Radiology: Cardiothoracic Imaging

IMAGES IN CARDIOTHORACIC IMAGING

Late Gadolinium Enhancement after COVID-19 Vaccination

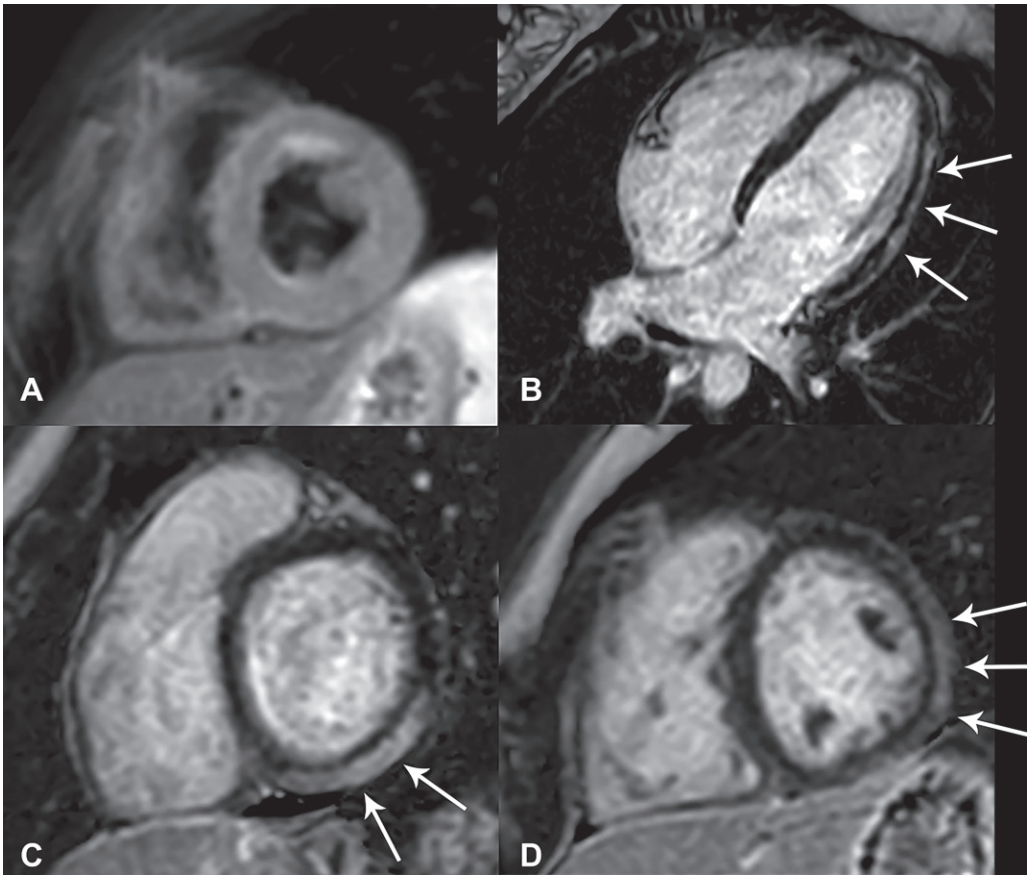
Hunter Wilson, MD • *Mark D. Norris, MD, MS* • *Olivia Frosch, MD* • *Prachi P. Agarwal, MD, MS*

From the Division of Pediatric Cardiology, Department of Pediatrics (H.W., M.D.N., O.F.), Department of Radiology (H.W., P.P.A.), and Department of Internal Medicine (M.D.N.), C.S. Mott Children's Hospital, University of Michigan Health System, 1540 E Hospital Dr, Ann Arbor, MI 48109. Received July 10, 2021; revision requested August 16; revision received August 30; accepted September 17. **Address correspondence to** P.P.A. (e-mail: *prachia@med.umich.edu*).

Authors declared no funding for this work.

Conflicts of interest are listed at the end of this article.

Radiology: Cardiothoracic Imaging 2021; 3(5):e210199 • https://doi.org/10.1148/ryct.2021210199 • Content codes: CA CH MR



Images in a 16-year-old female patient with chest pain 2 days after the second dose of COVID-19 vaccine and with a peak high-sensitivity cardiac troponin T level of 3492 pg/mL who underwent cardiac MRI 6 weeks after hospitalization. **(A)** Black-blood T2-weighted MR image in short-axis view shows no hyperintense signal to suggest myocardial edema. **(B–D)** Phase-sensitive inversion-recovery late gadolinium enhancement (LGE) MR images in **(B)** four-chamber and **(C, D)** short-axis planes show prominent subepicardial LGE involving more than 50% of the myocardium in the basal inferolateral and inferior segments of the left ventricle (arrows, **C**) and in the anterolateral (arrows, **B** and **D**), inferolateral, and inferior segments of the left ventricle at the midventricular level (arrows, **D**).

A previously healthy 16-year-old female patient experienced chest pain 2 days after the second dose of the Pfizer-BioNTech COVID-19 vaccine. Workup revealed elevated high-sensitivity cardiac troponin T level and electrocardiographic abnormalities, prompting hospitalization with diagnosis of myocarditis. Peak high-sensitivity cardiac troponin T level was 3492 pg/mL (reference range, 0–19 pg/mL); three echocardiograms were normal. Nonsteroidal anti-inflammatory drug therapy resulted in symptomatic improvement. Cardiac MRI performed 6 weeks after hospitalization revealed normal biventricular function and no myocardial edema. Late gadolinium enhancement (LGE) imaging showed subepicardial LGE of the basal inferolateral and inferior walls extending to the midventricular anterolateral, inferolateral, and inferior walls and apical lateral wall (Figure). Recent reports raise concern for acute myocarditis following COVID-19 vaccination (1–3); however, definite proof about the direct link between COVID-19 vaccine and myocarditis is still pending. Although long-term implications are unclear, the extensive LGE in this case seen well past resolution of acute symptoms raises concern for ventricular arrhythmia, future diastolic dysfunction, and other sequelae. Further evaluation of patients after symptomatic recovery should be considered given unknown natural history.

Keywords

Pediatrics, MR-Imaging, Cardiac, Heart

Acknowledgment: The authors acknowledge the contributions made by Jimmy Lu to help prepare this work.

Disclosures of Conflicts of Interest: H.W. No relevant relationships. **M.D.N.** No relevant relationships. **O.F.** No relevant relationships. **P.P.A.** Clinical Study Agreement MYK-461-005: A Randomized, Double-blind, Placebo-controlled Clinical Study to Evaluate Mavacamten (MYK-461) in Adults with Symptomatic Obstructive Hypertrophic Cardiomyopathy MyoKardia, Inc.-18- PAF06025 Co-I with Effort (Principal Investigator: Sara Saberi) 06/2018-03/2022; SPIROMICS II Heart Failure Substudy SubK-NIH-DHHS-US through a consortium with Columbia University- 19- PAF02625 Co-I with Effort (Principal Investigator: Meilan K Han) 06/2023; Editor-in-chief for *Seminars in Roentgenology*; editorial board member for *Radiology: Cardiothoracic Imaging*.

References

1. Marshall M, Ferguson ID, Lewis P, et al. Symptomatic Acute Myocarditis in 7 Adolescents After Pfizer-BioNTech COVID-19 Vaccination. Pediatrics 2021;148(3):e2021052478.
2. Rosner CM, Genovese L, Tehrani BN, et al. Myocarditis Temporally Associated With COVID-19 Vaccination. Circulation 2021;144(6):502–505.
3. Mansour J, Short RG, Bhalla S, et al. Acute myocarditis after a second dose of the mRNA COVID-19 vaccine: a report of two cases. Clin Imaging 2021;78:247–249.