



## Risk of left ventricular apical thrombus formation in patients with acute anterior ST-segment elevation myocardial infarction? Think about the CHA<sub>2</sub>DS<sub>2</sub>VASc score!

In this issue of *Acta Cardiologica*, Bayam et al. [1] evaluate the usefulness of CHA<sub>2</sub>DS<sub>2</sub>VASc Score evaluation in patients with acute anterior ST-segment elevation myocardial infarction (STEMI) to predict the presence of left ventricular apical thrombus (LVAT). This study in 378 patients presenting with anterior STEMI found that LVAT was present in 8.5% of patients after a mean follow-up of 233.1 ± 66.7 days. CHA<sub>2</sub>DS<sub>2</sub>VASc score was significantly higher in patients with LVAT (3.1 ± 1.9% vs 1.9 ± 1.2%,  $p < 0.001$ ). After analysis, it appeared that CHA<sub>2</sub>DS<sub>2</sub>VASc Score was an independent predictor for LVAT formation, as well as low left ventricular ejection fraction (LVEF) and left ventricular (LV) apical akinesis or aneurysm.

LVAT is not a rare complication after anterior STEMI, ranging from 4% to 8% in large recent studies [2,3], and is associated with poor clinical outcomes, especially if left untreated [4,5]. Some risk factors for LVAT formation are well known (large infarction size, anterior location, left anterior descending artery involvement, delayed or poor reperfusion, ...), but in some cases, other tools to evaluate the risk of LVAT formation may be welcomed. Patients with STEMI are treated with potent antiplatelet agents and adding anticoagulants increases the risk of bleeding. Evaluation of the risk of LVAT formation is therefore of the utmost importance to adjust the benefit/risk balance.

It is not surprising that the CHA<sub>2</sub>DS<sub>2</sub>VASc score is associated with LVAT formation as mechanisms of thrombus formation are partly related to the Virchow triad. As in patients with atrial fibrillation (AF), clinical factors included in this score (age, diabetes mellitus, hypertension, congestive heart failure (CHF), vascular disease, ...) are associated with endothelial dysfunction, stasis and hypercoagulation. As in AF, some factors may be directly responsible for thrombus formation (i.e. CHF), while others may be markers of a pro-thrombotic state (i.e. diabetes).

It is interesting to note that the CHADS<sub>2</sub> and/or CHA<sub>2</sub>DS<sub>2</sub>VASc scores have been shown to be independent predictors of events in other clinical settings such as acute coronary syndromes [6], underlining the association of a high clinical risk score with a 'prothrombotic state'. Patients with a high CHA<sub>2</sub>DS<sub>2</sub>VASc score may be at higher risk of different types of thrombotic events. This

may help clinicians in decisions regarding antithrombotic management.

In conclusion, the use of the CHA<sub>2</sub>DS<sub>2</sub>VASc score may be helpful in identifying patients with anterior STEMI at risk of LVAT formation. This simple clinical score could be used in a multi-factor patient evaluation and influence the management of antithrombotic therapy. Larger studies will be needed to confirm the benefit of this score.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

### References

- [1] Bayam E, Çakmak EÖ, Yıldırım E, et al. The relationship between CHA<sub>2</sub>DS<sub>2</sub>VASc score and left ventricular apical thrombus formation in patients with acute anterior ST segment elevation myocardial infarction. *Acta Cardiol.* 2021; 1–8. DOI:10.1080/00015385.2021.1991667
- [2] Gianstefani S, Douiri A, Delithanasis I, et al. Incidence and predictors of early left ventricular thrombus after ST-elevation myocardial infarction in the contemporary era of primary percutaneous coronary intervention. *Am J Cardiol.* 2014;113(7):1111–1116.
- [3] Weinsaft JW, Kim J, Medicherla CB, et al. Echocardiographic algorithm for post-myocardial infarction LV thrombus: a gatekeeper for thrombus evaluation by delayed enhancement CMR. *JACC Cardiovasc Imaging.* 2016;9(5):505–515.
- [4] Meurin P, Brandao Carreira V, Dumaine R, et al. Incidence, diagnostic methods, and evolution of left ventricular thrombus in patients with anterior myocardial infarction and low left ventricular ejection fraction: a prospective multicenter study. *Am Heart J.* 2015;170(2):256–262.
- [5] Stratton JR, Resnick AD. Increased embolic risk in patients with left ventricular thrombi. *Circulation.* 1987;75(5): 1004–1011.
- [6] Huang SS, Chen YH, Chan WL, et al. Usefulness of the CHADS<sub>2</sub> score for prognostic stratification of patients with acute myocardial infarction. *Am J Cardiol.* 2014;114(9): 1309–1314.

Mathieu Lempereur

Department of Cardiology, CHU Sart Tilman, University of Liège Hospital, GIGA Cardiovascular Sciences  
Liège, Belgium

 [mathieu.lempereur@chuliege.be](mailto:mathieu.lempereur@chuliege.be)

Patrizio Lancellotti  
Department of Cardiology,  
CHU Sart Tilman,  
University of  
Liège Hospital,  
GIGA Cardiovascular Sciences

*Liège, Belgium*  
*Gruppo Villa Maria Care and Research, Maria Cecilia*  
*Hospital, Cotignola, and Anthea Hospital*  
*Bari, Italy*

Received 26 November 2021; Accepted 2 December 2021  
© 2021 Belgian Society of Cardiology