ESC European Society of Cardiology

European Heart Journal - Case Reports (2022) **6**, 1–2
https://doi.org/10.1093/ehjcr/ytac117

CARDIOVASCULAR FLASHLIGHT
Cardiac imaging

Somatostatin receptor positron emission tomography/computed tomography in myocarditis following mRNA COVID-19 vaccination

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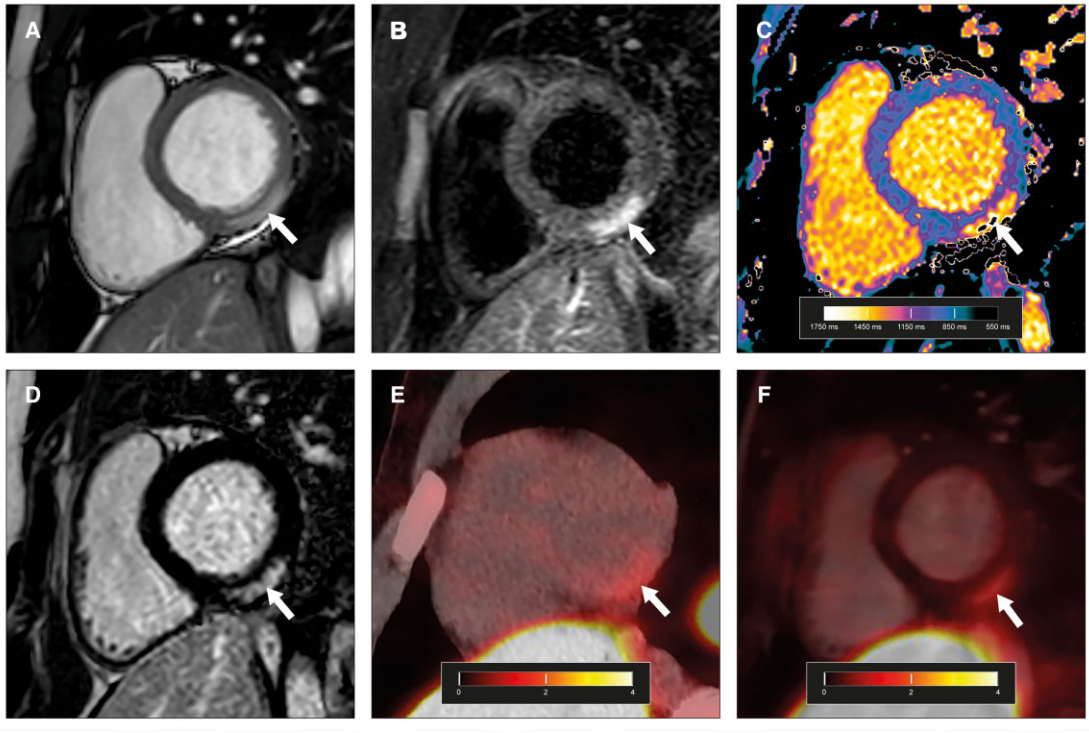
Received 6 December 2021; first decision 14 December 2021; accepted 8 March 2022; online publish-ahead-of-print 11 March 2022



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Handling Editor: Zahra Raisi Estabragh

A 20-year-old previously healthy man was admitted to the hospital due to a 3-day history of high persistent fever and subsequent sudden onset of central chest pain. Ten days earlier, the patient had received his second dose of mRNA-1273 SARS-CoV-2 vaccine. Upon admission, the electrocardiogram was unremarkable (supplementary figure), and the initial blood analysis showed elevated cardiac and inflammatory biomarkers [max troponin I 10 000 ng/L (ref. <35), max C-reactive protein 19 mg/L (ref. <3)]. Real-time polymerase chain reaction for SARS-CoV-2 was negative. A cardiac ultrasound showed normal findings. Cardiovascular magnetic resonance revealed signs of myocardial inflammation in form of hyperaemia (*Panel A*), oedema (*Panel B*), an increased native T1-signal [*Panel C*, 1456 $\pm$ 58 ms (local reference 999 $\pm$ 31 ms)], and subepicardial delayed enhancement in the basal inferolateral part of the left ventricle (*Panel D*). Additionally, the patient underwent a somatostatin receptor (SSTR) positron emission tomography/computed tomography (PET/CT) using Gallium-68 DOTATOC as a part of an ongoing research study (NCT04206163), which confirmed the presence of myocardial inflammation in the same location [*Panel E* (SSTR PET/CT) and *Panel F* (Fusion of SSTR PET with CMR)]. A hallmark of myocarditis is the presence of inflammatory cell infiltration, which can be visualized using SSTR PET/CT as SSTRs (particularly subtype-2 and subtype-3) are overexpressed on activated monocytes, macrophages, and lymphocytes. The maximum standardized uptake value (SUV) of the inflamed myocardium was 1.7 and the inflamed myocardium to blood SUV ratio was 3.4. Finally, the possible diagnosis of a COVID-19 vaccine-associated myocarditis was made, as no other underlying cause could be determined despite a thorough work-up. After discharge from the hospital, the patient suffered of recurrent episodes of chest discomfort for several weeks before he fully recovered.

Myocarditis is a rare complication after mRNA SARS-CoV-2 vaccination with unknown underlying mechanism. In our case, the presence of inflammatory cell infiltration could be demonstrated by SSTR imaging, which is a promising method for molecular myocardial inflammation imaging.

Ethical approval

The study is approved by the Swedish Ethical Review Authority and informed consent was obtained from the patient.

Supplementary material

Supplementary material is available at *European Heart Journal – Quality of Care and Clinical Outcomes* online.

Consent: The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

Conflicts of interest: None declared.

Funding: This work was supported by the Swedish state under the agreement between the Swedish government and the county councils, the ALF-agreement (ALFGBG-874631), the Emelle Foundation for Cardiovascular Research, and the Sahlgrenska University Hospital Fund C4A for research in Laboratory Medicine and Imaging.