EDITORIAL

Title: CHA_2DS_2VASc score use in sinus rhythm: Can it predict cardiovascular events?

Authors: Panagiota Anna Chousou[1,2], Peter J Pugh[2], Vassilios S Vassiliou[1,3]
[1]Norwich Medical School, University of East Anglia, Norwich, UK
[2]Cardiology Department, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, CB2 0QQ, UK
[3]Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, UK

Corresponding author: Panagiota Anna Chousou, Cardiology Department, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, CB2 0QQ, UK. Email: p.chousou@nhs.net

Main text

The CHA_2DS_2-VASc score has been developed to stratify patients with Atrial Fibrillation (AF) with regards to risk of thromboembolism, and is a universally accepted guide to antithrombotic therapy in patients with AF.[1]

However, higher scores have also been recently associated with increased mortality in patients with AF[2] and recent studies have investigated this association further in patients without AF. Such small studies in patients without AF determined that an increased CHA_2DS_2-VASc score was associated with increased risk of stroke and thromboembolism[3] as well increased risk of developing new AF in patients with[4] and without prior ischaemic stroke.[5]

In this issue of the *Journal* Renda et al. present a large study of 22,179 middle-aged individuals with 18,367 in sinus rhythm.[6] The main purpose of the study was to assess the prognostic yield of CHA_2DS_2-VASc score in the non-AF population for new onset AF, cardiovascular morbidity and mortality. The authors should be congratulated for a well-designed and executed study which provides the largest study to date assessing the role of CHA_2DS_2-VASc

score as a risk factor for new AF. The participants were stratified according to their CHA_2DS_2-VASc score into 5 different groups (0,1,2,3 and ≥4) and the risk of major adverse cardiovascular events was compared between the different groups.

Over a 15-year follow up period in the participants with sinus rhythm; they identified 5% with an ischaemic stroke, 9% with coronary events, 7% cardiovascular mortality and 24% all cause mortality. A CHA_2DS_2VASc ≥2 was associated with double the risk of all cause mortality, cardiovascular death and ischaemic stroke. Cumulative incidences, absolute and relative risks of major adverse events and mortality were greater with increasing CHA_2DS_2VASc score in subjects with and, importantly, without AF.

Moreover, the incidence of AF during the follow up period was 14% and was more common with higher CHA_2DS_2VASc score. More importantly they found that CHA_2DS_2VASc ≥2 was an independent predictor for new onset AF with a hazard ratio of 2.2.

Furthermore, a novel and clinically relevant finding was that the incidence of ischaemic stroke was similar in patients with a CHA_2DS_2VASc ≥4 in *sinus rhythm* and patients with a CHA_2DS_2VASc=2 in AF. This is an important finding as it could further help sub-categorise patients with Embolic Stroke of Undetermined Source (ESUS) that could potentially benefit from anticoagulation.

In conclusion, this large study confirms the predictive role of CHA_2DS_2VASc score for new onset AF in a population based on a large prospective cohort over several years of follow up and also identifies that cumulative incidence of AF is greater with increasing CHA_2DS_2VASc strata. Whilst this is not surprising as most of the risk factors for AF[7] are constituents of the CHA_2DS_2VASc score, it is the first large study to support this.

Finally, although recently published data showed that anticoagulating patients with ESUS and sinus rhythm was not superior to antiplatelet therapy in

preventing stoke recurrence[8] the current study by Renda et al,[6] would support that in future such studies should be directed towards patients at higher risk of showing AF, and the CHA_2DS_2VASc score could be such a discriminating variable.

References

1. Kirchhof P, Benussi S, Kotecha D, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J* 2016; 37: 2893–2962.
2. Proietti M, Farcomeni A, Romiti GF, et al. Association between clinical risk scores and mortality in atrial fibrillation: Systematic review and network meta-regression of 669,000 patients. *Eur J Prev Cardiol* 2018; 204748731881766.
3. Xing Y, Sun Y, Li H, et al. CHA2DS2-VASc score as a predictor of long-term cardiac outcomes in elderly patients with or without atrial fibrillation. *Clin Interv Aging* 2018; 13: 497–504.
4. Baturova MA, Lindgren A, Carlson J, et al. Predictors of new onset atrial fibrillation during 10-year follow-up after first-ever ischemic stroke. *Int J Cardiol* 2015; 199: 248–252.
5. Sciacqua A, Perticone M, Tripepi G, et al. CHADS2 and CHA2DS2-VASc scores are independently associated with incident atrial fibrillation: the Catanzaro Atrial Fibrillation Project. *Intern Emerg Med* 2015; 10: 815–821.
6. Renda G, Ricci F, Patti G, et al. CHA2DS2-VASc Score and Adverse Outcomes in Middle-Aged Individuals Without Atrial Fibrillation. *Eur J Prev Cardiol* 2019 (in press).
7. Aune D, Schlesinger S, Norat T, et al. Tobacco smoking and the risk of atrial fibrillation: A systematic review and meta-analysis of prospective studies. *Eur J Prev Cardiol* 2018; 25: 1437–1451.
8. Diener H-C, Sacco RL, Easton JD, et al. Dabigatran for Prevention of Stroke after Embolic Stroke of Undetermined Source. *N Engl J Med* 2019; 380: 1906–1917.