International Journal of Cardiology 293 (2019) 54

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Letter to the Editor

# Do electrocardiogram low amplitude QRS complexes predict adverse in-hospital outcomes in patients with takotsubo syndrome?

John E. Madias *

*Icahn School of Medicine at Mount Sinai, New York, NY, United States of America*
*Division of Cardiology, Elmhurst Hospital Center, Elmhurst, NY, United States of America*

ARTICLE INFO

*Article history:*
Received 9 July 2019
Accepted 9 July 2019

I was delighted to read the contribution by Jha et al. [1], in which the authors carried out an in-depth analysis of all available electrocardiograms (ECGs) of 215 patients with takotsubo syndrome (TTS), using the nationwide Swedish Angiography and Angioplasty Registry. The investigators concluded that the patients with T-wave inversion (TWI) on admission (47% of the cohort) and the ones having sinus rhythm had a lower risk of primary endpoint of in-hospital major adverse cardiac event, defined as the composite of death, ventricular tachycardia or fibrillation (VAs), atrioventricular block ≥2 or asystole ≫10 s [1]. I have some inquiries for the kind consideration of the authors: 1) Since patients with TTS often present with ST-segment elevation (STE) which later is converted to TWI, one wonders whether the subgroup with TWI presented later to the hospital than the patients with STE, and thus there is a selection bias stemming from late hospital presentation, and non-inclusion of possible patients with TTS and STE, who expired and never made it to the hospital. 2) Since low QRS amplitude (LQRS) is attributed to myocardial edema (ME) [2] and VAs are associated with ME [3–5] one wonders whether *change* in the amplitude of QRS complexes was associated with VA; the authors explored the outcome predictive role of LQRS [1], but they did not investigate *the loss* of QRS amplitude in the ECGs (i.e., comparison of admission ECGs with previous ECGs, or of the admission ECGs with the subsequent hospital ECGs, displaying the lowest QRS complexes [2]).

## Funding

No funding was received for this work.

## Disclosures

None.

## References

[1] S. Jha, R. Zeijlon, I. Enabtawi, A.S. Espinosa, J. Chamat, E. Omerovic, et al., Electrocardiographic predictors of adverse in-hospital outcomes in the Takotsubo syndrome, Int J Cardiol. (2019 Jun 19)https://doi.org/10.1016/j.ijcard.2019.06.021 pii: S0167-5273(19)32934-1. (Epub ahead of print).
[2] J.E. Madias, Transient attenuation of the amplitude of the QRS complexes in the diagnosis of Takotsubo syndrome, Eur. Heart J. Acute Cardiovasc. Care 3 (2014) 28–36.
[3] F. Migliore, A. Zorzi, M.P. Marra, C. Basso, F. Corbetti, M. De Lazzari, et al., Myocardial edema underlies dynamic T-wave inversion (Wellens' ECG pattern) in patients with reversible left ventricular dysfunction, Heart Rhythm 8 (2011) 1629–1634.
[4] M. Perazzolo Marra, A. Zorzi, F. Corbetti, M. De Lazzari, F. Migliore, F. Tona, et al., Apicobasal gradient of left ventricular myocardial edema underlies transient T-wave inversion and QT interval prolongation (Wellens' ECG pattern) in Tako-Tsubo cardiomyopathy, Heart Rhythm 10 (2013) 70–77.
[5] F. Migliore, A. Zorzi, M. Perazzolo Marra, S. Iliceto, D. Corrado, Myocardial edema as a substrate of electrocardiographic abnormalities and life-threatening arrhythmias in reversible ventricular dysfunction of Takotsubo cardiomyopathy: imaging evidence, presumed mechanisms, and implications for therapy, Heart Rhythm. 12 (2015) 1867–1877.

* Division of Cardiology, Elmhurst Hospital Center, 79-01 Broadway, Elmhurst, NY 11373, United States of America.
*E-mail address:* madiasj@nychhc.org.

https://doi.org/10.1016/j.ijcard.2019.07.032