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Myocardial Injury After COVID-19 Vaccine-Associated Myocarditis: Natural History

Muhammad Mustafa Alhussein

***Corresponding author**

Muhammad Mustafa Alhussein, MD
Stephenson Cardiac Imaging Centre, Libin Cardiovascular Institute, University of Calgary, Calgary, Alberta, Canada

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Abstract

Background : An uncommon side effect of the mRNA-based COVID-19 vaccine is acute myocarditis. The natural history of this problem is poorly understood.

Methods : In 20 consecutive patients meeting the criteria, baseline and convalescent cardiac magnetic resonance (CMR) imaging evaluations were carried out. current Lake Louise mRNA-based vaccination criteria within 10 days of acute myocarditis. Between baseline and convalescence, CMR-based changes in left ventricular volumes, mass, ejection fraction (LVEF), tissue inflammation markers (native T1 and T2 mapping), and fibrosis markers (late gadolinium enhancement [LGE] and extracellular volume [ECV]) were evaluated. Clinical results and cardiac symptoms were recorded.

Conclusions : Beyond three months of recovery in this young patient group, COVID-19 mRNA vaccineeassociated myocarditis demonstrated rapid improvements in CMR-based indices of edoema, contractile function, and overall LGE burden. However, regional fibrosis after edoema resolution was frequently seen, which supported the need for continuous observation.

Methods

Within 10 days of getting an mRNA-based test, 20 adult patients (age 18) were diagnosed with acute myocarditis.

From June 2021 to December 2021, people received the COVID-19 vaccine. Patients had to meet CMR-based diagnostic criteria for acute myocarditis by the Updated Lake Louise Criteria and have a high clinical suspicion of acute myocarditis based on the Diagnostic Criteria of the European Society of Cardiology20. 14 All participants underwent baseline blood sampling, 12-lead electrocardiography, chest X-rays, and clinical evaluations in addition to CMR imaging. A thorough health questionnaire was filled out, covering demographics, current heart symptoms, inflammatory disease history from the past, and concomitant conditions. After at least three months after recuperation, patients were then required to go through another CMR imaging, fill out questionnaires, and have their medical records reviewed. InformedUnder the Cardiovascular Imaging Registry of Calgary, patient permission was sought (CIROC; NCT04367220).

3 Tesla scanners were used for CMR imaging (Prisma or Skyra, Siemens Healthineers). The imaging procedure included native T1 mapping using a modified lock-locker inversion recovery (MOLLI) technique, T2 mapping using a T2-prepared gradient echo technique, black blood T2-weighted imaging using a spectral presaturation attenuated inversion recovery (SPAIR) technique, and black blood T2-weighted imaging prior to contrast infusion of 0.15 mmol/kg gadolinium (Gadovist, Bayer). Ten minutes following the delivery of contrast, short- and long-axis images of late gadolinium enhancement (LGE) imaging were obtained using a phase-sensitive inversion recovery (PSIR) pulse sequence, followed by repeated T1 mapping to determine the extracellular volume (ECV).

CONCLUSION

The COVID-19 mRNA vaccineeassociated myocarditis showed rapid improvements in CMR-based indicators of edoema, contractile function, and overall LGE load after three months of recovery in this young patient cohort. Regional fibrosis, however, was frequently observed following edoema resolution, supporting the necessity for ongoing surveillance.

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