Heart, Lung and Circulation (2021) ■, ■–■
1443-9506/21/$36.00
https://doi.org/10.1016/j.hlc.2021.06.521

IMAGE

Takotsubo Cardiomyopathy After mRNA COVID-19 Vaccination

Martina Boscolo Berto, MD [a], Giancarlo Spano, MD [a], Benedikt Wagner, MD [b], Benedikt Bernhard, MD [a], Jonas Häner, MD [a], Adrian T. Huber, MD, PhD [b], Christoph Gräni, MD, PhD [a,*]

[a]Department of Cardiology, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland
[b]Department of Diagnostic, Interventional and Paediatric Radiology, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland

Received 14 June 2021; accepted 22 June 2021; online published-ahead-of-print xxx

A healthy 63-year-old woman with no cardiovascular risk factors was admitted to the emergency room with new-onset dyspnoea and fever. The symptoms started 1 day after receiving the first of two mRNA-1273 (Moderna, Cambridge, MA, USA) COVID-19 vaccinations. She had no other prior complaints. A retronasal severe acute respiratory syndrome coronavirus 2 polymerase chain reaction test was negative. Laboratory tests revealed normal results for creatinine, creatine kinase, and creatine kinase MB (myocardial type). High-sensitivity troponin T was elevated at 320 ng/L

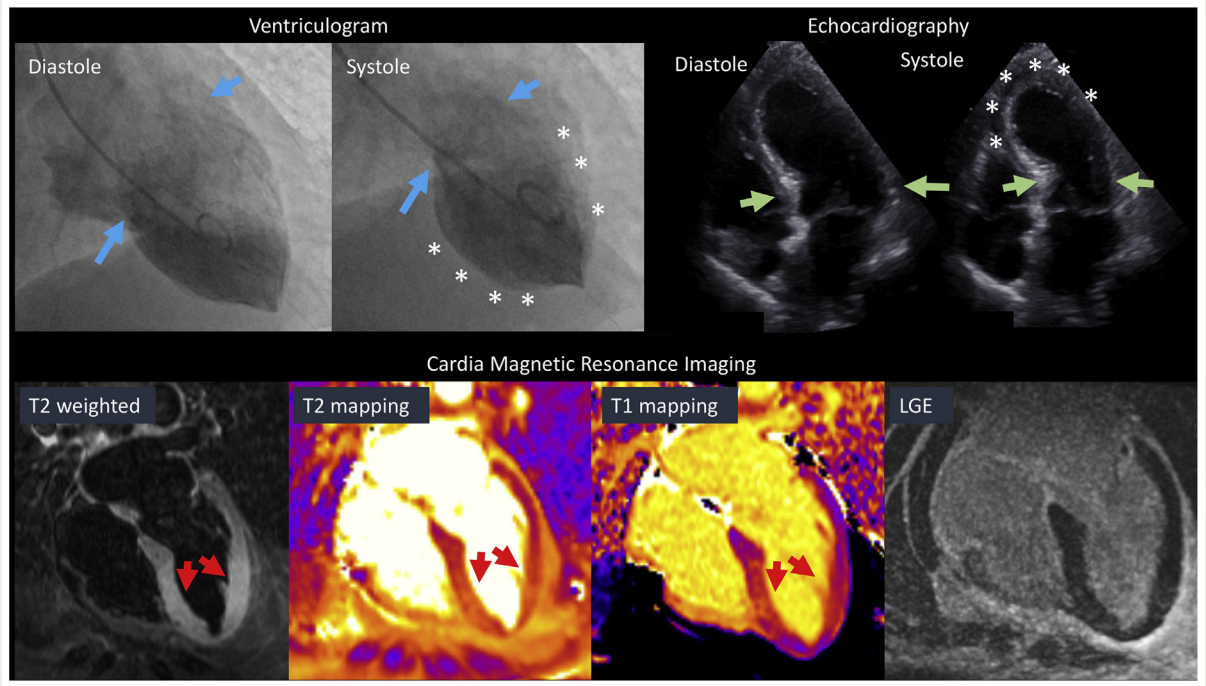

Figure 1 Multimodality imaging using ventriculography, Echocardiography and cardiac magnetic resonance of Takotsubo cardiomyopathy after COVID-19 mRNA vaccination.

*Corresponding author at: Department of Cardiology, University Hospital Bern, University of Bern, Freiburgstrasse 18, CH- 3010 Bern, Switzerland; Email: christoph.graeni@insel.ch; Twitter: @chrisgraeni

Please cite this article in press as: Boscolo Berto M, et al. Takotsubo Cardiomyopathy After mRNA COVID-19 Vaccination. Heart, Lung and Circulation (2021), https://doi.org/10.1016/j.hlc.2021.06.521

(normal: <14 ng/L), and N-terminal pro-B-type natriuretic peptide was highly elevated at 10,180 pg/mL (normal: <284 pg/mL). C-reactive protein was elevated, but the leucocytes were within the normal range at 8.44 g/L (reference interval [RI]: 3.00–10.5 g/L). Urine and blood cultures were negative. Computed tomography scan of the chest revealed no pulmonary embolism but did show signs of heart failure. An electrocardiogram showed negative T waves over the inferior/anterior leads. Invasive coronary angiography ruled out coronary artery disease, but the ventriculogram (Figure) showed mid-ventricular to apical ballooning (asterisk) with preserved basal contraction (blues arrows) and a moderately impaired left ventricular ejection fraction of 40%. Apical ballooning was confirmed by echocardiography and cardiac magnetic resonance imaging (CMR). CMR tissue characterisation further depicted extensive oedema in the mid-ventricular/apical segments (i.e., T2-weighted imaging in the myocardium vs skeletal muscle with a signal intensity ratio of >2.0), elevated T2 mapping at 56 ms (RI: 42–50 ms), elevated T1 mapping at 1,158 ms (RI: 903–1,059 ms), and the extracellular volume fraction was elevated at 35% (RI: 25±4%). There was no late gadolinium enhancement suggesting peri-/myocarditis and no pleural or pericardial effusion. As there were no other stressors that could be determined to be underlying the midventricular/apical oedema and ballooning, the most probable diagnosis of COVID-19 vaccine-induced Takotsubo cardiomyopathy (TCM) was made. Although myocarditis is a possible differential diagnosis after COVID-19 vaccination [1], the clinical and investigative features of this case were strongly suggestive of TCM. There have been rare reports of TCM after influenza vaccination [2,3], with an underlying pathophysiology of systemic inflammatory stress reaction after vaccination with a sympathovagal imbalance towards adrenergic predominance [4]. TCM confirmed by CMR after a COVID-19 vaccination has not yet been reported and may be considered as a differential diagnosis besides myocarditis in this clinical setting.

References

[1] Abu Mouch S, Roguin A, Hellou E, Ishai A, Shoshan U, Mahamid L, et al. Myocarditis following COVID-19 mRNA vaccination. Vaccine. 2021;39:3790–3.

[2] Singh K, Marinelli T, Horowitz JD. Takotsubo cardiomyopathy after anti-influenza vaccination: catecholaminergic effects of immune system. Am J Emerg Med. 2013;31:1627.

[3] Santoro F, Ieva R, Ferraretti A, Carpagnano G, Pappalardo I, De Gennaro L, et al. Tako-Tsubo cardiomyopathy after influenza vaccination. Int J Cardiol. 2013;167:e51–2.

[4] Lanza GA, Barone L, Scalone G, Pitocco D, Sgueglia GA, Mollo R, et al. Inflammation-related effects of adjuvant influenza A vaccination on platelet activation and cardiac autonomic function. J Intern Med. 2011;269:118–25.

Please cite this article in press as: Boscolo Berto M, et al. Takotsubo Cardiomyopathy After mRNA COVID-19 Vaccination. Heart, Lung and Circulation (2021), https://doi.org/10.1016/j.hlc.2021.06.521