The current clinical risk score (CHA_2DS_2-VASc) points out associated and well-validated factors that increase the risk of an embolic event (Congestive heart failure, Hypertension, Age, Diabetes, Stroke, Vascular disease, and Sex category). However, all the trials considered to validate this risk score investigated patients with mean ages over 60 years old. Thus, there is a gap between this clinical risk

score and most AF related to hyperthyroidism in regard to age, which is often forgotten.

In a retrospective analysis, Petterson, et al. [3] addressed this question almost 30 years ago and showed that age below 55 years was the main factor implying embolic risk in AF related to thyrotoxicosis. The relevance of age was corroborated when the previous clinical risk score (CHA_2DS_2) was replaced by the new CHA_2DS_2-VASc, which shifted the minimum age to receive 1 point in the clinical risk score from 75 to 65 years old and gives 2 points for patients ≥75 years. The fact that most Graves disease patients with AF are younger than 65 years old should at least bring some doubts about the applicability of this score in patients with hyperthyroidism, since such patients are very often between 30 and 50 years of age.

More recent data from Chan, et al. [8] suggested that patients with CHA_2DS_2-VASc ≥1 benefit from warfarin. But again, age was a problem since the mean age was 71.9 years, suggesting that his population was composed mostly of multinodular toxic goiter cases. Another crucial problem for the applicability of CHA_2DS_2-VASc to hyperthyroid patients is the potential reversibility of hypertension and heart failure with hyperthyroidism treatment. This completely changes the scenario compared to the usual patients with AF, where heart failure and hypertension are mostly progressive and irreversible. However, even during shorter periods with AF, an association with hypertension, heart failure, and uncontrolled hyperthyroidism may pose higher risks than other patients with AF.

Siu, et al. [9] conducted a prospective study to evaluate the risk of embolic stroke between non-thyroid AF and new-onset AF in hyperthyroid patients. After 1 year of follow-up, the incidence of stroke was 9.4% in hyperthyroid patients with AF and 3.1% in non-thyroid cases of AF. The most relevant message from these data is that the majority of ischemic stroke cases occurred within 30 days of clinical presentation with higher risk for hyperthyroid patients. Furthermore, this occurrence is probably related to coagulation disturbances induced by higher thyroxine levels before and around the beginning of medical treatment, a period when thyroxine levels are not yet normalized. Data have already shown that it takes at least 2-3 months to normalize serum thyroxine levels in most patients with proper antithyroid drugs [10].

AF, Hyperthyroidism, and Transesophageal Echocardiograph (TEE)

Due to these doubts surrounding hyperthyroidism, hypercoagulable state, and embolic risk, our group uses transesophageal echocardiograph (TEE) analysis to evaluate the atrial thrombogenic milieu (TM; thrombus, lower-left atrial appendix flow velocity, or spontaneous echo contrast) and compares the results with the clinical risk score. Our first publication [11] compared TEE to the previous clinical risk score ($CHADS_2$), which showed incongruence between scores with a critical TM in the TEE. In spite of a mean age of 49 years, there was a high prevalence of TM (45.2%), but there was no association between clinical risk factors from $CHADS_2$ with TEE markers of a TM. More recently, we published an extension of our cases [12] evaluating the prevalence of TM but instead comparing with the CHA_2DS_2-VASc score. We still found no association between CHA_2DS_2-VASc with TEE markers of TM. Most importantly, we showed that thyroid status might influence atrial thrombogenic abnormalities, especially when there is a longer duration of hyperthyroidism. Our data raise another issue that is normally overlooked by cardiologic guidelines and recommendations: the thyroid status. The severity of hyperthyroidism, thyrotoxicosis predominantly from T3, and longer time of untreated hyperthyroidism may be additional factors that have not yet evaluated. Nevertheless, these factors may explain this incongruence of the TEE findings with CHA_2DS_2-VASc scores.

TEE for All AF Related to Hyperthyroidism?

In our view, CHA_2DS_2-VASc is useful for hyperthyroid patients with AF who are beyond 65 years old. Consequently, warfarin should be prescribed since these patients would have a score of at least 1 point. However, we do not think that CHA_2DS_2-VASc is useful if the patient is younger, and we recommend a TEE-based approach as Dinh, et al. [13] recommend, especially for patients with low scores.

The patients for whom we do not recommend this approach are those who have had a previous vascular event. Otherwise, we maintain patients under 65 years old with only acetyl salicylic acid when they have TEE without classic TM, even with scores ≥2, including points from hypertension and heart failure. In a couple of weeks after anti-thyroid drug treatment, their CHA_2DS_2-VASc may become 1 or even 0, and their AF may be restored to a sinus rhythm. A TEE-based approach is also justified by many of our patients with low scores (0-1) but with critical TM in TEE, which implies higher risk and a need for proper anticoagulation.

Conclusion

In our opinion, CHA_2DS_2-VASc may be utilized for patients with hyperthyroidism and AF if they are over 65 years old. For younger patients, a TEE-based approach is more appropriate for directing proper anticoagulation for low-score patients with TM in TEE, or even opting for a more conservative approach on a case-by-case basined for those with higher scores but without critical TM in TEE. TEE adds useful information that may change antithrombotic therapy if otherwise guided solely by clinical risk classification.

References

1. Fuster V, Rydén LE, Cannom DS, Crijns HJ, Curtis AB, et al. (2011) 2011 ACCF/AHA/HRS Focused Updates Incorporated Into the ACC/AHA/ESC 2006 Guidelines for the Management of Patients With Atrial Fibrillation. Circulation 123(10): e269-e367.

2. Traube E, Coplan NL (2011) Embolic risk in atrial fibrillation that arises from hyperthyroidism: review of the medical literature. Tex Heart Inst J 38(3): 225-228.

How to cite this article: Marcus VL d S, Sharon J S F. Usefulness of CHA_2DS_2-Vasc Score for Hyperthyroid Patients with Atrial Fibrillation. J Cardiol & Cardiovasc Ther 2017; 6(2): 555681. DOI: 10.19080/JOCCT.2017.06.555681

3. Petersen P, Hansen JM (1988) Stroke in thyrotoxicosis with atrial fibrillation. Stroke 19(1): 15-18.
4. Camm AJ, Kirchhof P, Lip GY, Schotten U, Savelieva I, et al. (2010) Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). European heart rhythm association; European Association for Cardio-Thoracic Surgery. Eur Heart J 31(19): 2369-2429.
5. Stuijver DJF, van Zaane B, Romualdi E, Brandjes DP, Gerdes VE, et al. (2012) The effect of hyperthyroidism on procoagulant, anticoagulant and fibrinolytic factors: A systematic review and meta-analysis. Thromb Haemost 108(6): 1077-1088.
6. Shimoda Y, Satoh T, Takahashi H, Katano-Toki A, Ozawa A, et al. (2014) A case of thyroid storm with a markedly elevated level of circulating soluble interleukin-2 receptor complicatedb y multiple organ failure and disseminated intravascular coagulation syndrome. Endocr J 61(7): 691-696.
7. Squizzato A, Gerdes VE, Brandjes DP, Buller HR, Stam J (2005) Thyroid Diseases and Cerebrovascular Disease. Stroke 36(10): 2302-2310.
8. Chan PH, Hai J, Yeung CY, Lip GY, Lam KS, et al. (2015) Benefit of anticoagulation therapy in hyperthyroidism-related atrial fibrillation. Clin Cardiol 38(8): 476-482.
9. Siu CW, Pong V, Zhang X, Chan YH, Jim MH, et al. (2009) Risk of ischemic stroke after new-onset atrial fibrillation in patients with hyperthyroidism. Heart Rhythm 6(2): 169-173.
10. Nakamura H, Noh JY, Itoh K, Fukata S, Miyauchi A, et al. (2007) Comparison of Methimazole and Propylthiouracil in Patients with Hyperthyroidism Caused by Graves' Disease. J Clin Endocrinol Metab 92(6): 2157-2162.
11. Souza MVL, Duarte MM, Coeli CM, Vaisman M (2012) Atrial fibrillation and hyperthyroidism: relation between transoesophageal markers of a thrombogenic milieu and clinical risk factors for thromboembolism. Clin Endocrinol (Oxf) 76(3): 448-453.
12. de Souza MV, de Fátima Dos Santos Teixeira P, Vaisman M, Xavier SS (2017) Is CHA2DS2-VASc appropriate for hyperthyroid patients with atrial fibrillation? Implications of adding a transesophageal echocardiography evaluation. Int J Cardiol 228: 919-925.
13. Dinh T, Baur LH, Pisters R, Kamp O, Verheugt FW, et al. (2014) Aspirin versus vitamin K antagonist treatment guided by transoesophageal echocardiography in patients with atrial fibrillation: a pilot study TIARA investigators. Heart 100(7): 563-568.

DOI: 10.19080/JOCCT.2017.06.555681

How to cite this article: Marcus VL d S, Sharon J S F. Usefulness of CHA_2DS_2-Vasc Score for Hyperthyroid Patients with Atrial Fibrillation. J Cardiol & Cardiovasc Ther 2017; 6(2): 555681. DOI: 10.19080/JOCCT.2017.06.555681