

LETTER

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Letter on “Pre-hospital transthoracic echocardiography for early identification of non-ST-elevation myocardial infarction in patients with acute coronary syndrome”

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See related research by Bergmann et al., <https://ccforum.biomedcentral.com/articles/10.1186/s13054-017-1929-1>

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We read with interest the manuscript by Bergmann et al. [1] but believe it is fraught by several conceptual and methodological flaws, the main ones being:

- The authors used interchangeably the terms “transthoracic echocardiography”, “focus echocardiography”, and “focus cardiac ultrasound”(FoCUS) without the clear distinction required by the potential major clinical implications [2]; the screening for regional wall motion abnormalities (RWMA) is in fact clearly considered by international consensus beyond the scope of the limited training and application that FoCUS entails [3, 4], and the level of echocardiographic education/competence of emergency physicians was not detailed.
- The authors state: “A diagnosis of NSTEMI was based on the combination of ACS symptoms, lack of ST-segment elevation, and RWMA. Myocardial infarction was excluded in the absence of the latter.” Non-transmural infarctions compromising a small amount of necrotic myocardium may not be detectable on 2D-echo. It has been shown that RWMA detectable by echocardiography occur if

resting coronary flow is reduced by > 50%, if > 20% of myocardial thickness is jeopardized by actual ischemia/necrosis, or if at least 1–6% of the left ventricle mass is involved [5].

- Previous myocardial infarction is indicated as an exclusion criterion. But a screening for myocardial scars or signs of pre-existing left ventricle disease was omitted from the exam, and a subsequent re-reading of the images by a blinded expert was omitted too, which may have led to potential false positives in non-ST-segment myocardial infarction (NSTEMI) diagnosis.

It remains obscure how the authors can conclude that “No evidence of myocardial infarction was found in any patient with NSTEMI-ACS without RWMA in the pre-hospital TTE” and later state that NSTEMI was conclusively diagnosed in two patients without RWMA [1]. We agree, as recommendations do [2], that pre-hospital ultrasound has the potential to lead to earlier diagnosis and faster treatment in acute cardiac patients. But, based on questionable methodology and unclear data, this study conveys the equivocal message that FoCUS has sufficient diagnostic accuracy for NSTEMI.

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Abbreviations

ACS: Acute coronary syndrome; FoCUS: Focus cardiac ultrasound; MI: Myocardial infarction; NSTEMI: Non-ST-elevation acute coronary syndrome; NSTEMI: Non-ST-segment myocardial infarction; RWMA: Regional wall motion abnormality; TTE: Transthoracic echocardiography

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Authors' contributions

All the authors contributed equally. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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References

1. Bergmann I, Buttner B, Teut E, Jacobshagen C, Hinz J, Quintel M, Mansur A, Roessler M. Pre-hospital transthoracic echocardiography for early identification of non-ST-elevation myocardial infarction in patients with acute coronary syndrome. *Crit Care*. 2018;22(1):29.
2. Neskovic AN, Hagendorff A, Lancellotti P, Guarracino F, Varga A, Cosyns B, Flachskampf FA, Popescu BA, Gargani L, Zamorano JL. Emergency echocardiography: the European association of cardiovascular imaging recommendations. *Eur Heart J Cardiovasc Imaging*. 2013;14(1):1–11.
3. Via G, Hussain A, Wells M, Reardon R, ElBarbary M, Noble VE, Tsung JW, Neskovic AN, Price S, Oren-Grinberg A, et al. International evidence-based recommendations for focused cardiac ultrasound. *J Am Soc Echocardiogr*. 2014;27(7):683 e681–683 e633.
4. Labovitz AJ, Noble VE, Bierig M, Goldstein SA, Jones R, Kort S, Porter TR, Spencer KT, Tayal VS, Wei K. Focused cardiac ultrasound in the emergent setting: a consensus statement of the American Society of Echocardiography and American College of Emergency Physicians. *J Am Soc Echocardiogr*. 2010;23(12):1225–30.
5. Roffi M, Patrono C, Collet JP, Mueller C, Valgimigli M, Andreotti F, Bax JJ, Borger MA, Brotons C, Chew DP, et al. 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). *Eur Heart J*. 2016;37(3):267–315.