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Possible Association Between COVID-19 Vaccine and Myocarditis

Clinical and CMR Findings

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AS THE CORONAVIRUS DISEASE-2019 (COVID-19) OUTBREAK SPREAD ACROSS THE GLOBE, VACCINE development efforts were expedited. The U.S. Food and Drug Administration granted an emergent use authorization for 2 vaccines: the Pfizer-Bio Tech 2-dose vaccine and the Moderna 2-dose vaccine. Our knowledge regarding adverse reactions to these vaccines continues to grow. We present cardiac magnetic resonance (CMR) imaging findings in 4 cases of acute myocarditis that were temporally related to the receipt of COVID-19 vaccine and could raise the possibility of being associated with the vaccination (**Figures 1, 2, 3, 4, and 5**). CMR imaging used a specific institutional imaging protocol (see the following text) to evaluate for the presence of myocardial edema and nonischemic myocardial injury configuring the main criteria according to the updated Lake Louise criteria (1). To our knowledge, this is the largest case series to date with a comprehensive timeline description (**Figure 1**) and systematic CMR imaging evaluation of this potential adverse reaction to the COVID-19 vaccine. The fact that the 2 patients with prior COVID-19 infection developed symptoms following their first dose, and the 2 patients without prior COVID-19 infection developed symptoms following their second dose, raises interesting possibilities about a potential immune-boosting mechanism after prior immune exposure or priming.

CONCLUSIONS

It is important to note that although our small case series raises the possibility of a potential association based on the close temporal relation between a clinical and CMR picture of myocarditis and vaccination, this does not prove that the COVID-19 vaccination was the cause of myocarditis, nor does it completely exclude spontaneously occurring myocarditis in these individuals. However, documenting such findings is important given that the Centers for Disease Control and Prevention and other regulatory agencies are now actively investigating this possible adverse reaction to the Pfizer-Bio Tech and Moderna COVID-19 mRNA-based vaccines. Larger studies that vigilantly evaluate such patients using advanced imaging techniques might help clarify any possible causative association.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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