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Article type: Letter to the Editor

Received: November 3, 2022

Accepted: November 3, 2022

Early publication date: November 11, 2022

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MINOCA? Takotsubo syndrome? Or both? Pitfalls, clues and indications for advanced modalities in the differential diagnosis. Author's reply

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We would like to thank Dr Kenan Yalta, Dr Muhammet Gurdogan, Dr Cihan Ozturk and Dr Tulin Yalta for their thorough comment on our vignette and we are glad that it provokes important discussion about the challenges and pitfalls concerned with the diagnosis of myocardial infarction with nonobstructive coronary arteries (MINOCA).

First of all, we agree that in case of our patient the coexistence of MINOCA with Takotsubo cardiomyopathy (TTS) cannot be excluded. Our patient presented with the electrocardiographic picture of inferior ST-segment elevation myocardial infarction. However – female sex, the history of emotional stress, initial echocardiographic presentation (with akinetic apex and apical segments of the left ventricle) and no obstructive lesions in coronary arteries on angiography were suggestive of TTS and TTS was our first diagnosis. One more argument for TTS was fast partial recovery of wall motion abnormalities. To address your

question — this recovery was preceded by pain relief and resolution of ST-segment elevation in inferior leads in electrocardiography.

However, it was cardiac magnetic resonance (CMR) that changed our perception of the patient, because it revealed pattern of the myocardial damage typical for ischemia: with subendocardial lesion in late gadolinium enhancement sequences and subendocardial perfusion defect within the apical inferior segment and adjacent part of apical septal segment. Furthermore, the post-infarct scar was confirmed in the follow-up CMR performed 12 weeks later. CMR is recommended by both European and American guidelines as an essential diagnostic tool in all patients with the working diagnosis of MINOCA [1, 2]. It has been shown that early performed CMR provides diagnosis in 60%–80% of pts with MINOCA [3]. In a study by Reynolds et al. [4] performed in a group of women with a working diagnosis of MINOCA, early CMR identified ischemic myocardial injury in more than 50% of cases and combined with optical coherence tomography (OCT) provided diagnosis in 85% of cases; in 64% of these cases myocardial infarction was diagnosed. It is noteworthy that the early timing of the CMR examination is of crucial importance as pathologies typical for non-ischemic causes of a working-diagnosis MINOCA (myocarditis or TTS) might be transient [3].

Therefore, the coexistence of myocardial infarction and TTS in our patient is possible. The differential diagnosis between these two entities is extremely challenging because of the overlap of risk factors and clinical presentation, which was elegantly described by Yalta [5]. However, the aim of our vignette was to draw attention to the diagnosis of myocardial infarction in women with a working diagnosis of MINOCA. On the one hand, women constitute ca. 90% of patients with TTS and the majority of them are post-menopausal. On the other hand — it is after the menopause that the incidence of ischemic heart disease in women rapidly grows. It is of crucial importance not to overlook myocardial infarction in women without significant coronary stenosis because of therapeutic and prognostic implications. According to the ESC guidelines patients with a final diagnosis of MINOCA of unknown cause may be treated according to secondary prevention guidelines for atherosclerotic disease [1]. This is why we introduced a statin and dual antiplatelet therapy (DAPT) into the therapy of our patient after establishing the diagnosis of myocardial infarction. Lindahl et al. [6] showed that statins, alongside with angiotensin converting enzyme inhibitors/sartans, improve prognosis in patients with a final diagnosis of MINOCA. The data concerning DAPT in MINOCA is less conclusive – so far it is recommended in case of plaque disruption [2]. Unfortunately, neither OCT nor intravascular ultrasound were performed in our patient, so the mechanism of ischemia in this case remains unknown.

To conclude: there are many challenges and pitfalls in the diagnostic work-up of patients with MINOCA and thorough multi-modality imaging, alongside with careful analysis, is required.

Article information

Conflict of interest: None declared.

Funding: None.

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REFERENCES

1. Collet JP, Thiele H, Barbato E, et al. ESC Scientific Document Group. 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. *Eur Heart J*. 2021; 42(14): 1289–1367, doi: [10.1093/eurheartj/ehaa575](https://doi.org/10.1093/eurheartj/ehaa575), indexed in Pubmed: [32860058](https://pubmed.ncbi.nlm.nih.gov/32860058/).
2. Tamis-Holland JE, Jneid H, Reynolds HR, et al. Contemporary Diagnosis and Management of Patients With Myocardial Infarction in the Absence of Obstructive Coronary Artery Disease: A Scientific Statement From the American Heart Association. *Circulation*. 2019; 139(18): e891–e908, doi: [10.1161/CIR.0000000000000670](https://doi.org/10.1161/CIR.0000000000000670), indexed in Pubmed: [30913893](https://pubmed.ncbi.nlm.nih.gov/30913893/).
3. Sörensson P, Ekenbäck C, Lundin M, et al. Early Comprehensive Cardiovascular Magnetic Resonance Imaging in Patients With Myocardial Infarction With Nonobstructive Coronary Arteries. *JACC Cardiovasc Imaging*. 2021; 14(9): 1774–1783, doi: [10.1016/j.jcmg.2021.02.021](https://doi.org/10.1016/j.jcmg.2021.02.021), indexed in Pubmed: [33865778](https://pubmed.ncbi.nlm.nih.gov/33865778/).
4. Reynolds HR, Kwong RY, Maehara A, et al. Coronary Optical Coherence Tomography and Cardiac Magnetic Resonance Imaging to Determine Underlying Causes of Myocardial Infarction With Nonobstructive Coronary Arteries in Women. *Circulation*. 2021; 143(7): 624–640, doi: [10.1161/CIRCULATIONAHA.120.052008](https://doi.org/10.1161/CIRCULATIONAHA.120.052008), indexed in Pubmed: [33191769](https://pubmed.ncbi.nlm.nih.gov/33191769/).

5. Yalta K, Gurdogan M, Ozturk C, et al. MINOCA? Takotsubo syndrome? Or both? Pitfalls, clues and indications for advanced modalities in the differential diagnosis. *Kardiol Pol.* 2022 [Epub ahead of print], doi: [10.33963/KP.a2022.0234](https://doi.org/10.33963/KP.a2022.0234), indexed in Pubmed: [36226761](https://pubmed.ncbi.nlm.nih.gov/36226761/).
6. Lindahl B, Baron T, Erlinge D, et al. Medical therapy for secondary prevention and long-term outcome in patients with myocardial infarction with nonobstructive coronary artery disease. *Circulation.* 2017; 135(16): 1481–1489, doi: [10.1161/CIRCULATIONAHA.116.026336](https://doi.org/10.1161/CIRCULATIONAHA.116.026336), indexed in Pubmed: [28179398](https://pubmed.ncbi.nlm.nih.gov/28179398/).